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# 1.1 perl-constant 1.33-396.el8

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License: GPL+ or Artistic

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\* /opt/ws\_local/PERMITS\_SQL/1009548089\_1591379339.64/0/perl-constant-1.33-396.el8.src.rpm-cosi-expand-archive-m15loNwe/perl-constant.spec

No license file was found, but licenses were detected in source scan.

---

abstract: 'Perl pragma to declare constants'

author:

- 'SÃ©bastien Aperghis-Tramoni <sebastien@aperghis.net>'

build\_requires:

Test::More: 0

configure\_requires:

Module::Build: 0.2808

dynamic\_config: 1

generated\_by: 'Module::Build version 0.4003, CPAN::Meta::Converter version 2.120921'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: 1.4

name: constant

provides:

constant:

file: lib/constant.pm

version: 1.27

resources:

license: <http://dev.perl.org/licenses/>



version: 1.27

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548089\_1591379339.64/0/perl-constant-1.33-396.el8.src.rpm-cosi-expand-archive-m15loNwe/constant-1.27.tar.gz-cosi-expand-archive-jvagHUVh/constant-1.27/META.yml

No license file was found, but licenses were detected in source scan.

=head1 NAME

constant - Perl pragma to declare constants

=head1 SYNOPSIS

```
use constant PI => 4 * atan2(1, 1);
use constant DEBUG => 0;

print "Pi equals ", PI, "...\\n" if DEBUG;

use constant {
    SEC => 0,
    MIN => 1,
    HOUR => 2,
    MDAY => 3,
    MON => 4,
    YEAR => 5,
    WDAY => 6,
    YDAY => 7,
    ISDST => 8,
};

use constant WEEKDAYS => qw(
    Sunday Monday Tuesday Wednesday Thursday Friday Saturday
);

print "Today is ", (WEEKDAYS)[ (localtime)[WDAY] ], ".\\n";
```

=head1 DESCRIPTION

This pragma allows you to declare constants at compile-time.

When you declare a constant such as C<PI> using the method shown above, each machine your script runs upon can have as many digits of accuracy as it can use. Also, your program will be easier to read, more likely to be maintained (and maintained correctly), and far less likely to send a space probe to the wrong planet because nobody noticed the one equation in which you wrote C<3.14195>.

When a constant is used in an expression, Perl replaces it with its

value at compile time, and may then optimize the expression further. In particular, any code in an `C<if (CONSTANT)>` block will be optimized away if the constant is false.

## =head1 NOTES

As with all `C<use>` directives, defining a constant happens at compile time. Thus, it's probably not correct to put a constant declaration inside of a conditional statement (like `C<if ($foo) { use constant ... }>`).

Constants defined using this module cannot be interpolated into strings like variables. However, concatenation works just fine:

```
print "Pi equals PI...\n";    # WRONG: does not expand "PI"
print "Pi equals ".PI."...\n"; # right
```

Even though a reference may be declared as a constant, the reference may point to data which may be changed, as this code shows.

```
use constant ARRAY => [ 1,2,3,4 ];
print ARRAY->[1];
ARRAY->[1] = " be changed";
print ARRAY->[1];
```

Dereferencing constant references incorrectly (such as using an array subscript on a constant hash reference, or vice versa) will be trapped at compile time.

Constants belong to the package they are defined in. To refer to a constant defined in another package, specify the full package name, as in `C<Some::Package::CONSTANT>`. Constants may be exported by modules, and may also be called as either class or instance methods, that is, as `C<< Some::Package->CONSTANT >>` or as `C<< $obj->CONSTANT >>` where `C<$obj>` is an instance of `C<Some::Package>`. Subclasses may define their own constants to override those in their base class.

The use of all caps for constant names is merely a convention, although it is recommended in order to make constants stand out and to help avoid collisions with other barewords, keywords, and subroutine names. Constant names must begin with a letter or underscore. Names beginning with a double underscore are reserved. Some poor choices for names will generate warnings, if warnings are enabled at compile time.

## =head2 List constants

Constants may be lists of more (or less) than one value. A constant

with no values evaluates to C<undef> in scalar context. Note that constants with more than one value do I<not> return their last value in scalar context as one might expect. They currently return the number of values, but B<this may change in the future>. Do not use constants with multiple values in scalar context.

B<NOTE:> This implies that the expression defining the value of a constant is evaluated in list context. This may produce surprises:

```
use constant TIMESTAMP => localtime;      # WRONG!
use constant TIMESTAMP => scalar localtime; # right
```

The first line above defines C<TIMESTAMP> as a 9-element list, as returned by C<localtime()> in list context. To set it to the string returned by C<localtime()> in scalar context, an explicit C<scalar> keyword is required.

List constants are lists, not arrays. To index or slice them, they must be placed in parentheses.

```
my @workdays = WEEKDAYS[1 .. 5];      # WRONG!
my @workdays = (WEEKDAYS)[1 .. 5];    # right
```

=head2 Defining multiple constants at once

Instead of writing multiple C<use constant> statements, you may define multiple constants in a single statement by giving, instead of the constant name, a reference to a hash where the keys are the names of the constants to be defined. Obviously, all constants defined using this method must have a single value.

```
use constant {
    FOO => "A single value",
    BAR => "This", "won't", "work!",    # Error!
};
```

This is a fundamental limitation of the way hashes are constructed in Perl. The error messages produced when this happens will often be quite cryptic -- in the worst case there may be none at all, and you'll only later find that something is broken.

When defining multiple constants, you cannot use the values of other constants defined in the same declaration. This is because the calling package doesn't know about any constant within that group until I<after> the C<use> statement is finished.

```
use constant {
    BITMASK => 0xAFBAEBA8,
```

```

    NEGMASK => ~BITMASK,          # Error!
};

```

=head2 Magic constants

Magical values and references can be made into constants at compile time, allowing for way cool stuff like this. (These error numbers aren't totally portable, alas.)

```

    use constant E2BIG => ($! = 7);
    print E2BIG, "\n";    # something like "Arg list too long"
    print 0+E2BIG, "\n"; # "7"

```

You can't produce a tied constant by giving a tied scalar as the value. References to tied variables, however, can be used as constants without any problems.

=head1 TECHNICAL NOTES

In the current implementation, scalar constants are actually inlinable subroutines. As of version 5.004 of Perl, the appropriate scalar constant is inserted directly in place of some subroutine calls, thereby saving the overhead of a subroutine call. See [L<perlsyn/"Constant Functions">](#) for details about how and when this happens.

In the rare case in which you need to discover at run time whether a particular constant has been declared via this module, you may use this function to examine the hash `C<%constant::declared>`. If the given constant name does not include a package name, the current package is used.

```

sub declared ($) {
    use constant 1.01;    # don't omit this!
    my $name = shift;
    $name =~ s/^\s*/main::/;
    my $pkg = caller;
    my $full_name = $name =~ /::/ ? $name : "${pkg}::$name";
    $constant::declared{$full_name};
}

```

=head1 CAVEATS

In the current version of Perl, list constants are not inlined and some symbols may be redefined without generating a warning.

It is not possible to have a subroutine or a keyword with the same name as a constant in the same package. This is probably a Good Thing.

A constant with a name in the list C<STDIN STDOUT STDERR ARGV ARGVOUT ENV INC SIG> is not allowed anywhere but in package C<main::>, for technical reasons.

Unlike constants in some languages, these cannot be overridden on the command line or via environment variables.

You can get into trouble if you use constants in a context which automatically quotes barewords (as is true for any subroutine call). For example, you can't say C<\$hash{CONSTANT}> because C<CONSTANT> will be interpreted as a string. Use C<\$hash{CONSTANT()}> or C<\$hash{+CONSTANT}> to prevent the bareword quoting mechanism from kicking in. Similarly, since the C<< => >> operator quotes a bareword immediately to its left, you have to say C<< CONSTANT() => 'value' >> (or simply use a comma in place of the big arrow) instead of C<< CONSTANT => 'value' >>.

=head1 SEE ALSO

L<Readonly> - Facility for creating read-only scalars, arrays, hashes.

L<Attribute::Constant> - Make read-only variables via attribute

L<Scalar::Readonly> - Perl extension to the C<SvREADONLY> scalar flag

L<Hash::Util> - A selection of general-utility hash subroutines (mostly to lock/unlock keys and values)

=head1 BUGS

Please report any bugs or feature requests via the perlbug(1) utility.

=head1 AUTHORS

Tom Phoenix, E<lt>F<rootbeer@redcat.com>E<gt>, with help from many other folks.

Multiple constant declarations at once added by Casey West, E<lt>F<casey@geeknest.com>E<gt>.

Documentation mostly rewritten by Ilmari Karonen, E<lt>F<perl@itz.pp.sci.fi>E<gt>.

This program is maintained by the Perl 5 Porters.

The CPAN distribution is maintained by SE<eacute>bastien Aperghis-Tramoni E<lt>F<sebastien@aperghis.net>E<gt>.

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=cut

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## NAME

constant - Perl pragma to declare constants

## DESCRIPTION

This pragma allows you to declare constants at compile-time.

When a constant is used in an expression, Perl replaces it with its value at compile time, and may then optimize the expression further.

In particular, any code in an "if (CONSTANT)" block will be optimized away if the constant is false.

## INSTALLATION

To install this module, run the following commands:

```
perl Makefile.PL
make
make test
make install
```

Alternatively, to install with Module::Build, you can use the following commands:

```
perl Build.PL
./Build
./Build test
./Build install
```

## SUPPORT AND DOCUMENTATION

After installing, you can find documentation for this module with the perldoc command.

perldoc constant

You can also look for information at:

Search CPAN

<http://search.cpan.org/dist/constant>

CPAN Request Tracker:

<http://rt.cpan.org/Dist/Display.html?Name=constant>

AnnoCPAN, annotated CPAN documentation:

<http://annocpan.org/dist/constant>

CPAN Ratings:

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## 1.5 libunistring 0.9.9 3.el8

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\* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/core/Local.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/util/StringSwitcher.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/proxy/Dispatcher.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/impl/AddDelegateTransformer.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/AbstractProcessTask.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/impl/FieldProviderTransformer.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/proxy/NoOp.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/beans/BulkBeanException.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/impl/UndeclaredThrowableTransformer.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/TransformingClassGenerator.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/impl/AddPropertyTransformer.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/ClassVisitorTee.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/MethodFilter.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/impl/UndeclaredThrowableStrategy.java  
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 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/util/ParallelSorterEmitter.java  
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 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/core/ProcessSwitchCallback.java  
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\* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/core/NamingPolicy.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/core/ClassNameReader.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/ClassTransformerFactory.java  
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 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/ClassTransformer.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/transform/ClassFilter.java  
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 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/beans/BeanGenerator.java  
 \* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/proxy/Callback.java  
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jar/net/sf/cglib/transform/ClassReaderGenerator.java  
\* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-  
jar/net/sf/cglib/core/CodeGenerationException.java  
\* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-  
jar/net/sf/cglib/transform/impl/InterceptFieldEnabled.java  
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\* /opt/cola/permits/1112466733\_1607091817.23/0/cglib-2-2-0-b21-sources-1-jar/net/sf/cglib/core/Block.java  
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jar/net/sf/cglib/core/LocalVariablesSorter.java

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\* @api private

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\* base64-arraybuffer

\* <https://github.com/niklasvh/base64-arraybuffer>

\*

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# 1.9 checkpolicy 2.9 1.el8

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# 1.15 perl-exporter 5.72 396.el8

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=head1 NAME

Exporter - Implements default import method for modules

=head1 SYNOPSIS

In module F<YourModule.pm>:

```
package YourModule;
require Exporter;
@ISA = qw(Exporter);
@EXPORT_OK = qw(munge frobnicate); # symbols to export on request
```

or

```
package YourModule;
use Exporter 'import'; # gives you Exporter's import() method directly
@EXPORT_OK = qw(munge frobnicate); # symbols to export on request
```

In other files which wish to use C<YourModule>:

```
use YourModule qw(frobnicate); # import listed symbols
frobnicate($left, $right) # calls YourModule::frobnicate
```

Take a look at L</Good Practices> for some variants you will like to use in modern Perl code.

=head1 DESCRIPTION

The Exporter module implements an C<import> method which allows a module to export functions and variables to its users' namespaces. Many modules use Exporter rather than implementing their own C<import> method because Exporter provides a highly flexible interface, with an implementation optimised for the common case.

Perl automatically calls the C<import> method when processing a C<use> statement for a module. Modules and C<use> are documented in L<perlfunc> and L<perlmod>. Understanding the concept of modules and how the C<use> statement operates is important to understanding the Exporter.

=head2 How to Export

The arrays `C<@EXPORT>` and `C<@EXPORT_OK>` in a module hold lists of symbols that are going to be exported into the users name space by default, or which they can request to be exported, respectively. The symbols can represent functions, scalars, arrays, hashes, or typeglobs. The symbols must be given by full name with the exception that the ampersand in front of a function is optional, e.g.

```
@EXPORT = qw(afunc $scalar @array); # afunc is a function
@EXPORT_OK = qw(&bfunc %hash *typeglob); # explicit prefix on &bfunc
```

If you are only exporting function names it is recommended to omit the ampersand, as the implementation is faster this way.

=head2 Selecting What to Export

Do **not** export method names!

Do **not** export anything else by default without a good reason!

Exports pollute the namespace of the module user. If you must export try to use `C<@EXPORT_OK>` in preference to `C<@EXPORT>` and avoid short or common symbol names to reduce the risk of name clashes.

Generally anything not exported is still accessible from outside the module using the `C<YourModule::item_name>` (or `C<< $blessed_ref->method >>`) syntax. By convention you can use a leading underscore on names to informally indicate that they are 'internal' and not for public use.

(It is actually possible to get private functions by saying:

```
my $subref = sub { ... };
$subref->(@args);      # Call it as a function
$obj->$subref(@args);  # Use it as a method
```

However if you use them for methods it is up to you to figure out how to make inheritance work.)

As a general rule, if the module is trying to be object oriented then export nothing. If it's just a collection of functions then `C<@EXPORT_OK>` anything but use `C<@EXPORT>` with caution. For function and method names use barewords in preference to names prefixed with ampersands for the export lists.

Other module design guidelines can be found in [L<perlmod>](#).

=head2 How to Import



In other files which wish to use your module there are three basic ways for them to load your module and import its symbols:

=over 4

=item C<use YourModule;>

This imports all the symbols from YourModule's C<@EXPORT> into the namespace of the C<use> statement.

=item C<use YourModule ();>

This causes perl to load your module but does not import any symbols.

=item C<use YourModule qw(...);>

This imports only the symbols listed by the caller into their namespace. All listed symbols must be in your C<@EXPORT> or C<@EXPORT\_OK>, else an error occurs. The advanced export features of Exporter are accessed like this, but with list entries that are syntactically distinct from symbol names.

=back

Unless you want to use its advanced features, this is probably all you need to know to use Exporter.

=head1 Advanced Features

=head2 Specialised Import Lists

If any of the entries in an import list begins with !, : or / then the list is treated as a series of specifications which either add to or delete from the list of names to import. They are processed left to right. Specifications are in the form:

```
[!]name      This name only
[:]:DEFAULT  All names in @EXPORT
[:]:tag      All names in $EXPORT_TAGS{tag} anonymous list
[!]/pattern/ All names in @EXPORT and @EXPORT_OK which match
```

A leading ! indicates that matching names should be deleted from the list of names to import. If the first specification is a deletion it is treated as though preceded by :DEFAULT. If you just want to import extra names in addition to the default set you will still need to include :DEFAULT explicitly.

e.g., F<Module.pm> defines:

```
@EXPORT    = qw(A1 A2 A3 A4 A5);
@EXPORT_OK = qw(B1 B2 B3 B4 B5);
%EXPORT_TAGS = (T1 => [qw(A1 A2 B1 B2)], T2 => [qw(A1 A2 B3 B4)]);
```

Note that you cannot use tags in @EXPORT or @EXPORT\_OK.

Names in EXPORT\_TAGS must also appear in @EXPORT or @EXPORT\_OK.

An application using Module can say something like:

```
use Module qw(:DEFAULT :T2 !B3 A3);
```

Other examples include:

```
use Socket qw(!^[AP]F_ !SOMAXCONN !SOL_SOCKET);
use POSIX qw(:errno_h :termios_h !TCSADRAIN !^EXIT/);
```

Remember that most patterns (using //) will need to be anchored with a leading ^, e.g., C</^EXIT/> rather than C</EXIT/>.

You can say C<BEGIN { \$Exporter::Verbose=1 }> to see how the specifications are being processed and what is actually being imported into modules.

## =head2 Exporting Without Using Exporter's import Method

Exporter has a special method, 'export\_to\_level' which is used in situations where you can't directly call Exporter's import method. The export\_to\_level method looks like:

```
MyPackage->export_to_level(
$where_to_export, $package, @what_to_export
);
```

where C<\$where\_to\_export> is an integer telling how far up the calling stack to export your symbols, and C<@what\_to\_export> is an array telling what symbols \*to\* export (usually this is C<@\_>). The C<\$package> argument is currently unused.

For example, suppose that you have a module, A, which already has an import function:

```
package A;

@ISA = qw(Exporter);
@EXPORT_OK = qw($b);
```

```

sub import
{
$A::b = 1; # not a very useful import method
}

```

and you want to Export symbol C<\$A::b> back to the module that called package A. Since Exporter relies on the import method to work, via inheritance, as it stands Exporter::import() will never get called.

Instead, say the following:

```

package A;
@ISA = qw(Exporter);
@EXPORT_OK = qw($b);

sub import
{
$A::b = 1;
A->export_to_level(1, @_);
}

```

This will export the symbols one level 'above' the current package - ie: to the program or module that used package A.

Note: Be careful not to modify C<@\_> at all before you call export\_to\_level - or people using your package will get very unexplained results!

## =head2 Exporting Without Inheriting from Exporter

By including Exporter in your C<@ISA> you inherit an Exporter's import() method but you also inherit several other helper methods which you probably don't want. To avoid this you can do:

```

package YourModule;
use Exporter qw(import);

```

which will export Exporter's own import() method into YourModule. Everything will work as before but you won't need to include Exporter in C<@YourModule::ISA>.

Note: This feature was introduced in version 5.57 of Exporter, released with perl 5.8.3.

## =head2 Module Version Checking

The Exporter module will convert an attempt to import a number from a module into a call to C<< \$module\_name->VERSION(\$value) >>. This can be used to validate that the version of the module being used is greater than or equal to the required version.

For historical reasons, Exporter supplies a C<require\_version> method that simply delegates to C<VERSION>. Originally, before C<UNIVERSAL::VERSION> existed, Exporter would call C<require\_version>.

Since the C<UNIVERSAL::VERSION> method treats the C<\$VERSION> number as a simple numeric value it will regard version 1.10 as lower than 1.9. For this reason it is strongly recommended that you use numbers with at least two decimal places, e.g., 1.09.

## =head2 Managing Unknown Symbols

In some situations you may want to prevent certain symbols from being exported. Typically this applies to extensions which have functions or constants that may not exist on some systems.

The names of any symbols that cannot be exported should be listed in the C<@EXPORT\_FAIL> array.

If a module attempts to import any of these symbols the Exporter will give the module an opportunity to handle the situation before generating an error. The Exporter will call an `export_fail` method with a list of the failed symbols:

```
@failed_symbols = $module_name->export_fail(@failed_symbols);
```

If the C<export\_fail> method returns an empty list then no error is recorded and all the requested symbols are exported. If the returned list is not empty then an error is generated for each symbol and the export fails. The Exporter provides a default C<export\_fail> method which simply returns the list unchanged.

Uses for the C<export\_fail> method include giving better error messages for some symbols and performing lazy architectural checks (put more symbols into C<@EXPORT\_FAIL> by default and then take them out if someone actually tries to use them and an expensive check shows that they are usable on that platform).

## =head2 Tag Handling Utility Functions

Since the symbols listed within C<%EXPORT\_TAGS> must also appear in either C<@EXPORT> or C<@EXPORT\_OK>, two utility functions are provided which allow you to easily add tagged sets of symbols to C<@EXPORT> or C<@EXPORT\_OK>:

```
%EXPORT_TAGS = (foo => [qw(aa bb cc)], bar => [qw(aa cc dd)]);
```

```
Exporter::export_tags('foo'); # add aa, bb and cc to @EXPORT
Exporter::export_ok_tags('bar'); # add aa, cc and dd to @EXPORT_OK
```

Any names which are not tags are added to C<@EXPORT> or C<@EXPORT\_OK> unchanged but will trigger a warning (with C<-w>) to avoid misspelt tags names being silently added to C<@EXPORT> or C<@EXPORT\_OK>. Future versions may make this a fatal error.

## =head2 Generating Combined Tags

If several symbol categories exist in C<%EXPORT\_TAGS>, it's usually useful to create the utility ":all" to simplify "use" statements.

The simplest way to do this is:

```
%EXPORT_TAGS = (foo => [qw(aa bb cc)], bar => [qw(aa cc dd)]);

# add all the other ":class" tags to the ":all" class,
# deleting duplicates
{
    my %seen;

    push @{$EXPORT_TAGS{all}},
        grep { !$seen{$_}++ } @{$EXPORT_TAGS{$_}} foreach keys %EXPORT_TAGS;
}
```

F<CGI.pm> creates an ":all" tag which contains some (but not really all) of its categories. That could be done with one small change:

```
# add some of the other ":class" tags to the ":all" class,
# deleting duplicates
{
    my %seen;

    push @{$EXPORT_TAGS{all}},
        grep { !$seen{$_}++ } @{$EXPORT_TAGS{$_}}
            foreach qw/html2 html3 netscape form cgi internal/;
}
```

Note that the tag names in C<%EXPORT\_TAGS> don't have the leading '!'.

## =head2 C<AUTOLOAD>ed Constants

Many modules make use of C<AUTOLOAD>ing for constant subroutines to avoid having to compile and waste memory on rarely used values (see L<perlsub> for details on constant subroutines). Calls to such constant subroutines are not optimized away at compile time because they can't be checked at compile time for constancy.

Even if a prototype is available at compile time, the body of the subroutine is not (it hasn't been C<AUTOLOAD>ed yet). perl needs to examine both the C<()> prototype and the body of a subroutine at compile time to detect that it can safely replace calls to that subroutine with the constant value.

A workaround for this is to call the constants once in a C<BEGIN> block:

```
package My ;

use Socket ;

foo( SO_LINGER ); ## SO_LINGER NOT optimized away; called at runtime
BEGIN { SO_LINGER }
foo( SO_LINGER ); ## SO_LINGER optimized away at compile time.
```

This forces the C<AUTOLOAD> for C<SO\_LINGER> to take place before SO\_LINGER is encountered later in C<My> package.

If you are writing a package that C<AUTOLOAD>s, consider forcing an C<AUTOLOAD> for any constants explicitly imported by other packages or which are usually used when your package is C<use>d.

=head1 Good Practices

=head2 Declaring C<@EXPORT\_OK> and Friends

When using C<Exporter> with the standard C<strict> and C<warnings> pragmas, the C<our> keyword is needed to declare the package variables C<@EXPORT\_OK>, C<@EXPORT>, C<@ISA>, etc.

```
our @ISA = qw(Exporter);
our @EXPORT_OK = qw(munge frobnicate);
```

If backward compatibility for Perls under 5.6 is important, one must write instead a C<use vars> statement.

```
use vars qw(@ISA @EXPORT_OK);
@ISA = qw(Exporter);
@EXPORT_OK = qw(munge frobnicate);
```

=head2 Playing Safe

There are some caveats with the use of runtime statements like C<require Exporter> and the assignment to package variables, which can be very subtle for the unaware programmer.

This may happen for instance with mutually recursive modules, which are affected by the time the relevant

constructions are executed.

The ideal (but a bit ugly) way to never have to think about that is to use C<BEGIN> blocks. So the first part of the L</SYNOPSIS> code could be rewritten as:

```
package YourModule;

use strict;
use warnings;

our (@ISA, @EXPORT_OK);
BEGIN {
    require Exporter;
    @ISA = qw(Exporter);
    @EXPORT_OK = qw(munge frobnicate); # symbols to export on request
}
```

The C<BEGIN> will assure that the loading of F<Exporter.pm> and the assignments to C<@ISA> and C<@EXPORT\_OK> happen immediately, leaving no room for something to get awry or just plain wrong.

With respect to loading C<Exporter> and inheriting, there are alternatives with the use of modules like C<base> and C<parent>.

```
use base qw(Exporter);
# or
use parent qw(Exporter);
```

Any of these statements are nice replacements for C<BEGIN { require Exporter; @ISA = qw(Exporter); }> with the same compile-time effect. The basic difference is that C<base> code interacts with declared C<fields> while C<parent> is a streamlined version of the older C<base> code to just establish the IS-A relationship.

For more details, see the documentation and code of L<base> and L<parent>.

Another thorough remedy to that runtime vs. compile-time trap is to use L<Exporter::Easy>, which is a wrapper of Exporter that allows all boilerplate code at a single gulp in the use statement.

```
use Exporter::Easy (
    OK => [ qw(munge frobnicate) ],
```

```
);  
# @ISA setup is automatic  
# all assignments happen at compile time
```

=head2 What Not to Export

You have been warned already in L</Selecting What to Export>  
to not export:

=over 4

=item \*

method names (because you don't need to  
and that's likely to not do what you want),

=item \*

anything by default (because you don't want to surprise your users...  
badly)

=item \*

anything you don't need to (because less is more)

=back

There's one more item to add to this list. Do B<not>  
export variable names. Just because C<Exporter> lets you  
do that, it does not mean you should.

```
@EXPORT_OK = qw($svar @avar %hvar); # DON'T!
```

Exporting variables is not a good idea. They can  
change under the hood, provoking horrible  
effects at-a-distance that are too hard to track  
and to fix. Trust me: they are not worth it.

To provide the capability to set/get class-wide  
settings, it is best instead to provide accessors  
as subroutines or class methods instead.

=head1 SEE ALSO

C<Exporter> is definitely not the only module with  
symbol exporter capabilities. At CPAN, you may find  
a bunch of them. Some are lighter. Some  
provide improved APIs and features. Pick the one



that fits your needs. The following is a sample list of such modules.

```
Exporter::Easy
Exporter::Lite
Exporter::Renaming
Exporter::Tidy
Sub::Exporter / Sub::Installer
Perl6::Export / Perl6::Export::Attrs
```

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=cut

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1014324299_1591897088.49/0/perl-Exporter-5.72-396.el8.src.rpm-cosi-expand-
archive-xuMh3qh9/Exporter-5.70.tar.gz-cosi-expand-archive-clD9ejdT/Exporter-5.70/lib/Exporter.pm
```

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Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1014324299_1591897088.49/0/perl-Exporter-5.72-396.el8.src.rpm-cosi-expand-
archive-xuMh3qh9/Exporter-5.70.tar.gz-cosi-expand-archive-clD9ejdT/Exporter-5.70/README
```

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---

abstract: 'Implements default import method for modules'

author:

- unknown

build\_requires:

ExtUtils::MakeMaker: 0

configure\_requires:

ExtUtils::MakeMaker: 0

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 6.68, CPAN::Meta::Converter version 2.120921'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: 1.4

name: Exporter

no\_index:

directory:

- t

- inc  
recommends:  
Test::Pod: 1.18  
Test::Pod::Coverage: 1.04  
requires:  
Carp: 1.05  
resources:  
bugtracker: <http://rt.perl.org/perlbug/>  
license: <http://dev.perl.org/licenses/>  
repository: [http://perl5.git.perl.org/perl.git/tree/HEAD:/lib\\_x\\_MailingList](http://perl5.git.perl.org/perl.git/tree/HEAD:/lib_x_MailingList): <http://lists.perl.org/list/perl5-porters.html>  
version: 5.70

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1014324299\_1591897088.49/0/perl-Exporter-5.72-396.el8.src.rpm-cosi-expand-archive-xuMh3qh9/Exporter-5.70.tar.gz-cosi-expand-archive-clD9ejdT/Exporter-5.70/META.yml

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\* /opt/ws\_local/PERMITS\_SQL/1014324299\_1591897088.49/0/perl-Exporter-5.72-396.el8.src.rpm-cosi-expand-archive-xuMh3qh9/perl-Exporter.spec

## 1.16 sshpass 1.09

### 1.16.1 Available under license :

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```

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`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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## 1.17 jcl-over-slf4j 1.7.30

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Found in path(s):

- \* /opt/cola/permits/1135880174\_1613624046.95/0/jcl-over-slf4j-1-7-30-sources-1-jar/org/apache/commons/logging/LogFactory.java
- \* /opt/cola/permits/1135880174\_1613624046.95/0/jcl-over-slf4j-1-7-30-sources-1-jar/org/apache/commons/logging/impl/SLF4JLogFactory.java
- \* /opt/cola/permits/1135880174\_1613624046.95/0/jcl-over-slf4j-1-7-30-sources-1-jar/org/apache/commons/logging/LogConfigurationException.java
- \* /opt/cola/permits/1135880174\_1613624046.95/0/jcl-over-slf4j-1-7-30-sources-1-jar/org/apache/commons/logging/Log.java
- \* /opt/cola/permits/1135880174\_1613624046.95/0/jcl-over-slf4j-1-7-30-sources-1-jar/org/apache/commons/logging/impl/SimpleLog.java
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- \* /opt/cola/permits/1135880174\_1613624046.95/0/jcl-over-slf4j-1-7-30-sources-1-jar/org/apache/commons/logging/impl/SLF4JLog.java

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## 1.21 libassuan 2.5.1 3.el8

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@c Local Variables:  
@c ispell-local-pdict: "ispell-dict"  
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## 1.25 file-system 3.8-6.el8

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\* /opt/cola/permits/1253115708\_1642020634.47/0/filesystem-3.8-6.el8.src.rpm-cosi-expand-archive-hfVt6mML/filesystem.spec

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src/test/org/apache/commons/codec/language/DoubleMetaphoneTest.java

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## 1.27 libusb 1.0.23 4.el8

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## 1.28 netty-transport-native-epoll 4.1.35.Final

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* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-  
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\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/Epoll.java  
\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/EpollServerSocketChannel.java  
\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/EpollDatagramChannel.java  
\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/EpollEventLoopGroup.java  
\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/EpollSocketChannel.java  
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\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/EpollEventLoop.java  
\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/NativeDatagramPacketArray.java  
\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/AbstractEpollChannel.java

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\* /opt/cola/permits/1381525585\_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-jar/io/netty/channel/epoll/LinuxSocket.java

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/\*\*

\* Set the {@code TCP\_MD5SIG} option on the socket. See {@code linux/tcp.h} for more details.

\* Keys can only be set on, not read to prevent a potential leak, as they are confidential.

\* Allowing them being read would mean anyone with access to the channel could get them.

\*/

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jar/io/netty/channel/epoll/EpollServerSocketChannelConfig.java  
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jar/io/netty/channel/epoll/EpollMode.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/EpollEventArray.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/EpollRecvByteAllocatorHandle.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/AbstractEpollStreamChannel.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/EpollRecvByteAllocatorStreamingHandle.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/EpollChannelConfig.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/AbstractEpollServerChannel.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/EpollServerDomainSocketChannel.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/EpollServerChannelConfig.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/TcpMd5Util.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
jar/io/netty/channel/epoll/EpollDomainSocketChannel.java
* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
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/**
 * Set the { @code TCP_MD5SIG } option on the socket. See { @code linux/tcp.h } for more details.
 * Keys can only be set on, not read to prevent a potential leak, as they are confidential.
 * Allowing them being read would mean anyone with access to the channel could get them.
 */
/**
 * Set the { @code TCP_QUICKACK } option on the socket. See <a
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 */

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* /opt/cola/permits/1381525585_1659660564.485279/0/netty-transport-native-epoll-4-1-35-final-sources-2-
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# 1.29 crypto-policies 20211116-

## 1.gitae470d6.el8

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## 1.30 libgcrypt 1.8.5-7.el8\_6

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## 1.32 hk2-utils 2.2.0-b21

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## 1.33 libxfixes 5.0.3 7.e18

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## 1.34 perl-mime-base64 3.15 396.el8

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This package contains a base64 encoder/decoder and a quoted-printable encoder/decoder. These encoding methods are specified in RFC 2045 - MIME (Multipurpose Internet Mail Extensions).

The base64 encoding is designed to represent arbitrary sequences of octets in a form that need not be humanly readable. A 65-character subset ([A-Za-z0-9+/=]) of US-ASCII is used, enabling 6 bits to be represented per printable character.

The quoted-printable encoding is intended to represent data that largely consists of bytes that correspond to printable characters in the ASCII character set. Each non-printable character is represented by a triplet consisting of the character "=" followed by two hexadecimal digits.

In order to install and use this package you will need Perl version 5.6 or better. Installation as usual:

```
perl Makefile.PL
make
make test
make install
```

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Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1018810387_1591379702.59/0/perl-MIME-Base64-3.15-396.el8.src.rpm-cosi-expand-archive-0eqZ8FH8/MIME-Base64-3.15.tar.gz-cosi-expand-archive-Y9WxESAM/MIME-Base64-3.15/README
```

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---

abstract: 'The RFC 2045 encodings; base64 and quoted-printable'

author:

- 'Gisle Aas <gisle@activestate.com>'

build\_requires:

ExtUtils::MakeMaker: 0

configure\_requires:

ExtUtils::MakeMaker: 0

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 6.66, CPAN::Meta::Converter version 2.133380'

license: perl

meta-spec:  
url: <http://module-build.sourceforge.net/META-spec-v1.4.html>  
version: 1.4  
name: MIME-Base64  
no\_index:  
directory:  
- t  
- inc  
requires:  
XSLoader: 0  
perl: 5.004  
resources:  
repository: <https://github.com/gisle/mime-base64>  
version: 3.15

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1018810387\_1591379702.59/0/perl-MIME-Base64-3.15-396.el8.src.rpm-cosi-expand-archive-0eqZ8FH8/MIME-Base64-3.15.tar.gz-cosi-expand-archive-Y9WxESAM/MIME-Base64-3.15/META.yml

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=head1 NAME

MIME::Base64 - Encoding and decoding of base64 strings

=head1 SYNOPSIS

use MIME::Base64;

```
$encoded = encode_base64('Aladdin:open sesame');  
$decoded = decode_base64($encoded);
```

=head1 DESCRIPTION

This module provides functions to encode and decode strings into and from the base64 encoding specified in RFC 2045 - I<MIME (Multipurpose Internet Mail Extensions)>. The base64 encoding is designed to represent arbitrary sequences of octets in a form that need not be humanly readable. A 65-character subset ([A-Za-z0-9+/=]) of US-ASCII is used, enabling 6 bits to be represented per printable character.

The following primary functions are provided:

=over 4

=item encode\_base64( \$bytes )

=item encode\_base64( \$bytes, \$eol );

Encode data by calling the `encode_base64()` function. The first argument is the byte string to encode. The second argument is the line-ending sequence to use. It is optional and defaults to `"\n"`. The returned encoded string is broken into lines of no more than 76 characters each and it will end with `$eol` unless it is empty. Pass an empty string as second argument if you do not want the encoded string to be broken into lines.

The function will croak with "Wide character in subroutine entry" if `$bytes` contains characters with code above 255. The base64 encoding is only defined for single-byte characters. Use the `Encode` module to select the byte encoding you want.

```
=item decode_base64( $str )
```

Decode a base64 string by calling the `decode_base64()` function. This function takes a single argument which is the string to decode and returns the decoded data.

Any character not part of the 65-character base64 subset is silently ignored. Characters occurring after a '=' padding character are never decoded.

```
=back
```

If you prefer not to import these routines into your namespace, you can call them as:

```
use MIME::Base64 ();
$encoded = MIME::Base64::encode($decoded);
$decoded = MIME::Base64::decode($encoded);
```

Additional functions not exported by default:

```
=over 4
```

```
=item encode_base64url( $bytes )
```

```
=item decode_base64url( $str )
```

Encode and decode according to the base64 scheme for "URL applications" [1]. This is a variant of the base64 encoding which does not use padding, does not break the string into multiple lines and use the characters "-" and "\_" instead of "+" and "/" to avoid using reserved URL characters.

```
=item encoded_base64_length( $bytes )
```



```
=item encode_base64_length( $bytes, $eol )
```

Returns the length that the encoded string would have without actually encoding it. This will return the same value as `C<< length(encode_base64($bytes)) >>`, but should be more efficient.

```
=item decode_base64_length( $str )
```

Returns the length that the decoded string would have without actually decoding it. This will return the same value as `C<< length(decode_base64($str)) >>`, but should be more efficient.

```
=back
```

```
=head1 EXAMPLES
```

If you want to encode a large file, you should encode it in chunks that are a multiple of 57 bytes. This ensures that the base64 lines line up and that you do not end up with padding in the middle. 57 bytes of data fills one complete base64 line ( $76 == 57 * 4/3$ ):

```
use MIME::Base64 qw(encode_base64);

open(FILE, "/var/log/wtmp") or die "$!";
while (read(FILE, $buf, 60*57)) {
    print encode_base64($buf);
}
```

or if you know you have enough memory

```
use MIME::Base64 qw(encode_base64);
local($/) = undef; # slurp
print encode_base64(<STDIN>);
```

The same approach as a command line:

```
perl -MMIME::Base64 -0777 -ne 'print encode_base64($_)' <file
```

Decoding does not need slurp mode if every line contains a multiple of four base64 chars:

```
perl -MMIME::Base64 -ne 'print decode_base64($_)' <file
```

Perl v5.8 and better allow extended Unicode characters in strings. Such strings cannot be encoded directly, as the base64 encoding is only defined for single-byte characters. The solution is to use the Encode module to select the byte encoding you want. For example:

```
use MIME::Base64 qw(encode_base64);
use Encode qw(encode);

$encoded = encode_base64(encode("UTF-8", "\x{FFFF}\n"));
print $encoded;
```

## =head1 COPYRIGHT

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Distantly based on LWP::Base64 written by Martijn Koster <m.koster@nexor.co.uk> and Joerg Reichelt <j.reichelt@nexor.co.uk> and code posted to comp.lang.perl <3pd2lp\$6gf@wsinti07.win.tue.nl> by Hans Mulder <hansm@wsinti07.win.tue.nl>

The XS implementation uses code from metamail. Copyright 1991 Bell Communications Research, Inc. (Bellcore)

## =head1 SEE ALSO

L<MIME::QuotedPrint>

[1] L<[http://en.wikipedia.org/wiki/Base64#URL\\_applications](http://en.wikipedia.org/wiki/Base64#URL_applications)>

=cut

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1018810387_1591379702.59/0/perl-MIME-Base64-3.15-396.el8.src.rpm-cosi-expand-archive-0eqZ8FH8/MIME-Base64-3.15.tar.gz-cosi-expand-archive-Y9WxESAM/MIME-Base64-3.15/Base64.pm
```

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Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1018810387_1591379702.59/0/perl-MIME-Base64-3.15-396.el8.src.rpm-cosi-expand-archive-0eqZ8FH8/perl-MIME-Base64.spec
```

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## =head1 NAME

MIME::QuotedPrint - Encoding and decoding of quoted-printable strings

## =head1 SYNOPSIS

```
use MIME::QuotedPrint;
```

```
$encoded = encode_qp($decoded);
```

```
$decoded = decode_qp($encoded);
```

```
=head1 DESCRIPTION
```

This module provides functions to encode and decode strings into and from the quoted-printable encoding specified in RFC 2045 - I<MIME (Multipurpose Internet Mail Extensions)>. The quoted-printable encoding is intended to represent data that largely consists of bytes that correspond to printable characters in the ASCII character set. Each non-printable character (as defined by English Americans) is represented by a triplet consisting of the character "=" followed by two hexadecimal digits.

The following functions are provided:

```
=over 4
```

```
=item encode_qp( $str)
```

```
=item encode_qp( $str, $eol)
```

```
=item encode_qp( $str, $eol, $binmode )
```

This function returns an encoded version of the string (\$str) given as argument.

The second argument (\$eol) is the line-ending sequence to use. It is optional and defaults to "\n". Every occurrence of "\n" is replaced with this string, and it is also used for additional "soft line breaks" to ensure that no line end up longer than 76 characters. Pass it as "\015\012" to produce data suitable for external consumption. The string "\r\n" produces the same result on many platforms, but not all.

The third argument (\$binmode) will select binary mode if passed as a TRUE value. In binary mode "\n" will be encoded in the same way as any other non-printable character. This ensures that a decoder will end up with exactly the same string whatever line ending sequence it uses. In general it is preferable to use the base64 encoding for binary data; see L<MIME::Base64>.

An \$eol of "" (the empty string) is special. In this case, no "soft line breaks" are introduced and binary mode is effectively enabled so that any "\n" in the original data is encoded as well.

```
=item decode_qp( $str )
```

This function returns the plain text version of the string given as argument. The lines of the result are "\n" terminated, even if the \$str argument contains "\r\n" terminated lines.

```
=back
```

If you prefer not to import these routines into your namespace, you can call them as:

```
use MIME::QuotedPrint ();
$encoded = MIME::QuotedPrint::encode($decoded);
$decoded = MIME::QuotedPrint::decode($encoded);
```

Perl v5.8 and better allow extended Unicode characters in strings. Such strings cannot be encoded directly, as the quoted-printable encoding is only defined for single-byte characters. The solution is to use the Encode module to select the byte encoding you want. For example:

```
use MIME::QuotedPrint qw(encode_qp);
use Encode qw(encode);

$encoded = encode_qp(encode("UTF-8", "\x{FFFF}\n"));
print $encoded;
```

```
=head1 COPYRIGHT
```

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```
=head1 SEE ALSO
```

L<MIME::Base64>

```
=cut
```

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1018810387_1591379702.59/0/perl-MIME-Base64-3.15-396.el8.src.rpm-cosi-expand-archive-0eqZ8FH8/MIME-Base64-3.15.tar.gz-cosi-expand-archive-Y9WxESAM/MIME-Base64-3.15/QuotedPrint.pm
```

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/\*

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The tables and some of the code that used to be here was borrowed from metamail, which comes with this message:

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## 1.35 argparse 1.4.0

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#### A. HISTORY OF THE SOFTWARE

=====

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

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0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2.1	2.2	2002	PSF	yes
2.2.2	2.2.1	2002	PSF	yes
2.2.3	2.2.2	2003	PSF	yes
2.3	2.2.2	2002-2003	PSF	yes
2.3.1	2.3	2002-2003	PSF	yes
2.3.2	2.3.1	2002-2003	PSF	yes
2.3.3	2.3.2	2002-2003	PSF	yes
2.3.4	2.3.3	2004	PSF	yes
2.3.5	2.3.4	2005	PSF	yes
2.4	2.3	2004	PSF	yes
2.4.1	2.4	2005	PSF	yes
2.4.2	2.4.1	2005	PSF	yes
2.4.3	2.4.2	2006	PSF	yes
2.4.4	2.4.3	2006	PSF	yes
2.5	2.4	2006	PSF	yes
2.5.1	2.5	2007	PSF	yes
2.5.2	2.5.1	2008	PSF	yes
2.5.3	2.5.2	2008	PSF	yes
2.6	2.5	2008	PSF	yes
2.6.1	2.6	2008	PSF	yes

2.6.2	2.6.1	2009	PSF	yes
2.6.3	2.6.2	2009	PSF	yes
2.6.4	2.6.3	2009	PSF	yes
2.6.5	2.6.4	2010	PSF	yes
2.7	2.6	2010	PSF	yes

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```

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```

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```
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`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
```

```
Ty Coon, President of Vice
```

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## 1.39 webencodings 0.5.1

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```
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```

Found in path(s):

```
* /opt/cola/permits/1401468445_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/labels.py
```

```
* /opt/cola/permits/1401468445_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/__init__.py
```

```
* /opt/cola/permits/1401468445_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/tests.py
```

```
* /opt/cola/permits/1401468445_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/x_user_defined.py
```

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```
from setuptools import setup, find_packages
import io
from os import path
import re
```

```

VERSION = re.search("VERSION = '([^\s]+)'", io.open(
    path.join(path.dirname(__file__), 'webencodings', '__init__.py'),
    encoding='utf-8'
).read().strip()).group(1)

LONG_DESCRIPTION = io.open(
    path.join(path.dirname(__file__), 'README.rst'),
    encoding='utf-8'
).read()

setup(
    name='webencodings',
    version=VERSION,
    url='https://github.com/SimonSapin/python-webencodings',
    license='BSD',
    author='Simon Sapin',
    author_email='simon.sapin@exyr.org',
    maintainer='Geoffrey Sneddon',
    maintainer_email='me@gsnedders.com',
    description='Character encoding aliases for legacy web content',
    long_description=LONG_DESCRIPTION,
    classifiers=[
        'Development Status :: 4 - Beta',
        'Intended Audience :: Developers',
        'License :: OSI Approved :: BSD License',
        'Programming Language :: Python',
        'Programming Language :: Python :: 2',
        'Programming Language :: Python :: 2.6',
        'Programming Language :: Python :: 2.7',
        'Programming Language :: Python :: 3',
        'Programming Language :: Python :: 3.3',
        'Programming Language :: Python :: 3.4',
        'Programming Language :: Python :: 3.5',
        'Programming Language :: Python :: 3.6',
        'Programming Language :: Python :: Implementation :: CPython',
        'Programming Language :: Python :: Implementation :: PyPy',
        'Topic :: Internet :: WWW/HTTP',
    ],
    packages=find_packages(),
)

```

Found in path(s):

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/setup.py

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Metadata-Version: 1.1

Name: webencodings

Version: 0.5.1

Summary: Character encoding aliases for legacy web content

Home-page: <https://github.com/SimonSapin/python-webencodings>

Author: Geoffrey Sneddon

Author-email: [me@gsnedders.com](mailto:me@gsnedders.com)

License: BSD

Description: python-webencodings

=====

This is a Python implementation of the `WHATWG Encoding standard`  
<<http://encoding.spec.whatwg.org/>>`\_.

\* Latest documentation: <http://packages.python.org/webencodings/>

\* Source code and issue tracker:

<https://github.com/gsnedders/python-webencodings>

\* PyPI releases: <http://pypi.python.org/pypi/webencodings>

\* License: BSD

\* Python 2.6+ and 3.3+

In order to be compatible with legacy web content

when interpreting something like ``Content-Type: text/html; charset=latin1``,

tools need to use a particular set of aliases for encoding labels

as well as some overriding rules.

For example, ``US-ASCII`` and ``iso-8859-1`` on the web are actually

aliases for ``windows-1252``, and an UTF-8 or UTF-16 BOM takes precedence

over any other encoding declaration.

The Encoding standard defines all such details so that implementations do

not have to reverse-engineer each other.

This module has encoding labels and BOM detection,

but the actual implementation for encoders and decoders is Python's.

Platform: UNKNOWN

Classifier: Development Status :: 4 - Beta

Classifier: Intended Audience :: Developers

Classifier: License :: OSI Approved :: BSD License

Classifier: Programming Language :: Python

Classifier: Programming Language :: Python :: 2

Classifier: Programming Language :: Python :: 2.6

Classifier: Programming Language :: Python :: 2.7

Classifier: Programming Language :: Python :: 3

Classifier: Programming Language :: Python :: 3.3

Classifier: Programming Language :: Python :: 3.4

Classifier: Programming Language :: Python :: 3.5

Classifier: Programming Language :: Python :: 3.6

Classifier: Programming Language :: Python :: Implementation :: CPython

Classifier: Programming Language :: Python :: Implementation :: PyPy

Classifier: Topic :: Internet :: WWW/HTTP

Found in path(s):

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings.egg-info/PKG-INFO

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/PKG-INFO

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"""

webencodings.mklabels

~~~~~

Regenerate the webencodings.labels module.

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"""

```
import json
```

```
try:
```

```
    from urllib import urlopen
```

```
except ImportError:
```

```
    from urllib.request import urlopen
```

```
def assert_lower(string):
```

```
    assert string == string.lower()
```

```
    return string
```

```
def generate(url):
```

```
    parts = ["\
```

```
"""
```

webencodings.labels

~~~~~

Map encoding labels to their name.

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"""

```
# XXX Do not edit!
```

# This file is automatically generated by mklabels.py

```
LABELS = {
    ""
    labels = [
        (repr(assert_lower(label)).lstrip('u'),
         repr(encoding['name']).lstrip('u'))
        for category in json.loads(urlopen(url).read().decode('ascii'))
        for encoding in category['encodings']
        for label in encoding['labels']]
    max_len = max(len(label) for label, name in labels)
    parts.extend(
        ' %s:%s %s,\n' % (label, ' ' * (max_len - len(label)), name)
        for label, name in labels)
    parts.append('}')
    return ".join(parts)
```

```
if __name__ == '__main__':
    print(generate('http://encoding.spec.whatwg.org/encodings.json'))
```

Found in path(s):

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/webencodings/mklabels.py

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python-webencodings

=====

This is a Python implementation of the `WHATWG Encoding standard`  
<<http://encoding.spec.whatwg.org/>>` \_.

- \* Latest documentation: <http://packages.python.org/webencodings/>
- \* Source code and issue tracker:  
<https://github.com/gsnedders/python-webencodings>
- \* PyPI releases: <http://pypi.python.org/pypi/webencodings>
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In order to be compatible with legacy web content

when interpreting something like ``Content-Type: text/html; charset=latin1``, tools need to use a particular set of aliases for encoding labels as well as some overriding rules.

For example, ``US-ASCII`` and ``iso-8859-1`` on the web are actually aliases for ``windows-1252``, and an UTF-8 or UTF-16 BOM takes precedence over any other encoding declaration.

The Encoding standard defines all such details so that implementations do not have to reverse-engineer each other.

This module has encoding labels and BOM detection,  
but the actual implementation for encoders and decoders is Python's.

Found in path(s):

\* /opt/cola/permits/1401468445\_1661617535.3616152/0/webencodings-0-5-1-1-tar-gz/webencodings-0.5.1/README.rst

## 1.40 jersey 2.5.1

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## 1.52 Icms 1.19

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## 1.54 go-dockerclient 1.4.1

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*
* "Hand any two wizards a piece of rope and they would instinctively pull in
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*/
```

Found in path(s):

```
*/opt/ws_local/PERMITS_SQL/1009548094_1591901909.08/0/perl-threads-shared-1.58-2.el8.src.rpm-cosi-expand-archive-r04CR9IQ/threads-shared-1.58.tar.gz-cosi-expand-archive-XH2RZBES/threads-shared-1.58/shared.xs
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```
/*
```

-----

```
ppport.h -- Perl/Pollution/Portability Version 3.19
```

Automatically created by Devel::PPPort running under perl 5.010000.

Do NOT edit this file directly! -- Edit PPPort\_pm.PL and the includes in parts/inc/ instead.

Use 'perldoc ppport.h' to view the documentation below.

-----

SKIP

=pod

=head1 NAME

ppport.h - Perl/Pollution/Portability version 3.19

=head1 SYNOPSIS

perl ppport.h [options] [source files]

Searches current directory for files if no [source files] are given

--help            show short help

--version        show version

--patch=file     write one patch file with changes

--copy=suffix    write changed copies with suffix

--diff=program   use diff program and options

--compat-version=version provide compatibility with Perl version

--cplusplus     accept C++ comments

--quiet          don't output anything except fatal errors

--nodiag        don't show diagnostics

--nohints       don't show hints

--nochanges     don't suggest changes

--nofilter      don't filter input files

--strip         strip all script and doc functionality from  
ppport.h

--list-provided    list provided API

--list-unsupported list unsupported API

--api-info=name    show Perl API portability information

=head1 COMPATIBILITY

This version of F<ppport.h> is designed to support operation with Perl installations back to 5.003, and has been tested up to 5.10.0.

=head1 OPTIONS

=head2 --help

Display a brief usage summary.

=head2 --version

Display the version of F<ppport.h>.

=head2 --patch=I<file>

If this option is given, a single patch file will be created if any changes are suggested. This requires a working diff program to be installed on your system.

=head2 --copy=I<suffix>

If this option is given, a copy of each file will be saved with the given suffix that contains the suggested changes. This does not require any external programs. Note that this does not automagically add a dot between the original filename and the suffix. If you want the dot, you have to include it in the option argument.

If neither C<--patch> or C<--copy> are given, the default is to simply print the diffs for each file. This requires either C<Text::Diff> or a C<diff> program to be installed.

=head2 --diff=I<program>

Manually set the diff program and options to use. The default is to use C<Text::Diff>, when installed, and output unified context diffs.

=head2 --compat-version=I<version>

Tell F<ppport.h> to check for compatibility with the given Perl version. The default is to check for compatibility with Perl version 5.003. You can use this option to reduce the output of F<ppport.h> if you intend to be backward compatible only down to a certain Perl version.

=head2 --cplusplus



Usually, `F<ppport.h>` will detect C++ style comments and replace them with C style comments for portability reasons. Using this option instructs `F<ppport.h>` to leave C++ comments untouched.

`=head2 --quiet`

Be quiet. Don't print anything except fatal errors.

`=head2 --nodiag`

Don't output any diagnostic messages. Only portability alerts will be printed.

`=head2 --nohints`

Don't output any hints. Hints often contain useful portability notes. Warnings will still be displayed.

`=head2 --nochanges`

Don't suggest any changes. Only give diagnostic output and hints unless these are also deactivated.

`=head2 --nofilter`

Don't filter the list of input files. By default, files not looking like source code (i.e. not `*.xs`, `*.c`, `*.cc`, `*.cpp` or `*.h`) are skipped.

`=head2 --strip`

Strip all script and documentation functionality from `F<ppport.h>`. This reduces the size of `F<ppport.h>` dramatically and may be useful if you want to include `F<ppport.h>` in smaller modules without increasing their distribution size too much.

The stripped `F<ppport.h>` will have a `C<--unstrip>` option that allows you to undo the stripping, but only if an appropriate `C<Devel::PPPport>` module is installed.

`=head2 --list-provided`

Lists the API elements for which compatibility is provided by `F<ppport.h>`. Also lists if it must be explicitly requested, if it has dependencies, and if there are hints or warnings for it.

`=head2 --list-unsupported`

Lists the API elements that are known not to be supported by F<ppport.h> and below which version of Perl they probably won't be available or work.

```
=head2 --api-info=I<name>
```

Show portability information for API elements matching I<name>. If I<name> is surrounded by slashes, it is interpreted as a regular expression.

```
=head1 DESCRIPTION
```

In order for a Perl extension (XS) module to be as portable as possible across differing versions of Perl itself, certain steps need to be taken.

```
=over 4
```

```
=item *
```

Including this header is the first major one. This alone will give you access to a large part of the Perl API that hasn't been available in earlier Perl releases. Use

```
perl ppport.h --list-provided
```

to see which API elements are provided by ppport.h.

```
=item *
```

You should avoid using deprecated parts of the API. For example, using global Perl variables without the C<PL\_> prefix is deprecated. Also, some API functions used to have a C<perl\_> prefix. Using this form is also deprecated. You can safely use the supported API, as F<ppport.h> will provide wrappers for older Perl versions.

```
=item *
```

If you use one of a few functions or variables that were not present in earlier versions of Perl, and that can't be provided using a macro, you have to explicitly request support for these functions by adding one or more C<#define>s in your source code before the inclusion of F<ppport.h>.

These functions or variables will be marked C<explicit> in the list shown by C<--list-provided>.

Depending on whether you module has a single or multiple files that use such functions or variables, you want either C<static> or global

variants.

For a C<static> function or variable (used only in a single source file), use:

```
#define NEED_function
#define NEED_variable
```

For a global function or variable (used in multiple source files), use:

```
#define NEED_function_GLOBAL
#define NEED_variable_GLOBAL
```

Note that you mustn't have more than one global request for the same function or variable in your project.

Function / Variable	Static Request	Global Request
PL_parser	NEED_PL_parser	NEED_PL_parser_GLOBAL
PL_signals	NEED_PL_signals	NEED_PL_signals_GLOBAL
eval_pv()	NEED_eval_pv	NEED_eval_pv_GLOBAL
grok_bin()	NEED_grok_bin	NEED_grok_bin_GLOBAL
grok_hex()	NEED_grok_hex	NEED_grok_hex_GLOBAL
grok_number()	NEED_grok_number	NEED_grok_number_GLOBAL
grok_numeric_radix()	NEED_grok_numeric_radix	NEED_grok_numeric_radix_GLOBAL
grok_oct()	NEED_grok_oct	NEED_grok_oct_GLOBAL
load_module()	NEED_load_module	NEED_load_module_GLOBAL
my_snprintf()	NEED_my_snprintf	NEED_my_snprintf_GLOBAL
my_sprintf()	NEED_my_sprintf	NEED_my_sprintf_GLOBAL
my_strlcat()	NEED_my_strlcat	NEED_my_strlcat_GLOBAL
my_strlcpy()	NEED_my_strlcpy	NEED_my_strlcpy_GLOBAL
newCONSTSUB()	NEED_newCONSTSUB	NEED_newCONSTSUB_GLOBAL
newRV_noinc()	NEED_newRV_noinc	NEED_newRV_noinc_GLOBAL
newSV_type()	NEED_newSV_type	NEED_newSV_type_GLOBAL
newSVpv_flags()	NEED_newSVpv_flags	NEED_newSVpv_flags_GLOBAL
newSVpv_share()	NEED_newSVpv_share	NEED_newSVpv_share_GLOBAL
pv_display()	NEED_pv_display	NEED_pv_display_GLOBAL
pv_escape()	NEED_pv_escape	NEED_pv_escape_GLOBAL
pv_pretty()	NEED_pv_pretty	NEED_pv_pretty_GLOBAL
sv_2pv_flags()	NEED_sv_2pv_flags	NEED_sv_2pv_flags_GLOBAL
sv_2pvbyte()	NEED_sv_2pvbyte	NEED_sv_2pvbyte_GLOBAL
sv_catpvf_mg()	NEED_sv_catpvf_mg	NEED_sv_catpvf_mg_GLOBAL
sv_catpvf_mg_nocontext()	NEED_sv_catpvf_mg_nocontext	NEED_sv_catpvf_mg_nocontext_GLOBAL
sv_pvn_force_flags()	NEED_sv_pvn_force_flags	NEED_sv_pvn_force_flags_GLOBAL
sv_setpvf_mg()	NEED_sv_setpvf_mg	NEED_sv_setpvf_mg_GLOBAL
sv_setpvf_mg_nocontext()	NEED_sv_setpvf_mg_nocontext	NEED_sv_setpvf_mg_nocontext_GLOBAL
vload_module()	NEED_vload_module	NEED_vload_module_GLOBAL

```
vnewSVpvf()      NEED_vnewSVpvf      NEED_vnewSVpvf_GLOBAL
warner()         NEED_warner      NEED_warner_GLOBAL
```

To avoid namespace conflicts, you can change the namespace of the explicitly exported functions / variables using the C<DPPP\_NAMESPACE> macro. Just C<#define> the macro before including C<ppport.h>:

```
#define DPPP_NAMESPACE MyOwnNamespace_
#include "ppport.h"
```

The default namespace is C<DPPP\_>.

=back

The good thing is that most of the above can be checked by running F<ppport.h> on your source code. See the next section for details.

=head1 EXAMPLES

To verify whether F<ppport.h> is needed for your module, whether you should make any changes to your code, and whether any special defines should be used, F<ppport.h> can be run as a Perl script to check your source code. Simply say:

```
perl ppport.h
```

The result will usually be a list of patches suggesting changes that should at least be acceptable, if not necessarily the most efficient solution, or a fix for all possible problems.

If you know that your XS module uses features only available in newer Perl releases, if you're aware that it uses C++ comments, and if you want all suggestions as a single patch file, you could use something like this:

```
perl ppport.h --compat-version=5.6.0 --cplusplus --patch=test.diff
```

If you only want your code to be scanned without any suggestions for changes, use:

```
perl ppport.h --nochanges
```

You can specify a different C<diff> program or options, using the C<--diff> option:

```
perl ppport.h --diff='diff -C 10'
```

This would output context diffs with 10 lines of context.

If you want to create patched copies of your files instead, use:

```
perl ppport.h --copy=.new
```

To display portability information for the C<newSVpv> function, use:

```
perl ppport.h --api-info=newSVpv
```

Since the argument to C<--api-info> can be a regular expression, you can use

```
perl ppport.h --api-info=/_nomg$/
```

to display portability information for all C<\_nomg> functions or

```
perl ppport.h --api-info=/. /
```

to display information for all known API elements.

## =head1 BUGS

If this version of F<ppport.h> is causing failure during the compilation of this module, please check if newer versions of either this module or C<Devel::PPP> are available on CPAN before sending a bug report.

If F<ppport.h> was generated using the latest version of C<Devel::PPP> and is causing failure of this module, please file a bug report using the CPAN Request Tracker at L<<http://rt.cpan.org/>>.

Please include the following information:

=over 4

=item 1.

The complete output from running "perl -V"

=item 2.

This file.

=item 3.

The name and version of the module you were trying to build.

=item 4.

A full log of the build that failed.

=item 5.

Any other information that you think could be relevant.

=back

For the latest version of this code, please get the C<Devel::PPPort> module from CPAN.

=head1 COPYRIGHT

Version 3.x, Copyright (c) 2004-2009, Marcus Holland-Moritz.

Version 2.x, Copyright (C) 2001, Paul Marquess.

Version 1.x, Copyright (C) 1999, Kenneth Albanowski.

This program is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

=head1 SEE ALSO

See L<Devel::PPPort>.

=cut

use strict;

# Disable broken TRIE-optimization

BEGIN { eval '\${^RE\_TRIE\_MAXBUF} = -1' if \$] >= 5.009004 && \$] <= 5.009005 }

my \$VERSION = 3.19;

```
my %opt = (  
  quiet  => 0,  
  diag   => 1,  
  hints  => 1,  
  changes => 1,  
  cplusplus => 0,  
  filter => 1,  
  strip  => 0,  
  version => 0,  
);
```

```

my($ppport) = $0 =~ /([\w.]+)$/;
my $LF = '(?:\r\n|[\r\n])'; # line feed
my $HS = "[\t]";          # horizontal whitespace

# Never use C comments in this file!
my $ccs = '!.*';
my $cce = '*!.';
my $rcs = quotemeta $ccs;
my $rce = quotemeta $cce;

eval {
    require Getopt::Long;
    Getopt::Long::GetOptions(\%opt, qw(
        help quiet diag! filter! hints! changes! cplusplus strip version
        patch=s copy=s diff=s compat-version=s
        list-provided list-unsupported api-info=s
    )) or usage();
};

if ($@ and grep /^-/, @ARGV) {
    usage() if "@ARGV" =~ /^--?h(?:elp)?$/;
    die "Getopt::Long not found. Please don't use any options.\n";
}

if ($opt{version}) {
    print "This is $0 $VERSION.\n";
    exit 0;
}

usage() if $opt{help};
strip() if $opt{strip};

if (exists $opt{'compat-version'}) {
    my($r,$v,$s) = eval { parse_version($opt{'compat-version'}) };
    if ($@) {
        die "Invalid version number format: '$opt{'compat-version'}'\n";
    }
    die "Only Perl 5 is supported\n" if $r != 5;
    die "Invalid version number: $opt{'compat-version'}\n" if $v >= 1000 || $s >= 1000;
    $opt{'compat-version'} = sprintf "%d.%03d%03d", $r, $v, $s;
}
else {
    $opt{'compat-version'} = 5;
}

my %API = map { /^(\w+)(([^\*])|([^\*])|(\w*))$/
    ? ($1 => {

```

```

        ($2          ? ( base   => $2 ) : ()),
        ($3          ? ( todo   => $3 ) : ()),
        (index($4, 'v') >= 0 ? ( varargs => 1 ) : ()),
        (index($4, 'p') >= 0 ? ( provided => 1 ) : ()),
        (index($4, 'n') >= 0 ? ( nothxarg => 1 ) : ()),
    } )
    : die "invalid spec: $_" } qw(
AvFILLp|5.004050||p
AvFILL|||
CLASS|||n
CPERLscope|5.005000||p
CX_CURPAD_SAVE|||
CX_CURPAD_SV|||
CopFILEAV|5.006000||p
CopFILEGV_set|5.006000||p
CopFILEGV|5.006000||p
CopFILESV|5.006000||p
CopFILE_set|5.006000||p
CopFILE|5.006000||p
CopSTASHPV_set|5.006000||p
CopSTASHPV|5.006000||p
CopSTASH_eq|5.006000||p
CopSTASH_set|5.006000||p
CopSTASH|5.006000||p
CopyD|5.009002||p
Copy|||
CvPADLIST|||
CvSTASH|||
CvWEAKOUTSIDE|||
DEFSV_set|5.011000||p
DEFSV|5.004050||p
END_EXTERN_C|5.005000||p
ENTER|||
ERRSV|5.004050||p
EXTEND|||
EXTERN_C|5.005000||p
F0convert|||n
FREEMPS|||
GIMME_V||5.004000|n
GIMME|||n
GROK_NUMERIC_RADIX|5.007002||p
G_ARRAY|||
G_DISCARD|||
G_EVAL|||
G_METHOD|5.006001||p
G_NOARGS|||
G_SCALAR|||
G_VOID||5.004000|

```



GetVars|||  
GvSVn|5.009003||p  
GvSV|||  
Gv\_AMupdate|||  
HEf\_SVKEY|5.004000|  
HeHASH|5.004000|  
HeKEY|5.004000|  
HeKLEN|5.004000|  
HePV|5.004000|  
HeSVKEY\_force|5.004000|  
HeSVKEY\_set|5.004000|  
HeSVKEY|5.004000|  
HeUTF8|5.011000|  
HeVAL|5.004000|  
HvNAMELEN\_get|5.009003||p  
HvNAME\_get|5.009003||p  
HvNAME|||  
INT2PTR|5.006000||p  
IN\_LOCALE\_COMPILETIME|5.007002||p  
IN\_LOCALE\_RUNTIME|5.007002||p  
IN\_LOCALE|5.007002||p  
IN\_PERL\_COMPILETIME|5.008001||p  
IS\_NUMBER\_GREATER\_THAN\_UV\_MAX|5.007002||p  
IS\_NUMBER\_INFINITY|5.007002||p  
IS\_NUMBER\_IN\_UV|5.007002||p  
IS\_NUMBER\_NAN|5.007003||p  
IS\_NUMBER\_NEG|5.007002||p  
IS\_NUMBER\_NOT\_INT|5.007002||p  
IVSIZE|5.006000||p  
IVTYPE|5.006000||p  
IVdf|5.006000||p  
LEAVE|||  
LVRET|||  
MARK|||  
MULTICALL|5.011000|  
MY\_CXT\_CLONE|5.009002||p  
MY\_CXT\_INIT|5.007003||p  
MY\_CXT|5.007003||p  
MoveD|5.009002||p  
Move|||  
NOOP|5.005000||p  
NUM2PTR|5.006000||p  
NVTYPE|5.006000||p  
NVef|5.006001||p  
NVff|5.006001||p  
NVgf|5.006001||p  
Newxc|5.009003||p  
Newxz|5.009003||p

Newx|5.009003||p  
Nullav|||  
Nullch|||  
Nullcv|||  
Nullhv|||  
Nullsv|||  
ORIGMARK|||  
PAD\_BASE\_SV|||  
PAD\_CLONE\_VARS|||  
PAD\_COMPNAME\_FLAGS|||  
PAD\_COMPNAME\_GEN\_set|||  
PAD\_COMPNAME\_GEN|||  
PAD\_COMPNAME\_OURSTASH|||  
PAD\_COMPNAME\_PV|||  
PAD\_COMPNAME\_TYPE|||  
PAD\_DUP|||  
PAD\_RESTORE\_LOCAL|||  
PAD\_SAVE\_LOCAL|||  
PAD\_SAVE\_SETNULLPAD|||  
PAD\_SETSV|||  
PAD\_SET\_CUR\_NOSAVE|||  
PAD\_SET\_CUR|||  
PAD\_SV1|||  
PAD\_SV|||  
PERLIO\_FUNCS\_CAST|5.009003||p  
PERLIO\_FUNCS\_DECL|5.009003||p  
PERL\_ABS|5.008001||p  
PERL\_BCDVERSION|5.011000||p  
PERL\_GCC\_BRACE\_GROUPS\_FORBIDDEN|5.008001||p  
PERL\_HASH|5.004000||p  
PERL\_INT\_MAX|5.004000||p  
PERL\_INT\_MIN|5.004000||p  
PERL\_LONG\_MAX|5.004000||p  
PERL\_LONG\_MIN|5.004000||p  
PERL\_MAGIC\_arylen|5.007002||p  
PERL\_MAGIC\_backref|5.007002||p  
PERL\_MAGIC\_bm|5.007002||p  
PERL\_MAGIC\_collxfrm|5.007002||p  
PERL\_MAGIC\_dbfile|5.007002||p  
PERL\_MAGIC\_dbline|5.007002||p  
PERL\_MAGIC\_defelem|5.007002||p  
PERL\_MAGIC\_envelem|5.007002||p  
PERL\_MAGIC\_env|5.007002||p  
PERL\_MAGIC\_ext|5.007002||p  
PERL\_MAGIC\_fm|5.007002||p  
PERL\_MAGIC\_glob|5.011000||p  
PERL\_MAGIC\_isaelem|5.007002||p  
PERL\_MAGIC\_isa|5.007002||p

PERL\_MAGIC\_mutex|5.011000||p  
PERL\_MAGIC\_nkeys|5.007002||p  
PERL\_MAGIC\_overload\_elem|5.007002||p  
PERL\_MAGIC\_overload\_table|5.007002||p  
PERL\_MAGIC\_overload|5.007002||p  
PERL\_MAGIC\_pos|5.007002||p  
PERL\_MAGIC\_qr|5.007002||p  
PERL\_MAGIC\_regdata|5.007002||p  
PERL\_MAGIC\_regdatum|5.007002||p  
PERL\_MAGIC\_regex\_global|5.007002||p  
PERL\_MAGIC\_shared\_scalar|5.007003||p  
PERL\_MAGIC\_shared|5.007003||p  
PERL\_MAGIC\_sigelem|5.007002||p  
PERL\_MAGIC\_sig|5.007002||p  
PERL\_MAGIC\_substr|5.007002||p  
PERL\_MAGIC\_sv|5.007002||p  
PERL\_MAGIC\_taint|5.007002||p  
PERL\_MAGIC\_tiedelem|5.007002||p  
PERL\_MAGIC\_tiedscalar|5.007002||p  
PERL\_MAGIC\_tied|5.007002||p  
PERL\_MAGIC\_utf8|5.008001||p  
PERL\_MAGIC\_uvar\_elem|5.007003||p  
PERL\_MAGIC\_uvar|5.007002||p  
PERL\_MAGIC\_vec|5.007002||p  
PERL\_MAGIC\_vstring|5.008001||p  
PERL\_PV\_ESCAPE\_ALL|5.009004||p  
PERL\_PV\_ESCAPE\_FIRSTCHAR|5.009004||p  
PERL\_PV\_ESCAPE\_NOBACKSLASH|5.009004||p  
PERL\_PV\_ESCAPE\_NOCLEAR|5.009004||p  
PERL\_PV\_ESCAPE\_QUOTE|5.009004||p  
PERL\_PV\_ESCAPE\_RE|5.009005||p  
PERL\_PV\_ESCAPE\_UNI\_DETECT|5.009004||p  
PERL\_PV\_ESCAPE\_UNI|5.009004||p  
PERL\_PV\_PRETTY\_DUMP|5.009004||p  
PERL\_PV\_PRETTY\_ELLIPSES|5.010000||p  
PERL\_PV\_PRETTY\_LTGT|5.009004||p  
PERL\_PV\_PRETTY\_NOCLEAR|5.010000||p  
PERL\_PV\_PRETTY\_QUOTE|5.009004||p  
PERL\_PV\_PRETTY\_REGPROP|5.009004||p  
PERL\_QUAD\_MAX|5.004000||p  
PERL\_QUAD\_MIN|5.004000||p  
PERL\_REVISION|5.006000||p  
PERL\_SCAN\_ALLOW\_UNDERSCORES|5.007003||p  
PERL\_SCAN\_DISALLOW\_PREFIX|5.007003||p  
PERL\_SCAN\_GREATER\_THAN\_UV\_MAX|5.007003||p  
PERL\_SCAN\_SILENT\_ILLDIGIT|5.008001||p  
PERL\_SHORT\_MAX|5.004000||p  
PERL\_SHORT\_MIN|5.004000||p

PERL\_SIGNALS\_UNSAFE\_FLAG|5.008001||p  
PERL\_SUBVERSION|5.006000||p  
PERL\_SYS\_INIT3|5.006000|  
PERL\_SYS\_INIT|||  
PERL\_SYS\_TERM||5.011000|  
PERL\_UCHAR\_MAX|5.004000||p  
PERL\_UCHAR\_MIN|5.004000||p  
PERL\_UINT\_MAX|5.004000||p  
PERL\_UINT\_MIN|5.004000||p  
PERL\_ULONG\_MAX|5.004000||p  
PERL\_ULONG\_MIN|5.004000||p  
PERL\_UNUSED\_ARG|5.009003||p  
PERL\_UNUSED\_CONTEXT|5.009004||p  
PERL\_UNUSED\_DECL|5.007002||p  
PERL\_UNUSED\_VAR|5.007002||p  
PERL\_UQUAD\_MAX|5.004000||p  
PERL\_UQUAD\_MIN|5.004000||p  
PERL\_USE\_GCC\_BRACE\_GROUPS|5.009004||p  
PERL\_USHORT\_MAX|5.004000||p  
PERL\_USHORT\_MIN|5.004000||p  
PERL\_VERSION|5.006000||p  
PL\_DBsignal|5.005000||p  
PL\_DBsingle|||pn  
PL\_DBsub|||pn  
PL\_DBtrace|||pn  
PL\_Sv|5.005000||p  
PL\_bufend|5.011000||p  
PL\_bufptr|5.011000||p  
PL\_compiling|5.004050||p  
PL\_copline|5.011000||p  
PL\_curcop|5.004050||p  
PL\_curstash|5.004050||p  
PL\_debstash|5.004050||p  
PL\_defgv|5.004050||p  
PL\_diehook|5.004050||p  
PL\_dirty|5.004050||p  
PL\_dowarn|||pn  
PL\_errgv|5.004050||p  
PL\_error\_count|5.011000||p  
PL\_expect|5.011000||p  
PL\_hexdigit|5.005000||p  
PL\_hints|5.005000||p  
PL\_in\_my\_stash|5.011000||p  
PL\_in\_my|5.011000||p  
PL\_last\_in\_gv|||n  
PL\_laststatval|5.005000||p  
PL\_lex\_state|5.011000||p  
PL\_lex\_stuff|5.011000||p

PL\_linestr|5.011000||p  
PL\_modglobal||5.005000|n  
PL\_na|5.004050||pn  
PL\_no\_modify|5.006000||p  
PL\_ofsgv|||n  
PL\_parser|5.009005||p  
PL\_perl\_destruct\_level|5.004050||p  
PL\_perldb|5.004050||p  
PL\_ppaddr|5.006000||p  
PL\_rsfilters|5.004050||p  
PL\_rsfp|5.004050||p  
PL\_rs|||n  
PL\_signals|5.008001||p  
PL\_stack\_base|5.004050||p  
PL\_stack\_sp|5.004050||p  
PL\_statcache|5.005000||p  
PL\_stdingv|5.004050||p  
PL\_sv\_arenaroot|5.004050||p  
PL\_sv\_no|5.004050||pn  
PL\_sv\_undef|5.004050||pn  
PL\_sv\_yes|5.004050||pn  
PL\_tainted|5.004050||p  
PL\_tainting|5.004050||p  
PL\_tokenbuf|5.011000||p  
POP\_MULTICALL||5.011000|  
POPi|||n  
POPi|||n  
POPn|||n  
POPpbytex||5.007001|n  
POPpx||5.005030|n  
POPp|||n  
POPs|||n  
PTR2IV|5.006000||p  
PTR2NV|5.006000||p  
PTR2UV|5.006000||p  
PTR2nat|5.009003||p  
PTR2ul|5.007001||p  
PTRV|5.006000||p  
PUSHMARK|||  
PUSH\_MULTICALL||5.011000|  
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sv\_pos\_b2u\_midway||  
sv\_pos\_b2u|5.006000|  
sv\_pos\_u2b\_cached||  
sv\_pos\_u2b\_forwards||n  
sv\_pos\_u2b\_midway||n  
sv\_pos\_u2b|5.006000|  
sv\_pvbyten\_force|5.006000|  
sv\_pvbyten|5.006000|  
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sv\_setiv\_mg|5.004050|p  
sv\_setiv|||  
sv\_setnv\_mg|5.006000|p  
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sv\_setpv\_mg|5.004050|p  
sv\_setpvf\_mg\_nocontext|||pvn  
sv\_setpvf\_mg|5.006000|5.004000|pv  
sv\_setpvf\_nocontext|||vn  
sv\_setpvf|5.004000|v  
sv\_setpviv\_mg|5.008001|  
sv\_setpviv||5.008001|  
sv\_setpvn\_mg|5.004050|p  
sv\_setpvn|||  
sv\_setpvs|5.009004|p  
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sv\_setref\_pv|||  
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sv\_setsv\_flags|5.007002|  
sv\_setsv\_mg|5.004050|p  
sv\_setsv\_nomg|5.007002|p  
sv\_setsv|||  
sv\_setuv\_mg|5.004050|p  
sv\_setuv|5.004000|p  
sv\_tainted|5.004000|  
sv\_taint|5.004000|  
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sv\_unglob|||  
sv\_uni\_display||5.007003|  
sv\_unmagic|||  
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sv\_unref|||  
sv\_untaint|5.004000|  
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sv\_usepvn\_flags||5.009004|  
sv\_usepvn\_mg|5.004050|p  
sv\_usepvn|||  
sv\_utf8\_decode||5.006000|  
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sv\_utf8\_encode||5.006000|  
sv\_utf8\_upgrade\_flags\_grow||5.011000|  
sv\_utf8\_upgrade\_flags||5.007002|  
sv\_utf8\_upgrade\_nomg||5.007002|

sv\_utf8\_upgrade|5.007001|  
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sv\_vcatpvf\_mg|5.006000|5.004000|p  
sv\_vcatpvfn|5.004000|  
sv\_vcatpvf|5.006000|5.004000|p  
sv\_vsetpvf\_mg|5.006000|5.004000|p  
sv\_vsetpvfn|5.004000|  
sv\_vsetpvf|5.006000|5.004000|p  
sv\_xmlpeek|||  
svtype|||  
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swash\_get|||  
swash\_init|5.006000|  
sys\_init3|5.010000|n  
sys\_init|5.010000|n  
sys\_intern\_clear|||  
sys\_intern\_dup|||  
sys\_intern\_init|||  
sys\_term|5.010000|n  
taint\_env|||  
taint\_proper|||  
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toLOWER|||  
toUPPER|||  
to\_byte\_substr|||  
to\_uni\_fold|5.007003|  
to\_uni\_lower\_lc|5.006000|  
to\_uni\_lower|5.007003|  
to\_uni\_title\_lc|5.006000|  
to\_uni\_title|5.007003|  
to\_uni\_upper\_lc|5.006000|  
to\_uni\_upper|5.007003|  
to\_utf8\_case|5.007003|  
to\_utf8\_fold|5.007003|  
to\_utf8\_lower|5.007003|  
to\_utf8\_substr|||  
to\_utf8\_title|5.007003|  
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token\_free|||  
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tokenize\_use|||  
tokeq|||  
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uiv\_2buf|||n

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utf8\_length|5.007001|  
utf8\_mg\_pos\_cache\_update|||  
utf8\_to\_bytes|5.006001|  
utf8\_to\_uvchr|5.007001|  
utf8\_to\_uvuni|5.007001|  
utf8n\_to\_uvchr|||  
utf8n\_to\_uvuni|5.007001|  
utilize|||  
uvchr\_to\_utf8\_flags|5.007003|  
uvchr\_to\_utf8|||  
uvuni\_to\_utf8\_flags|5.007003|  
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vcroak|5.006000|  
vdeb|5.007003|  
vdie\_common|||  
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vdie|||  
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visit|||  
vivify\_defelem|||  
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vload\_module|5.006000|p  
vmess|5.006000|  
vnewSVpvf|5.006000|5.004000|p  
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vnumify|5.009000|  
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```

wait4pid|||
warn_nocontext|||vn
warner_nocontext|||vn
warner|5.006000|5.004000|pv
warn|||v
watch|||
whichsig|||
write_no_mem|||
write_to_stderr|||
xmldump_all|||
xmldump_attr|||
xmldump_eval|||
xmldump_form|||
xmldump_indent|||v
xmldump_packsubs|||
xmldump_sub|||
xmldump_vindent|||
yyerror|||
yylex|||
yyparse|||
yywarn|||
);

if (exists $opt{ 'list-unsupported' }) {
    my $f;
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $API{$f}{todo};
        print "$f ", 'x'(40-length($f)), " ", format_version($API{$f}{todo}), "\n";
    }
    exit 0;
}

# Scan for possible replacement candidates

my(%replace, %need, %hints, %warnings, %depends);
my $replace = 0;
my($hint, $define, $function);

sub find_api
{
    my $code = shift;
    $code =~ s{
        / (? : \*[^\*]*\*(?:[^\$ccs][^\*]*\*)* / | /[\r\n]*
        | "[^\\"]*(?:\\.["\\])*"
        | '[^\']*?(?:\\.["\\])*' }{ }egsx;
    grep { exists $API{$_} } $code =~ /(\w+)/mg;
}

```

```

while (<DATA>) {
if ($hint) {
my $h = $hint->[0] eq 'Hint' ? \%hints : \%warnings;
if (m{^\s*\*\s(.*)\s*$}) {
for (@{$hint->[1]}) {
$h->{$_} ||= "; # suppress warning with older perls
$h->{$_} .= "$1\n";
}
}
else { undef $hint }
}

$hint = [$1, [split /,?\s+/, $2]]
if m{^\s*$rcs\s+(Hint|Warning):\s+(\w+(?:,\s+\w+)*)\s*$};

if ($define) {
if ($define->[1] =~ /\$/) {
$define->[1] .= $_;
}
else {
if (exists $API{$define->[0]} && $define->[1] !~ /^DPPP_\(/) {
my @n = find_api($define->[1]);
push @{$depends{$define->[0]}}, @n if @n
}
undef $define;
}
}

$define = [$1, $2] if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(.*)};

if ($function) {
if (/^)/) {
if (exists $API{$function->[0]}) {
my @n = find_api($function->[1]);
push @{$depends{$function->[0]}}, @n if @n
}
undef $function;
}
else {
$function->[1] .= $_;
}
}

$function = [$1, ""] if m{^DPPP_(my_(\w+))};

$replace = $1 if m{^\s*$rcs\s+Replace:\s+(\d+)\s+$rcce\s*$};
$replace{ $2 } = $1 if $replace and m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+)};
$replace{ $2 } = $1 if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+).*\s*$rcs\s+Replace\s+$rcce};

```

```

$replace{$1} = $2 if m{^\s*$rccs\s+Replace (\w+) with (\w+)\s+$rcces*$};

if (m{^\s*$rccs\s+(\w+(\s*,\s*\w+*))\s+depends\s+on\s+(\w+(\s*,\s*\w+*))\s+$rcces*$}) {
    my @deps = map { s/\s+//g; $_ } split /,/, $3;
    my $d;
    for $d (map { s/\s+//g; $_ } split /,/, $1) {
        push @{$depends{$d}}, @deps;
    }
}

$need{$1} = 1 if m{^#\s+defined\(\NEED_\(\w+)\(?:_GLOBAL)?\)};
}

for (values %depends) {
    my %s;
    $_ = [sort grep !$_{$_}++, @$_];
}

if (exists $opt{'api-info'}) {
    my $f;
    my $count = 0;
    my $match = $opt{'api-info'} =~ m!^(.*)/#! ? $1 : "\Q$opt{'api-info'}\E\$";
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $f =~ /$match/;
        print "\n=== $f ===\n";
        my $info = 0;
        if ($API{$f}{base} || $API{$f}{todo}) {
            my $base = format_version($API{$f}{base} || $API{$f}{todo});
            print "Supported at least starting from perl-$base.\n";
            $info++;
        }
        if ($API{$f}{provided}) {
            my $todo = $API{$f}{todo} ? format_version($API{$f}{todo}) : "5.003";
            print "Support by $ppport provided back to perl-$todo.\n";
            print "Support needs to be explicitly requested by NEED_$. \n" if exists $need{$f};
            print "Depends on: ", join(', ', @{$depends{$f}}), ". \n" if exists $depends{$f};
            print "\n$hints{$f}" if exists $hints{$f};
            print "\nWARNING:\n$warnings{$f}" if exists $warnings{$f};
            $info++;
        }
    }
    print "No portability information available.\n" unless $info;
    $count++;
}
$count or print "Found no API matching '$opt{'api-info'}'.";
print "\n";
exit 0;
}

```

```

if (exists $opt{'list-provided'}) {
  my $f;
  for $f (sort { lc $a cmp lc $b } keys %API) {
    next unless $API{$f}{provided};
    my @flags;
    push @flags, 'explicit' if exists $need{$f};
    push @flags, 'depend' if exists $depends{$f};
    push @flags, 'hint' if exists $hints{$f};
    push @flags, 'warning' if exists $warnings{$f};
    my $flags = @flags ? ' [' . join(', ', @flags) . '] : ";
    print "$f$flags\n";
  }
  exit 0;
}

my @files;
my @srcext = qw( .xs .c .h .cc .cpp -c.inc -xs.inc );
my $srcext = join '|', map { quotemeta $_ } @srcext;

if (@ARGV) {
  my %seen;
  for (@ARGV) {
    if (-e) {
      if (-f) {
        push @files, $_ unless $seen{$_}++;
      }
      else { warn "'$_' is not a file.\n" }
    }
    else {
      my @new = grep { -f } glob $_
        or warn "'$_' does not exist.\n";
      push @files, grep { !$seen{$_}++ } @new;
    }
  }
}
else {
  eval {
    require File::Find;
    File::Find::find(sub {
      $File::Find::name =~ /($srcext)$/i
      and push @files, $File::Find::name;
    }, '.');
  };
  if ($?) {
    @files = map { glob "$*" } @srcext;
  }
}

```

```

if (!@ARGV || $opt{filter}) {
  my(@in, @out);
  my %xsc = map { /(.*)\.xs$/ ? ("$.c" => 1, "$.cc" => 1) : () } @files;
  for (@files) {
    my $out = exists $xsc{$_} || ^\b\Q$ppport\E$/i || !/($srcext)$/i;
    push @ { $out ? \@out : \@in }, $_;
  }
  if (@ARGV && @out) {
    warning("Skipping the following files (use --nofilter to avoid this):\n| ", join "\n| ", @out);
  }
  @files = @in;
}

```

```

die "No input files given!\n" unless @files;

```

```

my(%files, %global, %revreplace);
%revreplace = reverse %replace;
my $filename;
my $patch_opened = 0;

```

```

for $filename (@files) {
  unless (open IN, "<$filename") {
    warn "Unable to read from $filename: $!\n";
    next;
  }
}

```

```

info("Scanning $filename ...");

```

```

my $c = do { local $/; <IN> };
close IN;

```

```

my %file = (orig => $c, changes => 0);

```

```

# Temporarily remove C/XS comments and strings from the code
my @ccom;

```

```

$c =~ s{
  ( ^$HS*\#$HS*include\b[^\r\n]+\b(?:\Q$ppport\E|XSUB\.h)\b[^\r\n]*
  | ^$HS*\#$HS*(?:define|elif|if(?:def?))\b[^\r\n]* )
| ( ^$HS*\#[^\r\n]*
  | "[^"\\]*(?:\\.[^"\\])*"
  | '[^"\\]*(?:\\.[^"\\])*'
  | /(?: \*[^*]*\*+(?:\^[^$ccs][^*]*\*+)* /|/[^\r\n]* ) )
}{ defined $2 and push @ccom, $2;
  defined $1 ? $1 : "$ccs#$ccom$cc" }mgsex;

```

```

$file{ccom} = \@ccom;

```

```

$file{code} = $c;

```

```

$file{has_inc_ppport} = $c =~ /^$HS*#$HS*include[^\r\n]+\b\Q$ppport\E\b/m;

my $func;

for $func (keys %API) {
    my $match = $func;
    $match .= "$$revreplace{$func}" if exists $revreplace{$func};
    if ($c =~ /\b(?:Perl)?($match)\b/) {
        $file{uses_replace}{$1}++ if exists $revreplace{$func} && $1 eq $revreplace{$func};
        $file{uses_Perl}{$func}++ if $c =~ /\bPerl_{$func}\b/;
        if (exists $API{$func}{provided}) {
            $file{uses_provided}{$func}++;
            if (!exists $API{$func}{base} || $API{$func}{base} > $opt{'compat-version'}) {
                $file{uses}{$func}++;
                my @deps = rec_depend($func);
                if (@deps) {
                    $file{uses_deps}{$func} = \@deps;
                    for (@deps) {
                        $file{uses}{$_} = 0 unless exists $file{uses}{$_};
                    }
                }
                for ($func, @deps) {
                    $file{needs}{$_} = 'static' if exists $need{$_};
                }
            }
        }
        if (exists $API{$func}{todo} && $API{$func}{todo} > $opt{'compat-version'}) {
            if ($c =~ /\b{$func}\b/) {
                $file{uses_todo}{$func}++;
            }
        }
    }
}

while ($c =~ /^$HS*#$HS*define$HS+(NEED_(\w+?)(_GLOBAL)?)\b/mg) {
    if (exists $need{$2}) {
        $file{defined $3 ? 'needed_global' : 'needed_static'}{$2}++;
    }
    else { warning("Possibly wrong #define $1 in $filename") }
}

for (qw(uses needs uses_todo needed_global needed_static)) {
    for $func (keys %{$file{$_}}) {
        push @{$global{$_}{$func}}, $filename;
    }
}

$files{$filename} = \%file;

```

```

}

# Globally resolve NEED_'s
my $need;
for $need (keys %{$global{needs}}) {
    if (@{$global{needs}{$need}} > 1) {
        my @targets = @{$global{needs}{$need}};
        my @t = grep $files{$_}{needed_global}{$need}, @targets;
        @targets = @t if @t;
        @t = grep /\.xs$/i, @targets;
        @targets = @t if @t;
        my $target = shift @targets;
        $files{$target}{needs}{$need} = 'global';
        for (@{$global{needs}{$need}}) {
            $files{$_}{needs}{$need} = 'extern' if $_ ne $target;
        }
    }
}

for $filename (@files) {
    exists $files{$filename} or next;

    info("=== Analyzing $filename ===");

    my %file = %{$files{$filename}};
    my $func;
    my $c = $file{code};
    my $warnings = 0;

    for $func (sort keys %{$file{uses_Perl}}) {
        if ($API{$func}{varargs}) {
            unless ($API{$func}{nothxarg}) {
                my $changes = ($c =~ s{\b(Perl_?func\s*(\s*)(?!aTHX_?)\(\)[^\s]*\)}
                    { $1 . ($2 eq ' ') ? 'aTHX' : 'aTHX_ ' ) . $2 }ge);
                if ($changes) {
                    warning("Doesn't pass interpreter argument aTHX to Perl_$func");
                    $file{changes} += $changes;
                }
            }
        }
        else {
            warning("Uses Perl_$func instead of $func");
            $file{changes} += ($c =~ s{\bPerl_?func(\s*)(\s*aTHX_?)?\s*}
                {$func$1{}g);
        }
    }

    for $func (sort keys %{$file{uses_replace}}) {

```

```

warning("Uses $func instead of $replace{$func}");
$file{changes} += ($c =~ s/\b$func\b/$replace{$func}/g);
}

for $func (sort keys %{$file{uses_provided}}) {
  if ($file{uses}{$func}) {
    if (exists $file{uses_deps}{$func}) {
      diag("Uses $func, which depends on ", join(', ', @{$file{uses_deps}{$func}}));
    }
    else {
      diag("Uses $func");
    }
  }
  $warnings += hint($func);
}

unless ($opt{quiet}) {
  for $func (sort keys %{$file{uses_todo}}) {
    print "*** WARNING: Uses $func, which may not be portable below perl ",
      format_version($API{$func}{todo}), ", even with 'Sppport\n";
    $warnings++;
  }
}

for $func (sort keys %{$file{needed_static}}) {
  my $message = "";
  if (not exists $file{uses}{$func}) {
    $message = "No need to define NEED_$func if $func is never used";
  }
  elsif (exists $file{needs}{$func} && $file{needs}{$func} ne 'static') {
    $message = "No need to define NEED_$func when already needed globally";
  }
  if ($message) {
    diag($message);
    $file{changes} += ($c =~ s/^\$HS*#\$HS*define\$HS+NEED_$func\b.*$LF//mg);
  }
}

for $func (sort keys %{$file{needed_global}}) {
  my $message = "";
  if (not exists $global{uses}{$func}) {
    $message = "No need to define NEED_${func}_GLOBAL if $func is never used";
  }
  elsif (exists $file{needs}{$func}) {
    if ($file{needs}{$func} eq 'extern') {
      $message = "No need to define NEED_${func}_GLOBAL when already needed globally";
    }
    elsif ($file{needs}{$func} eq 'static') {

```



```

    $message = "No need to define NEED_${func}_GLOBAL when only used in this file";
}
}
if ($message) {
    diag($message);
    $file{changes} += ($c =~ s/^(?=$HS*#$HS*define$HS+NEED_${func}_GLOBAL\b.*$LF//mg);
}
}

$file{needs_inc_ppport} = keys %{$file{uses}};

if ($file{needs_inc_ppport}) {
    my $pp = "";

    for $func (sort keys %{$file{needs}}) {
        my $type = $file{needs}{$func};
        next if $type eq 'extern';
        my $suffix = $type eq 'global' ? '_GLOBAL' : "";
        unless (exists $file{"needed_$type"}{$func}) {
            if ($type eq 'global') {
                diag("Files [@{$global{needs}}{$func}] need $func, adding global request");
            }
            else {
                diag("File needs $func, adding static request");
            }
            $pp .= "#define NEED_${func}$suffix\n";
        }
    }
}

if ($pp && ($c =~ s/^(?=$HS*#$HS*define$HS+NEED_\w+)/$pp/m)) {
    $pp = "";
    $file{changes}++;
}

unless ($file{has_inc_ppport}) {
    diag("Needs to include '$ppport'");
    $pp .= qq(#include "$ppport"\n)
}

if ($pp) {
    $file{changes} += ($c =~ s/^(?=$HS*#$HS*define$HS+NEED_\w+.*?)/$1$pp/ms)
        || ($c =~ s/^(?=$HS*#$HS*include.*\Q$ppport\E)/$pp/m)
        || ($c =~ s/^(?=$HS*#$HS*include.*XSUB.*\s*?)/$1$pp/m)
        || ($c =~ s/^\Q$pp/);
}
}
else {
    if ($file{has_inc_ppport}) {

```

```

diag("No need to include '$ppport'");
$file{changes} += ($c =~ s/^\$HS*?#\$HS*include.*\Q$ppport\E.*?$LF//m);
}
}

# put back in our C comments
my $ix;
my $cpc = 0;
my @ccom = @{$file{ccom}};
for $ix (0 .. $#ccom) {
    if (!$opt{cplusplus} && $ccom[$ix] =~ s!^/!!) {
        $cpc++;
        $file{changes} += $c =~ s/$rcs$ix$rcce/$ccs$ccom[$ix] $cce/;
    }
    else {
        $c =~ s/$rcs$ix$rcce/$ccom[$ix]/;
    }
}

if ($cpc) {
    my $s = $cpc != 1 ? 's' : '';
    warning("Uses $cpc C++ style comment$s, which is not portable");
}

my $s = $warnings != 1 ? 's' : '';
my $warn = $warnings ? " ($warnings warning$s)" : "";
info("Analysis completed$warn");

if ($file{changes}) {
    if (exists $opt{copy}) {
        my $newfile = "$filename$opt{copy}";
        if (-e $newfile) {
            error("$newfile' already exists, refusing to write copy of '$filename'");
        }
        else {
            local *F;
            if (open F, ">$newfile") {
                info("Writing copy of '$filename' with changes to '$newfile'");
                print F $c;
                close F;
            }
            else {
                error("Cannot open '$newfile' for writing: $!");
            }
        }
    }
    elsif (exists $opt{patch} || $opt{changes}) {
        if (exists $opt{patch}) {

```

```

unless ($patch_opened) {
    if (open PATCH, ">$opt{patch}") {
        $patch_opened = 1;
    }
    else {
        error("Cannot open '$opt{patch}' for writing: $!");
        delete $opt{patch};
        $opt{changes} = 1;
        goto fallback;
    }
}
mydiff(\*PATCH, $filename, $c);
}
else {
fallback:
    info("Suggested changes:");
    mydiff(\*STDOUT, $filename, $c);
}
}
else {
    my $s = $file{changes} == 1 ? " : 's'";
    info("$file{changes} potentially required change$s detected");
}
}
else {
    info("Looks good");
}
}

close PATCH if $patch_opened;

exit 0;

sub try_use { eval "use @_;"; return "$@" eq " }

sub mydiff
{
    local *F = shift;
    my($file, $str) = @_;
    my $diff;

    if (exists $opt{diff}) {
        $diff = run_diff($opt{diff}, $file, $str);
    }

    if (!defined $diff and try_use("Text::Diff")) {
        $diff = Text::Diff::diff($file, \ $str, { STYLE => 'Unified' });
    }
}

```

```

    $diff = <<HEADER . $diff;
--- $file
+++ $file.patched
HEADER
}

if (!defined $diff) {
    $diff = run_diff('diff -u', $file, $str);
}

if (!defined $diff) {
    $diff = run_diff('diff', $file, $str);
}

if (!defined $diff) {
    error("Cannot generate a diff. Please install Text::Diff or use --copy.");
    return;
}

print F $diff;
}

sub run_diff
{
    my($prog, $file, $str) = @_ ;
    my $tmp = 'dppptemp';
    my $suf = 'aaa';
    my $diff = "";
    local *F;

    while (-e "$tmp.$suf") { $suf++ }
    $tmp = "$tmp.$suf";

    if (open F, ">$tmp") {
        print F $str;
        close F;

        if (open F, "$prog $file $tmp |") {
            while (<F>) {
                s/\Q$tmp\E/$file.patched/;
                $diff .= $_;
            }
            close F;
            unlink $tmp;
            return $diff;
        }

        unlink $tmp;

```

```

}
else {
    error("Cannot open '$tmp' for writing: $!");
}

return undef;
}

sub rec_depend
{
    my($func, $seen) = @_ ;
    return () unless exists $depends{$func};
    $seen = {%{$seen}{}};
    return () if $seen->{$func}++;
    my %s;
    grep !${$_}++, map { ($_, rec_depend($_, $seen)) } @{$depends{$func}};
}

sub parse_version
{
    my $ver = shift;

    if ($ver =~ /^(d+)\.(d+)\.(d+)$/) {
        return ($1, $2, $3);
    }
    elsif ($ver !~ /^d+\.[d_]+$/) {
        die "cannot parse version '$ver'\n";
    }

    $ver =~ s/_//g;
    $ver =~ s/$/000000/;

    my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

    $v = int $v;
    $s = int $s;

    if ($r < 5 || ($r == 5 && $v < 6)) {
        if ($s % 10) {
            die "cannot parse version '$ver'\n";
        }
    }

    return ($r, $v, $s);
}

sub format_version
{

```

```

my $ver = shift;

$ver =~ s/000000/;
my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

$v = int $v;
$s = int $s;

if ($r < 5 || ($r == 5 && $v < 6)) {
    if ($s % 10) {
        die "invalid version '$ver'\n";
    }
    $s /= 10;

    $ver = sprintf "%d.%03d", $r, $v;
    $s > 0 and $ver .= sprintf "_%02d", $s;

    return $ver;
}

return sprintf "%d.%d.%d", $r, $v, $s;

sub info
{
    $opt{quiet} and return;
    print @_, "\n";
}

sub diag
{
    $opt{quiet} and return;
    $opt{diag} and print @_, "\n";
}

sub warning
{
    $opt{quiet} and return;
    print "*** ", @_, "\n";
}

sub error
{
    print "*** ERROR: ", @_, "\n";
}

my %given_hints;
my %given_warnings;

```

```

sub hint
{
  $opt{quiet} and return;
  my $func = shift;
  my $rv = 0;
  if (exists $warnings{$func} && !$given_warnings{$func}++) {
    my $warn = $warnings{$func};
    $warn =~ s/^\!*** !mg;
    print "*** WARNING: $func\n", $warn;
    $rv++;
  }
  if ($opt{hints} && exists $hints{$func} && !$given_hints{$func}++) {
    my $hint = $hints{$func};
    $hint =~ s/^\s/ /mg;
    print " --- hint for $func ---\n", $hint;
  }
  $rv;
}

sub usage
{
  my($usage) = do { local(@ARGV,$/)=($0); <> } =~ /^=head\d$HS+SYNOPSIS\s*^(.*?)\s*^=/ms;
  my %M = ( 'T' => '*' );
  $usage =~ s/^\s*perl\s+\S+/$^X $0/;
  $usage =~ s/([A-Z])<([>]+)>/M{$1}$2M{$1}/g;

  print <<ENDUSAGE;

Usage: $usage

See perldoc $0 for details.

ENDUSAGE

exit 2;
}

sub strip
{
  my $self = do { local(@ARGV,$/)=($0); <> };
  my($copy) = $self =~ /^=head\d\s+COPYRIGHT\s*^(.*?)^=\w+/ms;
  $copy =~ s/^(?=\S+)/ /gms;
  $self =~ s/^\$HS+Do NOT edit.*?(?=-)/$copy/ms;
  $self =~ s/^\$SKIP.*(?:^__DATA__)/SKIP
  if (\@ARGV && \$_[0] eq '--unstrip') {
    eval { require Devel::PPPport };
    \$_ and die "Cannot require Devel::PPPport, please install.\n";
    if (eval { $Devel::PPPport::VERSION < $VERSION }) {

```

```

die "$0 was originally generated with Devel::PPPport $VERSION.\n"
. "Your Devel::PPPport is only version \${Devel::PPPport::VERSION}.\n"
. "Please install a newer version, or --unstrip will not work.\n";
}
Devel::PPPport::WriteFile(\$0);
exit 0;
}
print <<END;

```

Sorry, but this is a stripped version of \\$0.

To be able to use its original script and doc functionality,  
please try to regenerate this file using:

```

\${X} \$0 --unstrip

END
/ms;
my($pl, $c) = $self =~ /(.*^__DATA__)(.*)/ms;
$c =~ s{
 / (? : \*[^\*]*\*+(?:[^\$ccs][^\*]*\*+)* / | /[\r\n]*
 | ( "[^\\"]*(?:\\\[^\"]*)*"
 | '[^\']*?(?:\\\[^\']*)*' )
 | ($HS+) ) { defined $2 ? ' ' : ($1 || " ) }gsex;
$c =~ s!\s+!!mg;
$c =~ s!^\$LF!!mg;
$c =~ s!\s*#\s*#!mg;
$c =~ s!\s+!!mg;

open OUT, ">$0" or die "cannot strip $0: $!\n";
print OUT "$pl$c\n";

exit 0;
}

```

```

__DATA__
*/

```

Found in path(s):

```

* /opt/ws_local/PERMITS_SQL/1009548094_1591901909.08/0/perl-threads-shared-1.58-2.el8.src.rpm-cosi-
expand-archive-r04CR9IQ/threads-shared-1.58.tar.gz-cosi-expand-archive-XH2RZBES/threads-shared-
1.58/ppport.h

```

No license file was found, but licenses were detected in source scan.

License: GPL+ or Artistic

Found in path(s):

```

* /opt/ws_local/PERMITS_SQL/1009548094_1591901909.08/0/perl-threads-shared-1.58-2.el8.src.rpm-cosi-

```



expand-archive-r04CR9IQ/perl-threads-shared.spec

No license file was found, but licenses were detected in source scan.

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This program is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548094_1591901909.08/0/perl-threads-shared-1.58-2.el8.src.rpm-cosi-  
expand-archive-r04CR9IQ/threads-shared-1.58.tar.gz-cosi-expand-archive-XH2RZBES/threads-shared-  
1.58/examples/class.pl
```

No license file was found, but licenses were detected in source scan.

=head1 NAME

threads::shared - Perl extension for sharing data structures between threads

=head1 VERSION

This document describes threads::shared version 1.58

=head1 SYNOPSIS

```
use threads;
```

```
use threads::shared;
```

```
my $var :shared;
```

```
my %hsh :shared;
```

```
my @ary :shared;
```

```
my ($scalar, @array, %hash);
```

```
share($scalar);
```

```
share(@array);
```

```
share(%hash);
```

```
$var = $scalar_value;
```

```
$var = $shared_ref_value;
```

```
$var = shared_clone($non_shared_ref_value);
```

```
$var = shared_clone({'foo' => [qw/foo bar baz/]});
```

```
$hsh{'foo'} = $scalar_value;
```

```
$hsh{'bar'} = $shared_ref_value;
```

```
$hsh{'baz'} = shared_clone($non_shared_ref_value);
```

```
$hsh{'quz'} = shared_clone([1..3]);
```

```
$ary[0] = $scalar_value;
```

```
$ary[1] = $shared_ref_value;
```

```
$ary[2] = shared_clone($non_shared_ref_value);
```

```
$ary[3] = shared_clone([ {} , [] ]);
```

```
{ lock(%hash); ... }
```

```
cond_wait($scalar);  
cond_timedwait($scalar, time() + 30);  
cond_broadcast(@array);  
cond_signal(%hash);
```

```
my $lockvar :shared;  
# condition var != lock var  
cond_wait($var, $lockvar);  
cond_timedwait($var, time()+30, $lockvar);
```

## =head1 DESCRIPTION

By default, variables are private to each thread, and each newly created thread gets a private copy of each existing variable. This module allows you to share variables across different threads (and pseudo-forks on Win32). It is used together with the L<threads> module.

This module supports the sharing of the following data types only: scalars and scalar refs, arrays and array refs, and hashes and hash refs.

## =head1 EXPORT

The following functions are exported by this module: C<share>, C<shared\_clone>, C<is\_shared>, C<cond\_wait>, C<cond\_timedwait>, C<cond\_signal> and C<cond\_broadcast>

Note that if this module is imported when L<threads> has not yet been loaded, then these functions all become no-ops. This makes it possible to write modules that will work in both threaded and non-threaded environments.

## =head1 FUNCTIONS

=over 4

### =item share VARIABLE

C<share> takes a variable and marks it as shared:

```
my ($scalar, @array, %hash);  
share($scalar);  
share(@array);  
share(%hash);
```

C<share> will return the shared rvalue, but always as a reference.

Variables can also be marked as shared at compile time by using the C<:shared> attribute:

```
my ($var, %hash, @array) :shared;
```

Shared variables can only store scalars, refs of shared variables, or refs of shared data (discussed in next section):

```
my ($var, %hash, @array) :shared;
my $bork;
```

```
# Storing scalars
```

```
$var = 1;
$hash{'foo'} = 'bar';
$array[0] = 1.5;
```

```
# Storing shared refs
```

```
$var = \%hash;
$hash{'ary'} = \@array;
$array[1] = $var;
```

```
# The following are errors:
```

```
# $var = $bork;           # ref of non-shared variable
# $hash{'bork'} = [];    # non-shared array ref
# push(@array, { 'x' => 1 }); # non-shared hash ref
```

=item shared\_clone REF

C<shared\_clone> takes a reference, and returns a shared version of its argument, performing a deep copy on any non-shared elements. Any shared elements in the argument are used as is (i.e., they are not cloned).

```
my $cpy = shared_clone({'foo' => [qw/foo bar baz/]});
```

Object status (i.e., the class an object is blessed into) is also cloned.

```
my $obj = {'foo' => [qw/foo bar baz/]};
bless($obj, 'Foo');
my $cpy = shared_clone($obj);
print(ref($cpy), "\n");    # Outputs 'Foo'
```

For cloning empty array or hash refs, the following may also be used:

```
$var = &share([]); # Same as $var = shared_clone([]);
$var = &share({}); # Same as $var = shared_clone({});
```

Not all Perl data types can be cloned (e.g., globs, code refs). By default,

C<shared\_clone> will L<croak|Carp> if it encounters such items. To change this behaviour to a warning, then set the following:

```
$threads::shared::clone_warn = 1;
```

In this case, C<undef> will be substituted for the item to be cloned. If set to zero:

```
$threads::shared::clone_warn = 0;
```

then the C<undef> substitution will be performed silently.

=item is\_shared VARIABLE

C<is\_shared> checks if the specified variable is shared or not. If shared, returns the variable's internal ID (similar to C<refaddr()> (see L<Scalar::Util>). Otherwise, returns C<undef>.

```
if (is_shared($var)) {
    print("\$var is shared\n");
} else {
    print("\$var is not shared\n");
}
```

When used on an element of an array or hash, C<is\_shared> checks if the specified element belongs to a shared array or hash. (It does not check the contents of that element.)

```
my %hash :shared;
if (is_shared(%hash)) {
    print("\%hash is shared\n");
}
```

```
$hash{'elem'} = 1;
if (is_shared($hash{'elem'})) {
    print("\$hash{'elem'} is in a shared hash\n");
}
```

=item lock VARIABLE

C<lock> places a B<advisory> lock on a variable until the lock goes out of scope. If the variable is locked by another thread, the C<lock> call will block until it's available. Multiple calls to C<lock> by the same thread from within dynamically nested scopes are safe -- the variable will remain locked until the outermost lock on the variable goes out of scope.

C<lock> follows references exactly I<one> level:

```

my %hash :shared;
my $ref = \%hash;
lock($ref);      # This is equivalent to lock(%hash)

```

Note that you cannot explicitly unlock a variable; you can only wait for the lock to go out of scope. This is most easily accomplished by locking the variable inside a block.

```

my $var :shared;
{
    lock($var);
    # $var is locked from here to the end of the block
    ...
}
# $var is now unlocked

```

As locks are advisory, they do not prevent data access or modification by another thread that does not itself attempt to obtain a lock on the variable.

You cannot lock the individual elements of a container variable:

```

my %hash :shared;
$hash{'foo'} = 'bar';
#lock($hash{'foo'});    # Error
lock(%hash);            # Works

```

If you need more fine-grained control over shared variable access, see `L<Thread::Semaphore>`.

=item cond\_wait VARIABLE

=item cond\_wait CONDVAR, LOCKVAR

The `C<cond_wait>` function takes a `B<locked>` variable as a parameter, unlocks the variable, and blocks until another thread does a `C<cond_signal>` or `C<cond_broadcast>` for that same locked variable. The variable that `C<cond_wait>` blocked on is re-locked after the `C<cond_wait>` is satisfied. If there are multiple threads `C<cond_wait>`ing on the same variable, all but one will re-block waiting to reacquire the lock on the variable. (So if you're only using `C<cond_wait>` for synchronization, give up the lock as soon as possible). The two actions of unlocking the variable and entering the blocked wait state are atomic, the two actions of exiting from the blocked wait state and re-locking the variable are not.

In its second form, `C<cond_wait>` takes a shared, `B<unlocked>` variable followed by a shared, `B<locked>` variable. The second variable is unlocked and thread execution suspended until another thread signals the first variable.

It is important to note that the variable can be notified even if no thread C<cond\_signal> or C<cond\_broadcast> on the variable. It is therefore important to check the value of the variable and go back to waiting if the requirement is not fulfilled. For example, to pause until a shared counter drops to zero:

```
{ lock($counter); cond_wait($counter) until $counter == 0; }
```

=item cond\_timedwait VARIABLE, ABS\_TIMEOUT

=item cond\_timedwait CONDVAR, ABS\_TIMEOUT, LOCKVAR

In its two-argument form, C<cond\_timedwait> takes a B<locked> variable and an absolute timeout in I<epoch> seconds (see L<time() in perlfunc|perlfunc/time> for more) as parameters, unlocks the variable, and blocks until the timeout is reached or another thread signals the variable. A false value is returned if the timeout is reached, and a true value otherwise. In either case, the variable is re-locked upon return.

Like C<cond\_wait>, this function may take a shared, B<locked> variable as an additional parameter; in this case the first parameter is an B<unlocked> condition variable protected by a distinct lock variable.

Again like C<cond\_wait>, waking up and reacquiring the lock are not atomic, and you should always check your desired condition after this function returns. Since the timeout is an absolute value, however, it does not have to be recalculated with each pass:

```
lock($var);
my $abs = time() + 15;
until ($ok = desired_condition($var)) {
    last if !cond_timedwait($var, $abs);
}
# we got it if $ok, otherwise we timed out!
```

=item cond\_signal VARIABLE

The C<cond\_signal> function takes a B<locked> variable as a parameter and unblocks one thread that's C<cond\_wait>ing on that variable. If more than one thread is blocked in a C<cond\_wait> on that variable, only one (and which one is indeterminate) will be unblocked.

If there are no threads blocked in a C<cond\_wait> on the variable, the signal is discarded. By always locking before signaling, you can (with care), avoid signaling before another thread has entered cond\_wait().

C<cond\_signal> will normally generate a warning if you attempt to use it on an unlocked variable. On the rare occasions where doing this may be sensible, you can suppress the warning with:

```
{ no warnings 'threads'; cond_signal($foo); }
```

=item cond\_broadcast VARIABLE

The C<cond\_broadcast> function works similarly to C<cond\_signal>. C<cond\_broadcast>, though, will unblock B<all> the threads that are blocked in a C<cond\_wait> on the locked variable, rather than only one.

=back

=head1 OBJECTS

L<threads::shared> exports a version of L<bless()|perlfunc/"bless REF"> that works on shared objects such that I<blessings> propagate across threads.

```
# Create a shared 'Foo' object
my $foo :shared = shared_clone({});
bless($foo, 'Foo');

# Create a shared 'Bar' object
my $bar :shared = shared_clone({});
bless($bar, 'Bar');

# Put 'bar' inside 'foo'
$foo->{'bar'} = $bar;

# Rebless the objects via a thread
threads->create(sub {
    # Rebless the outer object
    bless($foo, 'Yin');

    # Cannot directly rebless the inner object
    #bless($foo->{'bar'}, 'Yang');

    # Retrieve and rebless the inner object
    my $obj = $foo->{'bar'};
    bless($obj, 'Yang');
    $foo->{'bar'} = $obj;

})->join();

print(ref($foo), "\n"); # Prints 'Yin'
```

```
print(ref($foo->{'bar'}), "\n"); # Prints 'Yang'
print(ref($bar), "\n"); # Also prints 'Yang'
```

## =head1 NOTES

L<threads::shared> is designed to disable itself silently if threads are not available. This allows you to write modules and packages that can be used in both threaded and non-threaded applications.

If you want access to threads, you must C<use threads> before you C<use threads::shared>. L<threads> will emit a warning if you use it after L<threads::shared>.

## =head1 WARNINGS

=over 4

=item cond\_broadcast() called on unlocked variable

=item cond\_signal() called on unlocked variable

See L<"cond\_signal VARIABLE">, above.

=back

## =head1 BUGS AND LIMITATIONS

When C<share> is used on arrays, hashes, array refs or hash refs, any data they contain will be lost.

```
my @arr = qw(foo bar baz);
share(@arr);
# @arr is now empty (i.e., == ());
```

```
# Create a 'foo' object
my $foo = { 'data' => 99 };
bless($foo, 'foo');
```

```
# Share the object
share($foo); # Contents are now wiped out
print("ERROR: \ $foo is empty\n")
  if (! exists($foo->{'data'}));
```

Therefore, populate such variables B<after> declaring them as shared. (Scalar and scalar refs are not affected by this problem.)

Blessing a shared item after it has been nested in another shared item does not propagate the blessing to the shared reference:



```

my $foo = &share({});
my $bar = &share({});
$bar->{foo} = $foo;
bless($foo, 'baz'); # $foo is now of class 'baz',
                    # but $bar->{foo} is unblessed.

```

Therefore, you should bless objects before sharing them.

It is often not wise to share an object unless the class itself has been written to support sharing. For example, a shared object's destructor may get called multiple times, once for each thread's scope exit, or may not get called at all if it is embedded inside another shared object. Another issue is that the contents of hash-based objects will be lost due to the above mentioned limitation. See `F<examples/class.pl>` (in the CPAN distribution of this module) for how to create a class that supports object sharing.

Destructors may not be called on objects if those objects still exist at global destruction time. If the destructors must be called, make sure there are no circular references and that nothing is referencing the objects before the program ends.

Does not support `C<splice>` on arrays. Does not support explicitly changing array lengths via `$#array --` use `C<push>` and `C<pop>` instead.

Taking references to the elements of shared arrays and hashes does not autovivify the elements, and neither does slicing a shared array/hash over non-existent indices/keys autovivify the elements.

`C<share()>` allows you to `C<< share($hashref->{key}) >>` and `C<< share($arrayref->[idx]) >>` without giving any error message. But the `C<< $hashref->{key} >>` or `C<< $arrayref->[idx] >>` is **not** shared, causing the error "lock can only be used on shared values" to occur when you attempt to `C<< lock($hashref->{key}) >>` or `C<< lock($arrayref->[idx]) >>` in another thread.

Using `C<refaddr()>` is unreliable for testing whether or not two shared references are equivalent (e.g., when testing for circular references). Use `L<is_shared()/"is_shared VARIABLE">`, instead:

```

use threads;
use threads::shared;
use Scalar::Util qw(refaddr);

# If ref is shared, use threads::shared's internal ID.
# Otherwise, use refaddr().
my $addr1 = is_shared($ref1) || refaddr($ref1);

```

```
my $addr2 = is_shared($ref2) || refaddr($ref2);
```

```
if ($addr1 == $addr2) {  
    # The refs are equivalent  
}
```

L<each()|perlfunc/"each HASH"> does not work properly on shared references embedded in shared structures. For example:

```
my %foo :shared;  
$foo{'bar'} = shared_clone({'a'=>'x', 'b'=>'y', 'c'=>'z'});  
  
while (my ($key, $val) = each(%{$foo{'bar'}})) {  
    ...  
}
```

Either of the following will work instead:

```
my $ref = $foo{'bar'};  
while (my ($key, $val) = each(%{$ref})) {  
    ...  
}
```

```
foreach my $key (keys(%{$foo{'bar'}})) {  
    my $val = $foo{'bar'}{$key};  
    ...  
}
```

This module supports dual-valued variables created using C<dualvar()> from L<Scalar::Util>. However, while C<\$!> acts like a dualvar, it is implemented as a tied SV. To propagate its value, use the follow construct, if needed:

```
my $errno :shared = dualvar($!, $!);
```

View existing bug reports at, and submit any new bugs, problems, patches, etc. to: L<<http://rt.cpan.org/Public/Dist/Display.html?Name=threads-shared>>

=head1 SEE ALSO

threads::shared on MetaCPAN:

L<<https://metacpan.org/release/threads-shared>>

Code repository for CPAN distribution:

L<<https://github.com/Dual-Life/threads-shared>>

L<threads>, L<perlthrtut>

L<<http://www.perl.com/pub/a/2002/06/11/threads.html>> and

L<<http://www.perl.com/pub/a/2002/09/04/threads.html>>

Perl threads mailing list:

L<<http://lists.perl.org/list/ithreads.html>>

Sample code in the I<examples> directory of this distribution on CPAN.

=head1 AUTHOR

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Documentation borrowed from the old Thread.pm.

CPAN version produced by Jerry D. Hedden E<lt>jdhedden AT cpan DOT orgE<gt>.

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=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548094\_1591901909.08/0/perl-threads-shared-1.58-2.el8.src.rpm-cosi-expand-archive-r04CR9IQ/threads-shared-1.58.tar.gz-cosi-expand-archive-XH2RZBES/threads-shared-1.58/lib/threads/shared.pm

No license file was found, but licenses were detected in source scan.

---

abstract: 'Perl extension for sharing data structures between threads'

author:

- 'Artur Bergman, Jerry D. Hedden <jdhedden AT cpan DOT org>'

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.24, CPAN::Meta::Converter version 2.150010'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: threads-shared

no\_index:

directory:

- t

- inc

requires:

Carp: '0'  
Config: '0'  
ExtUtils::testlib: '0'  
Scalar::Util: '0'  
Test::More: '0'  
XSLoader: '0'  
strict: '0'  
threads: '1.73'  
warnings: '0'  
version: '1.58'  
x\_serialization\_backend: 'CPAN::Meta::YAML version 0.018'

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548094\_1591901909.08/0/perl-threads-shared-1.58-2.el8.src.rpm-cosi-expand-archive-r04CR9IQ/threads-shared-1.58.tar.gz-cosi-expand-archive-XH2RZBES/threads-shared-1.58/META.yml

# 1.56 importlib-resources 5.9.0

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# 1.57 systemd 239-58.el8

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## 1.59 kerberos 1.18.2-14.el8

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lib/gss\_mechs/mech\_krb5/et/kdb5\_err.c  
lib/gss\_mechs/mech\_spnego/mech/gssapiP\_spnego.h  
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lib/krb5/kdb/kdb\_convert.c  
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lib/libgss/g\_dsp\_status.c  
lib/libgss/g\_dup\_name.c  
lib/libgss/g\_exp\_sec\_context.c  
lib/libgss/g\_export\_name.c  
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lib/libgss/g\_utils.c  
lib/libgss/g\_verify.c  
lib/libgss/gssd\_pname\_to\_uid.c  
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uts/common/gssapi/include/mechglueP.h

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- lib/gssapi/mechglue/g\_accept\_sec\_context.c
- lib/gssapi/mechglue/g\_acquire\_cred.c
- lib/gssapi/mechglue/g\_canon\_name.c
- lib/gssapi/mechglue/g\_compare\_name.c
- lib/gssapi/mechglue/g\_context\_time.c
- lib/gssapi/mechglue/g\_delete\_sec\_context.c
- lib/gssapi/mechglue/g\_dsp\_name.c
- lib/gssapi/mechglue/g\_dsp\_status.c
- lib/gssapi/mechglue/g\_dup\_name.c
- lib/gssapi/mechglue/g\_exp\_sec\_context.c
- lib/gssapi/mechglue/g\_export\_name.c
- lib/gssapi/mechglue/g\_glue.c
- lib/gssapi/mechglue/g\_imp\_name.c
- lib/gssapi/mechglue/g\_imp\_sec\_context.c
- lib/gssapi/mechglue/g\_init\_sec\_context.c
- lib/gssapi/mechglue/g\_initialize.c
- lib/gssapi/mechglue/g\_inquire\_context.c
- lib/gssapi/mechglue/g\_inquire\_cred.c
- lib/gssapi/mechglue/g\_inquire\_names.c
- lib/gssapi/mechglue/g\_process\_context.c
- lib/gssapi/mechglue/g\_rel\_buffer.c
- lib/gssapi/mechglue/g\_rel\_cred.c
- lib/gssapi/mechglue/g\_rel\_name.c
- lib/gssapi/mechglue/g\_rel\_oid\_set.c
- lib/gssapi/mechglue/g\_seal.c
- lib/gssapi/mechglue/g\_sign.c
- lib/gssapi/mechglue/g\_store\_cred.c
- lib/gssapi/mechglue/g\_unseal.c
- lib/gssapi/mechglue/g\_userok.c
- lib/gssapi/mechglue/g\_utils.c
- lib/gssapi/mechglue/g\_verify.c

lib/gssapi/mechglue/gssd\_pname\_to\_uid.c  
lib/gssapi/mechglue/mglueP.h  
lib/gssapi/mechglue/oid\_ops.c  
lib/gssapi/spnego/gssapiP\_spnego.h  
lib/gssapi/spnego/spnego\_mech.c

and the initial implementation of incremental propagation, including the following new or changed files:

include/ipropr\_hdr.h  
kadmin/server/ipropr\_svc.c  
lib/kdb/ipropr.x  
lib/kdb/kdb\_convert.c  
lib/kdb/kdb\_log.c  
lib/kdb/kdb\_log.h  
lib/krb5/error\_tables/kdb5\_err.et  
kprop/kpropd\_rpc.c  
kprop/kproplog.c

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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocketFrameAggregator.java

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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/spdy/SpdySynReplyFrame.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/DefaultFullHttpResponse.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/spdy/DefaultSpdyWindowUpdateFrame.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/spdy/SpdyStreamFrame.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/spdy/SpdySessionHandler.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/spdy/DefaultSpdyHeaders.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocketFrameEncoder.java

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* /opt/cola/permits/1258802822_1643111461.86/0/netty-codec-http-4-1-35-final-sources-
jar/io/netty/handler/codec/http/websocketx/extensions/compression/PerFrameDeflateEncoder.java
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jar/io/netty/handler/codec/http/HttpServerExpectContinueHandler.java
* /opt/cola/permits/1258802822_1643111461.86/0/netty-codec-http-4-1-35-final-sources-
jar/io/netty/handler/codec/http/ReadOnlyHttpHeaders.java
* /opt/cola/permits/1258802822_1643111461.86/0/netty-codec-http-4-1-35-final-sources-
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- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/multipart/DefaultHttpDataFactory.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/ContinuationWebSocketFrame.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/HttpConstants.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocketUtil.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/DefaultLastHttpContent.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/HttpHeaders.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/QueryStringDecoder.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/QueryStringEncoder.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/CloseWebSocketFrame.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/multipart/MemoryFileUpload.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocketServerHandshaker.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/multipart/HttpPostBodyUtil.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocket00FrameEncoder.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocketServerHandshakerFactory.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/HttpRequest.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/HttpServerCodec.java
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- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/DefaultHttpRequest.java
- \* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/package-info.java

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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/multipart/package-info.java  
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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocketHandshakeException.java  
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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocketServerProtocolHandshakeHandler.java  
\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/DefaultHttpContent.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/DefaultCookie.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/multipart/FileUpload.java

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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/DefaultHttpHeaders.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/HttpRequestEncoder.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/WebSocketClientHandshaker.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/multipart/AbstractDiskHttpData.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/spdy/DefaultSpdySettingsFrame.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/multipart/MixedFileUpload.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/websocketx/PingWebSocketFrame.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/CookieDecoder.java

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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/rtsp/RtspVersions.java

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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/HttpHeaderDateFormat.java

\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/rtsp/RtspResponseStatuses.java

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\* /opt/cola/permits/1258802822\_1643111461.86/0/netty-codec-http-4-1-35-final-sources-jar/io/netty/handler/codec/http/HttpContentDecompressor.java

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# 1.67 python-requests 2.28.1

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## 1.68 libxkbcommon 0.9.1 1.e18

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## 1.69 perl-text-tabs-wrap 2013.0523 395.el8

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abstract: 'Expand tabs and do simple line wrapping'

author:

- 'David Muir Sharnoff <muir@idiom.org>'

build\_requires:

ExtUtils::MakeMaker: 0

configure\_requires:

ExtUtils::MakeMaker: 0

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 6.62, CPAN::Meta::Converter version 2.112150'

license: unknown

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: 1.4

name: Text-Tabs+Wrap

no\_index:

directory:

- t

- inc

requires: {}

resources:

repository: <http://github.com/muir/Text-Tabs-Wrap>

version: 2013.0523

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1019676549\_1591379882.87/0/perl-Text-Tabs+Wrap-2013.0523-395.el8.src.rpm-cosi-expand-archive-WoUTJPer/Text-Tabs+Wrap-2013.0523.tar.gz-cosi-expand-archive-ZHl16Ysd/Text-Tabs+Wrap-2013.0523/META.yml

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```
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```

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```

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# 1.73 pam 1.3.1-16.el8

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## 1.76 scala 2.9.1

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## 1.81 libxft 2.3.3 1.el8

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\* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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\* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.  
\* org.eclipse.jetty.orbit:javax.mail.glassfish

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The following artifacts are CDDL + GPLv2 with classpath exception.  
<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

\* javax.servlet:javax.servlet-api  
\* javax.annotation:javax.annotation-api

- \* javax.transaction:javax.transaction-api
- \* javax.websocket:javax.websocket-api

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## Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following artifacts may be included in the distribution or downloaded when ALPN module is selected.

- \* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.

<http://openjdk.java.net/legal/gplv2+ce.html>

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The following artifacts are licensed by the OW2 Foundation according to the terms of <http://asm.ow2.org/license.html>

- org.ow2.asm:asm-commons
- org.ow2.asm:asm

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## Apache

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- org.apache.taglibs:taglibs-standard-spec
- org.apache.taglibs:taglibs-standard-impl

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- org.mortbay.jasper:apache-jsp
- org.apache.tomcat:tomcat-jasper
- org.apache.tomcat:tomcat-juli
- org.apache.tomcat:tomcat-jsp-api
- org.apache.tomcat:tomcat-el-api

org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-api  
org.apache.tomcat:tomcat-util-scan  
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-el-api

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Mortbay

The following artifacts are CDDL + GPLv2 with classpath exception.

<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

The UnixCrypt.java code implements the one way cryptography used by Unix systems for simple password protection. Copyright 1996 Aki Yoshida, modified April 2001 by Iris Van den Broeke, Daniel Deville.

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## 1.92 jersey-server 2.5.1

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```

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\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/package.html  
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\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/LogConfigurationException.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/Log4JLogger.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/LogFactoryImpl.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/Jdk13LumberjackLogger.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/SimpleLog.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/Jdk14Logger.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/LogSource.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/NoOpLog.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/LogKitLogger.java  
\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/Log.java  
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\* /opt/cola/permits/1135840457\_1613613080.13/0/commons-logging-1-1-sources-9-  
jar/org/apache/commons/logging/impl/ServletContextCleaner.java

## 1.96 python-requests 2.18.4

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\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/InetAddressResolver.java

\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/DefaultAddressResolverGroup.java

\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/HostsFileParser.java

\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/InetSocketAddressResolver.java

\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/DefaultHostsFileEntriesResolver.java

\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/AbstractAddressResolver.java

\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/DefaultNameResolver.java

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\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-

jar/io/netty/resolver/CompositeNameResolver.java  
\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/AddressResolver.java  
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\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/META-INF/maven/io.netty/netty-resolver/pom.xml  
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\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/HostsFileEntries.java  
\* /opt/cola/permits/1258508460\_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/ResolvedAddressTypes.java  
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```
* /opt/cola/permits/1258508460_1643078730.22/0/netty-resolver-4-1-35-final-sources-
jar/io/netty/resolver/NameResolver.java
* /opt/cola/permits/1258508460_1643078730.22/0/netty-resolver-4-1-35-final-sources-jar/io/netty/resolver/package-
info.java
* /opt/cola/permits/1258508460_1643078730.22/0/netty-resolver-4-1-35-final-sources-
jar/io/netty/resolver/SimpleNameResolver.java
* /opt/cola/permits/1258508460_1643078730.22/0/netty-resolver-4-1-35-final-sources-
jar/io/netty/resolver/AddressResolverGroup.java
* /opt/cola/permits/1258508460_1643078730.22/0/netty-resolver-4-1-35-final-sources-
jar/io/netty/resolver/NoopAddressResolverGroup.java
* /opt/cola/permits/1258508460_1643078730.22/0/netty-resolver-4-1-35-final-sources-
jar/io/netty/resolver/NoopAddressResolver.java
```

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```
builds/unix/pkg.m4
#
docs/FTL.TXT
docs/GPLv2.TXT
#
include/freetype/internal/fthash.h
#
src/base/fthash.c
src/base/md5.c
src/base/md5.h
#
src/bdf/bdf.c
src/bdf/bdf.h
src/bdf/bdfdrivr.c
src/bdf/bdfdrivr.h
src/bdf/bdferror.h
src/bdf/bdflib.c
src/bdf/module.mk
src/bdf/README
src/bdf/rules.mk
#
src/pcf/module.mk
src/pcf/pcf.c
src/pcf/pcf.h
src/pcf/pcfdrivr.c
src/pcf/pcfdrivr.h
src/pcf/pcferror.h
src/pcf/pcfread.c
src/pcf/pcfread.h
src/pcf/pcfutil.c
src/pcf/pcfutil.h
src/pcf/README
src/pcf/rules.mk
#
src/gzip/adler32.c
src/gzip/infblock.c
src/gzip/infblock.h
src/gzip/infcodes.c
src/gzip/infcodes.h
src/gzip/inffixed.h
src/gzip/inflate.c
src/gzip/inftrees.c
src/gzip/inftrees.h
src/gzip/infutil.c
src/gzip/infutil.h
src/gzip/zconf.h
src/gzip/zlib.h
src/gzip/zutil.c
```

```
src/gzip/zutil.h
#
src/tools/apinames.c
src/tools/frandom/frandom.c
#
# EOF
```

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## 1.104 flask-appbuilder 1.9.1

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## 1.107 pexpect 4.8.0

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## 1.108 mime-pull 1.9.7

## 1.109 protobuf-java 3.4.0

# 1.110 httpcomponents-core 4.4.9

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# 1.111 python-certifi 2022.06.15

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ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication. Just configure this file as the SSLCACertificateFile.#

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@(#) \$RCSfile: certdata.txt,v \$ \$Revision: 1.80 \$ \$Date: 2011/11/03 15:11:58 \$

# 1.112 langpacks 1.0 12.el8

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```
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jar/javax/annotation/concurrent/NotThreadSafe.java  
* /opt/cola/permits/1401347239_1661579786.718194/0/jsr305-2-0-1-2-  
jar/javax/annotation/concurrent/GuardedBy.java  
* /opt/cola/permits/1401347239_1661579786.718194/0/jsr305-2-0-1-2-  
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```
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```

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Version 2, June 1991

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When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)
- b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.
- c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

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If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

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Appendix: How to Apply These Terms to Your New Libraries

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To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

=====  
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=====

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Developed by:

LLVM Team

University of Illinois at Urbana-Champaign

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@cindex LGPL, Lesser General Public License  
@center Version 2.1, February 1999

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@appendixsubsec Preamble

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This license, the Lesser General Public License, applies to some  
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rights. These restrictions translate to certain responsibilities for  
you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis  
or for a fee, you must give the recipients all the rights that we gave  
you. You must make sure that they, too, receive or can get the source  
code. If you link other code with the library, you must provide  
complete object files to the recipients, so that they can relink them

with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the `Lesser` General Public License because it does *Less* to protect the user's freedom than the ordinary General Public License. It also provides other free software developers *Less* of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free

library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a ``work based on the library" and a ``work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

@iftex

@appendixsubsec TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

@end iftex

@ifinfo

@center GNU LESSER GENERAL PUBLIC LICENSE

@center TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

@end ifinfo

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A ``library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The ``Library", below, refers to any such software library or work which has been distributed under these terms. A ``work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is

included without limitation in the term ``modification".)

``Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

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You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

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You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

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If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

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@end enumerate

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

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that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

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A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a ``work that uses the Library''. Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a ``work that uses the Library'' with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a ``work that uses the library''. The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a ``work that uses the Library'' uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may

distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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As an exception to the Sections above, you may also combine or link a ``work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

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Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable ``work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

@item

Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

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Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

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For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

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Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

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Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

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# 1.121 bouncy-castle 1.59

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/\* lib/font/fontfile/gunzip.c

written by Mark Eichin <eichin@kitten.gen.ma.us> September 1996.

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## 1.127 swagger-annotations 1.5.3-M1

## 1.128 flask-cors 3.0.2

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## 1.129 sphinx-rtd-theme 0.2.5b2

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# 1.130 go-units 0.4.0

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## 1.131 sed 4.5-5.el8

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For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

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its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

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You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

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Version 3, 29 June 2007

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Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

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#+STARTUP: showall
```

\* DNS resolver (dirmngr/dns.c)

dns.c - Recursive, Reentrant DNS Resolver.

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## 1.133 packaging 20.4

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## 1.136 mail 1.4.2

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## 1.142 restlet 2.4.0

## 1.143 tzlocal 4.2

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## 1.144 curl 7.61.1-22.el8\_6.3

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License Mixing

=====

libcurl can be built to use a fair amount of various third party libraries, libraries that are written and provided by other parties that are distributed using their own licenses. Even libcurl itself contains code that may cause problems to some. This document attempts to describe what licenses libcurl and

the other libraries use and what possible dilemmas linking and mixing them all can lead to for end users.

I am not a lawyer and this is not legal advice!

One common dilemma is that [GPL](<https://www.gnu.org/licenses/gpl.html>) licensed code is not allowed to be linked with code licensed under the [Original BSD license](<https://spdx.org/licenses/BSD-4-Clause.html>) (with the announcement clause). You may still build your own copies that use them all, but distributing them as binaries would be to violate the GPL license - unless you accompany your license with an [exception](<https://www.gnu.org/licenses/gpl-faq.html#GPLIncompatibleLibs>). This particular problem was addressed when the [Modified BSD license](<https://opensource.org/licenses/BSD-3-Clause>) was created, which does not have the announcement clause that collides with GPL.

## libcurl

Uses an [MIT style license](<https://curl.haxx.se/docs/copyright.html>) that is very liberal.

## OpenSSL

(May be used for SSL/TLS support) Uses an Original BSD-style license with an announcement clause that makes it "incompatible" with GPL. You are not allowed to ship binaries that link with OpenSSL that includes GPL code (unless that specific GPL code includes an exception for OpenSSL - a habit that is growing more and more common). If OpenSSL's licensing is a problem for you, consider using another TLS library.

## GnuTLS

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## WolfSSL

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## mbedTLS

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## libressl

(May be used for SSL/TLS support) As an OpenSSL fork, it has the same license as that.

## c-ares

(Used for asynchronous name resolves) Uses an MIT license that is very liberal and imposes no restrictions on any other library or part you may link with.

## zlib

(Used for compressed Transfer-Encoding support) Uses an MIT-style license that shouldn't collide with any other library.

## MIT Kerberos

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## Heimdal

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## OpenLDAP

(Used for LDAP support) Uses a Modified BSD-style license. Since libcurl uses OpenLDAP as a shared library only, I have not heard of anyone that ships OpenLDAP linked with libcurl in an app.

## libssh2

(Used for scp and sftp support) libssh2 uses a Modified BSD-style license.

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## 1.146 flask-login 0.2.11

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# 1.147 npth 1.5 4.el8

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## 1.148 sshd-core 2.7.0

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This option is useful when you wish to copy part of the code of

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## 1.150 libxi 1.1.4 1.e18

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# 1.151 perl-scalar-list-utils 1.49-2.el8

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=head1 NAME

List::Util::XS - Indicate if List::Util was compiled with a C compiler

=head1 SYNOPSIS

```
use List::Util::XS 1.20;
```

=head1 DESCRIPTION

C<List::Util::XS> can be used as a dependency to ensure List::Util was installed using a C compiler and that the XS version is installed.

During installation C<\$List::Util::XS::VERSION> will be set to C<undef> if the XS was not compiled.

Starting with release 1.23\_03, Scalar-List-Util is B<always> using the XS implementation, but for backwards compatibility, we still ship the C<List::Util::XS> module which just loads C<List::Util>.

=head1 SEE ALSO

L<Scalar::Util>, L<List::Util>, L<List::MoreUtils>

=head1 COPYRIGHT

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=cut

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548127_1591903205.0/0/perl-Scalar-List-Utills-1.49-2.el8.src.rpm-cosi-expand-archive-yRiYhbUa/Scalar-List-Utills-1.49.tar.gz-cosi-expand-archive-J35iwRNQ/Scalar-List-Utills-1.49/lib/List/Util/XS.pm
```

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=head1 KNOWN BUGS

=head2 RT #95409

L<<https://rt.cpan.org/Ticket/Display.html?id=95409>>

If the block of code given to L</pairmap> contains lexical variables that are captured by a returned closure, and the closure is executed after the block has been re-used for the next iteration, these lexicals will not see the correct values. For example:

```
my @subs = pairmap {  
    my $var = "$a is $b";  
    sub { print "$var\n" };  
} one => 1, two => 2, three => 3;
```

\$\_->() for @subs;

Will incorrectly print

```
three is 3  
three is 3  
three is 3
```

This is due to the performance optimisation of using C<MULTICALL> for the code block, which means that fresh SVs do not get allocated for each call to the block. Instead, the same SV is re-assigned for each iteration, and all the closures will share the value seen on the final iteration.

To work around this bug, surround the code with a second set of braces. This creates an inner block that defeats the C<MULTICALL> logic, and does get fresh SVs allocated each time:

```

my @subs = pairmap {
  {
    my $var = "$a is $b";
    sub { print "$var\n"; }
  }
} one => 1, two => 2, three => 3;

```

This bug only affects closures that are generated by the block but used afterwards. Lexical variables that are only used during the lifetime of the block's execution will take their individual values for each invocation, as normal.

=head2 uniqnum() on oversized bignums

Due to the way that C<uniqnum()> compares numbers, it cannot distinguish differences between bignums (especially bigints) that are too large to fit in the native platform types. For example,

```

my $x = Math::BigInt->new( "1" x 100 );
my $y = $x + 1;

```

```

say for uniqnum( $x, $y );

```

Will print just the value of C<\$x>, believing that C<\$y> is a numerically-equivalent value. This bug does not affect C<uniqstr()>, which will correctly observe that the two values stringify to different strings.

=head1 SUGGESTED ADDITIONS

The following are additions that have been requested, but I have been reluctant to add due to them being very simple to implement in perl

```

# How many elements are true

```

```

sub true { scalar grep { $_ } @_ }

```

```

# How many elements are false

```

```

sub false { scalar grep { !$_ } @_ }

```

=head1 SEE ALSO

L<Scalar::Util>, L<List::MoreUtils>

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Recent additions and current maintenance by  
Paul Evans, <leonerd@leonerd.org.uk>.

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548127\_1591903205.0/0/perl-Scalar-List-Utils-1.49-2.el8.src.rpm-cosi-expand-archive-yRiYhbUa/Scalar-List-Utils-1.49.tar.gz-cosi-expand-archive-J35iwRNQ/Scalar-List-Utils-1.49/lib/List/Util.pm

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Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548127\_1591903205.0/0/perl-Scalar-List-Utils-1.49-2.el8.src.rpm-cosi-expand-archive-yRiYhbUa/perl-Scalar-List-Utils.spec

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Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548127\_1591903205.0/0/perl-Scalar-List-Utils-1.49-2.el8.src.rpm-cosi-expand-archive-yRiYhbUa/Scalar-List-Utils-1.49.tar.gz-cosi-expand-archive-J35iwRNQ/Scalar-List-Utils-1.49/ListUtil.xs

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/\*

-----

ppport.h -- Perl/Pollution/Portability Version 3.19\_02

Automatically created by Devel::PPPort running under perl 5.010000.

Do NOT edit this file directly! -- Edit PPPort\_pm.PL and the  
includes in parts/inc/ instead.

Use 'perldoc ppport.h' to view the documentation below.

-----

SKIP

=pod

=head1 NAME

ppport.h - Perl/Pollution/Portability version 3.19\_02

=head1 SYNOPSIS

perl ppport.h [options] [source files]

Searches current directory for files if no [source files] are given

--help	show short help
--version	show version
--patch=file	write one patch file with changes
--copy=suffix	write changed copies with suffix
--diff=program	use diff program and options
--compat-version=version	provide compatibility with Perl version
--cplusplus	accept C++ comments
--quiet	don't output anything except fatal errors
--nodiag	don't show diagnostics
--nohints	don't show hints
--nochanges	don't suggest changes
--nofilter	don't filter input files
--strip	strip all script and doc functionality from ppport.h
--list-provided	list provided API
--list-unsupported	list unsupported API
--api-info=name	show Perl API portability information

=head1 COMPATIBILITY

This version of F<ppport.h> is designed to support operation with Perl installations back to 5.003, and has been tested up to 5.11.5.

=head1 OPTIONS

=head2 --help

Display a brief usage summary.

=head2 --version

Display the version of F<ppport.h>.

```
=head2 --patch=I<file>
```

If this option is given, a single patch file will be created if any changes are suggested. This requires a working diff program to be installed on your system.

```
=head2 --copy=I<suffix>
```

If this option is given, a copy of each file will be saved with the given suffix that contains the suggested changes. This does not require any external programs. Note that this does not automatically add a dot between the original filename and the suffix. If you want the dot, you have to include it in the option argument.

If neither C<--patch> or C<--copy> are given, the default is to simply print the diffs for each file. This requires either C<Text::Diff> or a C<diff> program to be installed.

```
=head2 --diff=I<program>
```

Manually set the diff program and options to use. The default is to use C<Text::Diff>, when installed, and output unified context diffs.

```
=head2 --compat-version=I<version>
```

Tell F<ppport.h> to check for compatibility with the given Perl version. The default is to check for compatibility with Perl version 5.003. You can use this option to reduce the output of F<ppport.h> if you intend to be backward compatible only down to a certain Perl version.

```
=head2 --cplusplus
```

Usually, F<ppport.h> will detect C++ style comments and replace them with C style comments for portability reasons. Using this option instructs F<ppport.h> to leave C++ comments untouched.

```
=head2 --quiet
```

Be quiet. Don't print anything except fatal errors.

```
=head2 --nodiag
```



Don't output any diagnostic messages. Only portability alerts will be printed.

```
=head2 --nohints
```

Don't output any hints. Hints often contain useful portability notes. Warnings will still be displayed.

```
=head2 --nochanges
```

Don't suggest any changes. Only give diagnostic output and hints unless these are also deactivated.

```
=head2 --nofilter
```

Don't filter the list of input files. By default, files not looking like source code (i.e. not \*.xs, \*.c, \*.cc, \*.cpp or \*.h) are skipped.

```
=head2 --strip
```

Strip all script and documentation functionality from F<ppport.h>. This reduces the size of F<ppport.h> dramatically and may be useful if you want to include F<ppport.h> in smaller modules without increasing their distribution size too much.

The stripped F<ppport.h> will have a C<--unstrip> option that allows you to undo the stripping, but only if an appropriate C<Devel::PPPport> module is installed.

```
=head2 --list-provided
```

Lists the API elements for which compatibility is provided by F<ppport.h>. Also lists if it must be explicitly requested, if it has dependencies, and if there are hints or warnings for it.

```
=head2 --list-unsupported
```

Lists the API elements that are known not to be supported by F<ppport.h> and below which version of Perl they probably won't be available or work.

```
=head2 --api-info=I<name>
```

Show portability information for API elements matching I<name>. If I<name> is surrounded by slashes, it is interpreted as a regular expression.

```
=head1 DESCRIPTION
```

In order for a Perl extension (XS) module to be as portable as possible across differing versions of Perl itself, certain steps need to be taken.

=over 4

=item \*

Including this header is the first major one. This alone will give you access to a large part of the Perl API that hasn't been available in earlier Perl releases. Use

```
perl ppport.h --list-provided
```

to see which API elements are provided by ppport.h.

=item \*

You should avoid using deprecated parts of the API. For example, using global Perl variables without the C<PL\_> prefix is deprecated. Also, some API functions used to have a C<perl\_> prefix. Using this form is also deprecated. You can safely use the supported API, as F<ppport.h> will provide wrappers for older Perl versions.

=item \*

If you use one of a few functions or variables that were not present in earlier versions of Perl, and that can't be provided using a macro, you have to explicitly request support for these functions by adding one or more C<#define>s in your source code before the inclusion of F<ppport.h>.

These functions or variables will be marked C<explicit> in the list shown by C<--list-provided>.

Depending on whether your module has a single or multiple files that use such functions or variables, you want either C<static> or global variants.

For a C<static> function or variable (used only in a single source file), use:

```
#define NEED_function  
#define NEED_variable
```

For a global function or variable (used in multiple source files), use:

```
#define NEED_function_GLOBAL
```

```
#define NEED_variable_GLOBAL
```

Note that you mustn't have more than one global request for the same function or variable in your project.

Function / Variable	Static Request	Global Request
PL_parser	NEED_PL_parser	NEED_PL_parser_GLOBAL
PL_signals	NEED_PL_signals	NEED_PL_signals_GLOBAL
eval_pv()	NEED_eval_pv	NEED_eval_pv_GLOBAL
grok_bin()	NEED_grok_bin	NEED_grok_bin_GLOBAL
grok_hex()	NEED_grok_hex	NEED_grok_hex_GLOBAL
grok_number()	NEED_grok_number	NEED_grok_number_GLOBAL
grok_numeric_radix()	NEED_grok_numeric_radix	NEED_grok_numeric_radix_GLOBAL
grok_oct()	NEED_grok_oct	NEED_grok_oct_GLOBAL
load_module()	NEED_load_module	NEED_load_module_GLOBAL
my_snprintf()	NEED_my_snprintf	NEED_my_snprintf_GLOBAL
my_sprintf()	NEED_my_sprintf	NEED_my_sprintf_GLOBAL
my_strlcat()	NEED_my_strlcat	NEED_my_strlcat_GLOBAL
my_strlcpy()	NEED_my_strlcpy	NEED_my_strlcpy_GLOBAL
newCONSTSUB()	NEED_newCONSTSUB	NEED_newCONSTSUB_GLOBAL
newRV_noinc()	NEED_newRV_noinc	NEED_newRV_noinc_GLOBAL
newSV_type()	NEED_newSV_type	NEED_newSV_type_GLOBAL
newSVpv_flags()	NEED_newSVpv_flags	NEED_newSVpv_flags_GLOBAL
newSVpv_share()	NEED_newSVpv_share	NEED_newSVpv_share_GLOBAL
pv_display()	NEED_pv_display	NEED_pv_display_GLOBAL
pv_escape()	NEED_pv_escape	NEED_pv_escape_GLOBAL
pv_pretty()	NEED_pv_pretty	NEED_pv_pretty_GLOBAL
sv_2pv_flags()	NEED_sv_2pv_flags	NEED_sv_2pv_flags_GLOBAL
sv_2pvbyte()	NEED_sv_2pvbyte	NEED_sv_2pvbyte_GLOBAL
sv_catpvf_mg()	NEED_sv_catpvf_mg	NEED_sv_catpvf_mg_GLOBAL
sv_catpvf_mg_nocontext()	NEED_sv_catpvf_mg_nocontext	NEED_sv_catpvf_mg_nocontext_GLOBAL
sv_pvn_force_flags()	NEED_sv_pvn_force_flags	NEED_sv_pvn_force_flags_GLOBAL
sv_setpvf_mg()	NEED_sv_setpvf_mg	NEED_sv_setpvf_mg_GLOBAL
sv_setpvf_mg_nocontext()	NEED_sv_setpvf_mg_nocontext	NEED_sv_setpvf_mg_nocontext_GLOBAL
vload_module()	NEED_vload_module	NEED_vload_module_GLOBAL
vnewSVpvf()	NEED_vnewSVpvf	NEED_vnewSVpvf_GLOBAL
warn()	NEED_warner	NEED_warner_GLOBAL

To avoid namespace conflicts, you can change the namespace of the explicitly exported functions / variables using the C<DPPP\_NAMESPACE> macro. Just C<#define> the macro before including C<ppport.h>:

```
#define DPPP_NAMESPACE MyOwnNamespace_  
#include "ppport.h"
```

The default namespace is C<DPPP\_>.

=back

The good thing is that most of the above can be checked by running `F<ppport.h>` on your source code. See the next section for details.

=head1 EXAMPLES

To verify whether `F<ppport.h>` is needed for your module, whether you should make any changes to your code, and whether any special defines should be used, `F<ppport.h>` can be run as a Perl script to check your source code. Simply say:

```
perl ppport.h
```

The result will usually be a list of patches suggesting changes that should at least be acceptable, if not necessarily the most efficient solution, or a fix for all possible problems.

If you know that your XS module uses features only available in newer Perl releases, if you're aware that it uses C++ comments, and if you want all suggestions as a single patch file, you could use something like this:

```
perl ppport.h --compat-version=5.6.0 --cplusplus --patch=test.diff
```

If you only want your code to be scanned without any suggestions for changes, use:

```
perl ppport.h --nochanges
```

You can specify a different `C<diff>` program or options, using the `C<--diff>` option:

```
perl ppport.h --diff='diff -C 10'
```

This would output context diffs with 10 lines of context.

If you want to create patched copies of your files instead, use:

```
perl ppport.h --copy=.new
```

To display portability information for the `C<newSVpv>` function, use:

```
perl ppport.h --api-info=newSVpv
```

Since the argument to `C<--api-info>` can be a regular expression,

you can use

```
perl ppport.h --api-info=/_nomg$/
```

to display portability information for all C<\_nomg> functions or

```
perl ppport.h --api-info=./
```

to display information for all known API elements.

=head1 BUGS

If this version of F<ppport.h> is causing failure during the compilation of this module, please check if newer versions of either this module or C<Devel::PPPport> are available on CPAN before sending a bug report.

If F<ppport.h> was generated using the latest version of C<Devel::PPPport> and is causing failure of this module, please file a bug report using the CPAN Request Tracker at L<<http://rt.cpan.org/>>.

Please include the following information:

=over 4

=item 1.

The complete output from running "perl -V"

=item 2.

This file.

=item 3.

The name and version of the module you were trying to build.

=item 4.

A full log of the build that failed.

=item 5.

Any other information that you think could be relevant.

=back

For the latest version of this code, please get the C<Devel::PPPport>

module from CPAN.

=head1 COPYRIGHT

Version 3.x, Copyright (c) 2004-2010, Marcus Holland-Moritz.

Version 2.x, Copyright (C) 2001, Paul Marquess.

Version 1.x, Copyright (C) 1999, Kenneth Albanowski.

This program is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

=head1 SEE ALSO

See L<Devel::PPPort>.

=cut

use strict;

# Disable broken TRIE-optimization

BEGIN { eval '\${^RE\_TRIE\_MAXBUF} = -1' if \$] >= 5.009004 && \$] <= 5.009005 }

my \$VERSION = 3.19\_02;

```
my %opt = (  
  quiet => 0,  
  diag => 1,  
  hints => 1,  
  changes => 1,  
  cplusplus => 0,  
  filter => 1,  
  strip => 0,  
  version => 0,  
);
```

```
my($ppport) = $0 =~ /([\w.]+)/;
```

```
my $LF = '(?:\r\n|[\r\n])'; # line feed
```

```
my $HS = "[\t]"; # horizontal whitespace
```

# Never use C comments in this file!

```
my $ccs = '!.*';
```

```
my $cce = '*!./';
```

```
my $rcs = quotemeta $ccs;
```

```
my $rce = quotemeta $cce;
```

```
eval {
```

```

require Getopt::Long;
Getopt::Long::GetOptions(\%opt, qw(
    help quiet diag! filter! hints! changes! cplusplus strip version
    patch=s copy=s diff=s compat-version=s
    list-provided list-unsupported api-info=s
)) or usage();
};

if ($@ and grep /^-/, @ARGV) {
    usage() if "@ARGV" =~ /^--?h(?:elp)?$/;
    die "Getopt::Long not found. Please don't use any options.\n";
}

if ($opt{version}) {
    print "This is $0 $VERSION.\n";
    exit 0;
}

usage() if $opt{help};
strip() if $opt{strip};

if (exists $opt{'compat-version'}) {
    my($r,$v,$s) = eval { parse_version($opt{'compat-version'}) };
    if ($@) {
        die "Invalid version number format: '$opt{'compat-version'}'\n";
    }
    die "Only Perl 5 is supported\n" if $r != 5;
    die "Invalid version number: $opt{'compat-version'}\n" if $v >= 1000 || $s >= 1000;
    $opt{'compat-version'} = sprintf "%d.%03d%03d", $r, $v, $s;
}
else {
    $opt{'compat-version'} = 5;
}

my %API = map { /^(\w+)\|([^\|]*)\|([^\|]*)\|(\w*)$/
    ? ( $1 => {
        ($2          ? ( base   => $2 ) : ()),
        ($3          ? ( todo   => $3 ) : ()),
        (index($4, 'v') >= 0 ? ( varargs => 1 ) : ()),
        (index($4, 'p') >= 0 ? ( provided => 1 ) : ()),
        (index($4, 'n') >= 0 ? ( nothxarg => 1 ) : ()),
    } )
    : die "invalid spec: $_" } qw(
    AvFILLp|5.004050||p
    AvFILL|||
    CLASS|||n
    CPERLscope|5.005000||p
    CX_CURPAD_SAVE|||

```

CX\_CURPAD\_SV|||  
CopFILEAV|5.006000||p  
CopFILEGV\_set|5.006000||p  
CopFILEGV|5.006000||p  
CopFILESV|5.006000||p  
CopFILE\_set|5.006000||p  
CopFILE|5.006000||p  
CopSTASHPV\_set|5.006000||p  
CopSTASHPV|5.006000||p  
CopSTASH\_eq|5.006000||p  
CopSTASH\_set|5.006000||p  
CopSTASH|5.006000||p  
CopyD|5.009002||p  
Copy|||  
CvPADLIST|||  
CvSTASH|||  
CvWEAKOUTSIDE|||  
DEFSV\_set|5.010001||p  
DEFSV|5.004050||p  
END\_EXTERN\_C|5.005000||p  
ENTER|||  
ERRSV|5.004050||p  
EXTEND|||  
EXTERN\_C|5.005000||p  
F0convert|||n  
FREEMPS|||  
GIMME\_V||5.004000|n  
GIMME|||n  
GROK\_NUMERIC\_RADIX|5.007002||p  
G\_ARRAY|||  
G\_DISCARD|||  
G\_EVAL|||  
G\_METHOD|5.006001||p  
G\_NOARGS|||  
G\_SCALAR|||  
G\_VOID||5.004000|  
GetVars|||  
GvSVn|5.009003||p  
GvSV|||  
Gv\_AMupdate||5.011000|  
HEf\_SVKEY||5.004000|  
HeHASH||5.004000|  
HeKEY||5.004000|  
HeKLEN||5.004000|  
HePV||5.004000|  
HeSVKEY\_force||5.004000|  
HeSVKEY\_set||5.004000|  
HeSVKEY||5.004000|



HeUTF8|5.010001|  
HeVAL|5.004000|  
HvNAMELEN\_get|5.009003||p  
HvNAME\_get|5.009003||p  
HvNAME|||  
INT2PTR|5.006000||p  
IN\_LOCALE\_COMPILETIME|5.007002||p  
IN\_LOCALE\_RUNTIME|5.007002||p  
IN\_LOCALE|5.007002||p  
IN\_PERL\_COMPILETIME|5.008001||p  
IS\_NUMBER\_GREATER\_THAN\_UV\_MAX|5.007002||p  
IS\_NUMBER\_INFINITY|5.007002||p  
IS\_NUMBER\_IN\_UV|5.007002||p  
IS\_NUMBER\_NAN|5.007003||p  
IS\_NUMBER\_NEG|5.007002||p  
IS\_NUMBER\_NOT\_INT|5.007002||p  
IVSIZE|5.006000||p  
IVTYPE|5.006000||p  
IVdf|5.006000||p  
LEAVE|||  
LVRET|||  
MARK|||  
MULTICALL|5.011005|  
MY\_CXT\_CLONE|5.009002||p  
MY\_CXT\_INIT|5.007003||p  
MY\_CXT|5.007003||p  
MoveD|5.009002||p  
Move|||  
NOOP|5.005000||p  
NUM2PTR|5.006000||p  
NVTYPE|5.006000||p  
NVef|5.006001||p  
NVff|5.006001||p  
NVgf|5.006001||p  
Newxc|5.009003||p  
Newxz|5.009003||p  
Newx|5.009003||p  
Nullav|||  
Nullch|||  
Nullcv|||  
Nullhv|||  
Nullsv|||  
ORIGMARK|||  
PAD\_BASE\_SV|||  
PAD\_CLONE\_VARS|||  
PAD\_COMPNAME\_FLAGS|||  
PAD\_COMPNAME\_GEN\_set|||  
PAD\_COMPNAME\_GEN|||

PAD\_COMPNAME\_OURSTASH|||  
PAD\_COMPNAME\_PV|||  
PAD\_COMPNAME\_TYPE|||  
PAD\_DUP|||  
PAD\_RESTORE\_LOCAL|||  
PAD\_SAVE\_LOCAL|||  
PAD\_SAVE\_SETNULLPAD|||  
PAD\_SETSV|||  
PAD\_SET\_CUR\_NOSAVE|||  
PAD\_SET\_CUR|||  
PAD\_SV1|||  
PAD\_SV|||  
PERLIO\_FUNCS\_CAST|5.009003||p  
PERLIO\_FUNCS\_DECL|5.009003||p  
PERL\_ABS|5.008001||p  
PERL\_BCDVERSION|5.011004||p  
PERL\_GCC\_BRACE\_GROUPS\_FORBIDDEN|5.008001||p  
PERL\_HASH|5.004000||p  
PERL\_INT\_MAX|5.004000||p  
PERL\_INT\_MIN|5.004000||p  
PERL\_LONG\_MAX|5.004000||p  
PERL\_LONG\_MIN|5.004000||p  
PERL\_MAGIC\_arylen|5.007002||p  
PERL\_MAGIC\_backref|5.007002||p  
PERL\_MAGIC\_bm|5.007002||p  
PERL\_MAGIC\_collxfrm|5.007002||p  
PERL\_MAGIC\_dbfile|5.007002||p  
PERL\_MAGIC\_dbline|5.007002||p  
PERL\_MAGIC\_defelem|5.007002||p  
PERL\_MAGIC\_envelem|5.007002||p  
PERL\_MAGIC\_env|5.007002||p  
PERL\_MAGIC\_ext|5.007002||p  
PERL\_MAGIC\_fm|5.007002||p  
PERL\_MAGIC\_glob|5.011004||p  
PERL\_MAGIC\_isaelem|5.007002||p  
PERL\_MAGIC\_isa|5.007002||p  
PERL\_MAGIC\_mutex|5.011004||p  
PERL\_MAGIC\_nkeys|5.007002||p  
PERL\_MAGIC\_overload\_elem|5.007002||p  
PERL\_MAGIC\_overload\_table|5.007002||p  
PERL\_MAGIC\_overload|5.007002||p  
PERL\_MAGIC\_pos|5.007002||p  
PERL\_MAGIC\_qr|5.007002||p  
PERL\_MAGIC\_regdata|5.007002||p  
PERL\_MAGIC\_regdatum|5.007002||p  
PERL\_MAGIC\_regex\_global|5.007002||p  
PERL\_MAGIC\_shared\_scalar|5.007003||p  
PERL\_MAGIC\_shared|5.007003||p

PERL\_MAGIC\_sigelem|5.007002||p  
PERL\_MAGIC\_sig|5.007002||p  
PERL\_MAGIC\_substr|5.007002||p  
PERL\_MAGIC\_sv|5.007002||p  
PERL\_MAGIC\_taint|5.007002||p  
PERL\_MAGIC\_tiedelem|5.007002||p  
PERL\_MAGIC\_tiedscalar|5.007002||p  
PERL\_MAGIC\_tied|5.007002||p  
PERL\_MAGIC\_utf8|5.008001||p  
PERL\_MAGIC\_uvar\_elem|5.007003||p  
PERL\_MAGIC\_uvar|5.007002||p  
PERL\_MAGIC\_vec|5.007002||p  
PERL\_MAGIC\_vstring|5.008001||p  
PERL\_PV\_ESCAPE\_ALL|5.009004||p  
PERL\_PV\_ESCAPE\_FIRSTCHAR|5.009004||p  
PERL\_PV\_ESCAPE\_NOBACKSLASH|5.009004||p  
PERL\_PV\_ESCAPE\_NOCLEAR|5.009004||p  
PERL\_PV\_ESCAPE\_QUOTE|5.009004||p  
PERL\_PV\_ESCAPE\_RE|5.009005||p  
PERL\_PV\_ESCAPE\_UNI\_DETECT|5.009004||p  
PERL\_PV\_ESCAPE\_UNI|5.009004||p  
PERL\_PV\_PRETTY\_DUMP|5.009004||p  
PERL\_PV\_PRETTY\_ELLIPSES|5.010000||p  
PERL\_PV\_PRETTY\_LTGT|5.009004||p  
PERL\_PV\_PRETTY\_NOCLEAR|5.010000||p  
PERL\_PV\_PRETTY\_QUOTE|5.009004||p  
PERL\_PV\_PRETTY\_REGPROP|5.009004||p  
PERL\_QUAD\_MAX|5.004000||p  
PERL\_QUAD\_MIN|5.004000||p  
PERL\_REVISION|5.006000||p  
PERL\_SCAN\_ALLOW\_UNDERSCORES|5.007003||p  
PERL\_SCAN\_DISALLOW\_PREFIX|5.007003||p  
PERL\_SCAN\_GREATER\_THAN\_UV\_MAX|5.007003||p  
PERL\_SCAN\_SILENT\_ILLDIGIT|5.008001||p  
PERL\_SHORT\_MAX|5.004000||p  
PERL\_SHORT\_MIN|5.004000||p  
PERL\_SIGNALS\_UNSAFE\_FLAG|5.008001||p  
PERL\_SUBVERSION|5.006000||p  
PERL\_SYS\_INIT3|5.006000|  
PERL\_SYS\_INIT||  
PERL\_SYS\_TERM||5.011005|  
PERL\_UCHAR\_MAX|5.004000||p  
PERL\_UCHAR\_MIN|5.004000||p  
PERL\_UINT\_MAX|5.004000||p  
PERL\_UINT\_MIN|5.004000||p  
PERL\_ULONG\_MAX|5.004000||p  
PERL\_ULONG\_MIN|5.004000||p  
PERL\_UNUSED\_ARG|5.009003||p

PERL\_UNUSED\_CONTEXT|5.009004||p  
PERL\_UNUSED\_DECL|5.007002||p  
PERL\_UNUSED\_VAR|5.007002||p  
PERL\_UQUAD\_MAX|5.004000||p  
PERL\_UQUAD\_MIN|5.004000||p  
PERL\_USE\_GCC\_BRACE\_GROUPS|5.009004||p  
PERL\_USHORT\_MAX|5.004000||p  
PERL\_USHORT\_MIN|5.004000||p  
PERL\_VERSION|5.006000||p  
PL\_DBsignal|5.005000||p  
PL\_DBsingle|||pn  
PL\_DBsub|||pn  
PL\_DBtrace|||pn  
PL\_Sv|5.005000||p  
PL\_bufend|5.011004||p  
PL\_bufptr|5.011004||p  
PL\_compiling|5.004050||p  
PL\_copline|5.011004||p  
PL\_curcop|5.004050||p  
PL\_curstash|5.004050||p  
PL\_debstash|5.004050||p  
PL\_defgv|5.004050||p  
PL\_diehook|5.004050||p  
PL\_dirty|5.004050||p  
PL\_dowarn|||pn  
PL\_errgv|5.004050||p  
PL\_error\_count|5.011004||p  
PL\_expect|5.011004||p  
PL\_hexdigit|5.005000||p  
PL\_hints|5.005000||p  
PL\_in\_my\_stash|5.011004||p  
PL\_in\_my|5.011004||p  
PL\_keyword\_plugin||5.011002|  
PL\_last\_in\_gv|||n  
PL\_laststatval|5.005000||p  
PL\_lex\_state|5.011004||p  
PL\_lex\_stuff|5.011004||p  
PL\_linestr|5.011004||p  
PL\_modglobal||5.005000|n  
PL\_na|5.004050||pn  
PL\_no\_modify|5.006000||p  
PL\_ofsgv|||n  
PL\_opfreehook||5.011000|n  
PL\_parser|5.009005|5.009005|p  
PL\_perl\_destruct\_level|5.004050||p  
PL\_perldb|5.004050||p  
PL\_ppaddr|5.006000||p  
PL\_rsfilters|5.004050||p

PL\_rsfpl|5.004050||p  
PL\_rs|||n  
PL\_signals|5.008001||p  
PL\_stack\_base|5.004050||p  
PL\_stack\_sp|5.004050||p  
PL\_statcache|5.005000||p  
PL\_stdingv|5.004050||p  
PL\_sv\_arenaroot|5.004050||p  
PL\_sv\_no|5.004050||pn  
PL\_sv\_undef|5.004050||pn  
PL\_sv\_yes|5.004050||pn  
PL\_tainted|5.004050||p  
PL\_tainting|5.004050||p  
PL\_tokenbuf|5.011004||p  
POP\_MULTICALL||5.011005|  
POPi|||n  
POP1|||n  
POPn|||n  
POPpbytex||5.007001|n  
POPpx||5.005030|n  
POPp|||n  
POPs|||n  
PTR2IV|5.006000||p  
PTR2NV|5.006000||p  
PTR2UV|5.006000||p  
PTR2nat|5.009003||p  
PTR2ul|5.007001||p  
PTRV|5.006000||p  
PUSHMARK|||  
PUSH\_MULTICALL||5.011005|  
PUSHi|||  
PUSHmortal|5.009002||p  
PUSHn|||  
PUSHp|||  
PUSHs|||  
PUSHu|5.004000||p  
PUTBACK|||  
PerlIO\_clearerr||5.007003|  
PerlIO\_close||5.007003|  
PerlIO\_context\_layers||5.009004|  
PerlIO\_eof||5.007003|  
PerlIO\_error||5.007003|  
PerlIO\_fileno||5.007003|  
PerlIO\_fill||5.007003|  
PerlIO\_flush||5.007003|  
PerlIO\_get\_base||5.007003|  
PerlIO\_get\_bufsiz||5.007003|  
PerlIO\_get\_cnt||5.007003|

PerlIO\_get\_ptr|5.007003|  
PerlIO\_read|5.007003|  
PerlIO\_seek|5.007003|  
PerlIO\_set\_cnt|5.007003|  
PerlIO\_set\_ptrcnt|5.007003|  
PerlIO\_setlinebuf|5.007003|  
PerlIO\_stderr|5.007003|  
PerlIO\_stdin|5.007003|  
PerlIO\_stdout|5.007003|  
PerlIO\_tell|5.007003|  
PerlIO\_unread|5.007003|  
PerlIO\_write|5.007003|  
Perl\_signbit|5.009005|n  
PoisonFree|5.009004||p  
PoisonNew|5.009004||p  
PoisonWith|5.009004||p  
Poison|5.008000||p  
RETVAl||n  
Renewc|||  
Renew|||  
SAVECLEARSV|||  
SAVECOMPPAD|||  
SAVEPADSV|||  
SAVETMPS|||  
SAVE\_DEFSV|5.004050||p  
SPAGAIN|||  
SP|||  
START\_EXTERN\_C|5.005000||p  
START\_MY\_CXT|5.007003||p  
STMT\_END|||p  
STMT\_START|||p  
STR\_WITH\_LEN|5.009003||p  
ST|||  
SV\_CONST\_RETURN|5.009003||p  
SV\_COW\_DROP\_PV|5.008001||p  
SV\_COW\_SHARED\_HASH\_KEYS|5.009005||p  
SV\_GMAGIC|5.007002||p  
SV\_HAS\_TRAILING\_NUL|5.009004||p  
SV\_IMMEDIATE\_UNREF|5.007001||p  
SV\_MUTABLE\_RETURN|5.009003||p  
SV\_NOSTEAL|5.009002||p  
SV\_SMAGIC|5.009003||p  
SV\_UTF8\_NO\_ENCODING|5.008001||p  
SVfARG|5.009005||p  
SVf\_UTF8|5.006000||p  
SVf|5.006000||p  
SVt\_IV|||  
SVt\_NV|||

SVt\_PVAV|||  
SVt\_PVCV|||  
SVt\_PVHV|||  
SVt\_PVMG|||  
SVt\_PV|||  
Safefree|||  
Slab\_Alloc|||  
Slab\_Free|||  
Slab\_to\_rw|||  
StructCopy|||  
SvCUR\_set|||  
SvCUR|||  
SvEND|||  
SvGAMAGIC|5.006001|  
SvGETMAGIC|5.004050|p  
SvGROW|||  
SvIOK\_UV|5.006000|  
SvIOK\_notUV|5.006000|  
SvIOK\_off|||  
SvIOK\_only\_UV|5.006000|  
SvIOK\_only|||  
SvIOK\_on|||  
SvIOKp|||  
SvIOK|||  
SvIVX|||  
SvIV\_nomg|5.009001|p  
SvIV\_set|||  
SvIVx|||  
SvIV|||  
SvIsCOW\_shared\_hash|5.008003|  
SvIsCOW|5.008003|  
SvLEN\_set|||  
SvLEN|||  
SvLOCK|5.007003|  
SvMAGIC\_set|5.009003|p  
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sv\_pvn\_force|||  
sv\_pvn\_nong|5.007003|5.005000|p  
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sv\_setiv|||  
sv\_setnv\_mg|5.006000||p  
sv\_setnv|||  
sv\_setpv\_mg|5.004050||p  
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sv\_setpvf\_mg|5.006000|5.004000|pv  
sv\_setpvf\_nocontext|||vn  
sv\_setpvf||5.004000|v  
sv\_setpviv\_mg||5.008001|

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sv\_setpvn\_mg|5.004050||p  
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sv\_setref\_nv|||  
sv\_setref\_pvn|||  
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sv\_utf8\_upgrade\_nomg|5.007002|  
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sv\_vcatpvf|5.006000|5.004000|p  
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to\_uni\_lower|5.007003|  
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to\_uni\_title|5.007003|  
to\_uni\_upper\_lc|5.006000|  
to\_uni\_upper|5.007003|  
to\_utf8\_case|5.007003|  
to\_utf8\_fold|5.007003|  
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```

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xmldump_sub_perl|||
xmldump_sub|||
xmldump_vindent|||
yyerror|||
yylex|||
yyparse|||
yywarn|||
);

if (exists $opt{'list-unsupported'}) {
    my $f;
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $API{$f}{todo};
        print "$f ", '!x(40-length($f)), " ", format_version($API{$f}{todo}), "\n";
    }
    exit 0;
}

# Scan for possible replacement candidates

my(%replace, %need, %hints, %warnings, %depends);
my $replace = 0;
my($hint, $define, $function);

sub find_api
{
    my $code = shift;
    $code =~ s{
        / (? : \*[^\*]*\*+(?:[^\$ccs][^\*]*\*+)* / | /[\r\n]*
        | "[^"\\]*(?:\\.[^\\"\\]*)*"
        | '[^'\\]*(?:\\.[^\\"\\]*)*' }{ }egsx;
    grep { exists $API{$_} } $code =~ /(\w+)/mg;
}

while (<DATA>) {
    if ($hint) {
        my $h = $hint->[0] eq 'Hint' ? \%hints : \%warnings;
        if (m{^\s*\s(?:\s*)\s*$}) {
            for (@{$hint->[1]}) {
                $h->{$_} ||= ""; # suppress warning with older perls
                $h->{$_} .= "$1\n";
            }
        }
    }
}

```

```

else { undef $hint }
}

$hint = [$1, [split /,?\s+/, $2]]
  if m{^\s*$rccs\s+(Hint|Warning):\s+(\w+(?:,\s+\w+)*)\s*$};

if ($define) {
  if ($define->[1] =~ /\$/) {
    $define->[1] .= $_;
  }
  else {
    if (exists $API{$define->[0]} && $define->[1] !~ /^DPPP_\(/) {
      my @n = find_api($define->[1]);
      push @{$depends{$define->[0]}}, @n if @n
    }
    undef $define;
  }
}

$define = [$1, $2] if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(.*)};

if ($function) {
  if (/^/) {
    if (exists $API{$function->[0]}) {
      my @n = find_api($function->[1]);
      push @{$depends{$function->[0]}}, @n if @n
    }
    undef $function;
  }
  else {
    $function->[1] .= $_;
  }
}

$function = [$1, ""] if m{^DPPP_\(my_(\w+)\)};

$replace = $1 if m{^\s*$rccs\s+Replace:\s+(\d+)\s+$rcc\s*$};
$replace{$2} = $1 if $replace and m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+)};
$replace{$2} = $1 if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+).*rccs\s+Replace\s+$rcc\s*};
$replace{$1} = $2 if m{^\s*$rccs\s+Replace (\w+) with (\w+)\s+$rcc\s*$};

if (m{^\s*$rccs\s+(\w+(\s*,\s*\w+)*)\s+depends\s+on\s+(\w+(\s*,\s*\w+)*)\s+$rcc\s*$}) {
  my @deps = map { s/\s+//g; $_ } split /,/, $3;
  my $d;
  for $d (map { s/\s+//g; $_ } split /,/, $1) {
    push @{$depends{$d}}, @deps;
  }
}

```

```

$need{$1} = 1 if m{^#if\s+defined\((NEED_(\w+)(?:_GLOBAL)?\)};
}

for (values %depends) {
  my %s;
  $_ = [sort grep !${$_}++, @$_];
}

if (exists $opt{'api-info'}) {
  my $f;
  my $count = 0;
  my $match = $opt{'api-info'} =~ m!^(.*)/$! ? $1 : "\Q$opt{'api-info'}\E\$";
  for $f (sort { lc $a cmp lc $b } keys %API) {
    next unless $f =~ /$match/;
    print "\n=== $f ===\n\n";
    my $info = 0;
    if ($API{$f}{base} || $API{$f}{todo}) {
      my $base = format_version($API{$f}{base} || $API{$f}{todo});
      print "Supported at least starting from perl-$base.\n";
      $info++;
    }
    if ($API{$f}{provided}) {
      my $todo = $API{$f}{todo} ? format_version($API{$f}{todo}) : "5.003";
      print "Support by $ppport provided back to perl-$todo.\n";
      print "Support needs to be explicitly requested by NEED_$. \n" if exists $need{$f};
      print "Depends on: ", join(', ', @{$depends{$f}}), ". \n" if exists $depends{$f};
      print "\n$hints{$f}" if exists $hints{$f};
      print "\nWARNING:\n$warnings{$f}" if exists $warnings{$f};
      $info++;
    }
    print "No portability information available.\n" unless $info;
    $count++;
  }
  $count or print "Found no API matching '$opt{'api-info'}'.";
  print "\n";
  exit 0;
}

if (exists $opt{'list-provided'}) {
  my $f;
  for $f (sort { lc $a cmp lc $b } keys %API) {
    next unless $API{$f}{provided};
    my @flags;
    push @flags, 'explicit' if exists $need{$f};
    push @flags, 'depend' if exists $depends{$f};
    push @flags, 'hint' if exists $hints{$f};
    push @flags, 'warning' if exists $warnings{$f};
  }
}

```

```

my $flags = @flags ? ' [' .join(', ', @flags).']' : "";
print "$f$flags\n";
}
exit 0;
}

my @files;
my @srcext = qw( .xs .c .h .cc .cpp -c.inc -xs.inc );
my $srcext = join '|', map { quotemeta $_ } @srcext;

if (@ARGV) {
my %seen;
for (@ARGV) {
if (-e) {
if (-f) {
push @files, $_ unless $seen{$_}++;
}
else { warn "'$_' is not a file.\n" }
}
else {
my @new = grep { -f } glob $_
or warn "'$_' does not exist.\n";
push @files, grep { !$seen{$_}++ } @new;
}
}
}
else {
eval {
require File::Find;
File::Find::find(sub {
$File::Find::name =~ /($srcext)$/i
and push @files, $File::Find::name;
}, '.');
};
if ($?) {
@files = map { glob "*$_" } @srcext;
}
}

if (!@ARGV || $opt{filter}) {
my(@in, @out);
my %xsc = map { /(.*)\.xs$/ ? ("1.c" => 1, "1.cc" => 1) : () } @files;
for (@files) {
my $out = exists $xsc{$_} || ^b\Q$ppport\E$/i || !/($srcext)$/i;
push @ { $out ? \@out : \@in }, $_;
}
if (@ARGV && @out) {
warning("Skipping the following files (use --nofilter to avoid this):\n| ", join "\n| ", @out);
}
}
}

```

```

}
@files = @in;
}

die "No input files given!\n" unless @files;

my(%files, %global, %revreplace);
%revreplace = reverse %replace;
my $filename;
my $patch_opened = 0;

for $filename (@files) {
    unless (open IN, "<$filename") {
        warn "Unable to read from $filename: $!\n";
        next;
    }

    info("Scanning $filename ...");

    my $c = do { local $/; <IN> };
    close IN;

    my %file = (orig => $c, changes => 0);

    # Temporarily remove C/XS comments and strings from the code
    my @ccom;

    $c =~ s{
        ( ^$HS*#$HS*include\b[^\r\n]+\b(?:\Q$ppport\E\XSUB\.h)\b[^\r\n]*
        | ^$HS*#$HS*(?:define|elif|if(?:def?))\b[^\r\n]* )
    | ( ^$HS*\#[^\r\n]*
        | "[^"\\]*(?:\\.[^"\\])*"
        | '[^"\\]*(?:\\.[^"\\])*'
        | /(?:\*[^\*]*+(?:[^\$ccs][^\*]*+)* /|/[^\r\n]* ) )
    ){ defined $2 and push @ccom, $2;
        defined $1 ? $1 : "$ccs$#ccom$cce" }mgsex;

    $file{ccom} = \@ccom;
    $file{code} = $c;
    $file{has_inc_ppport} = $c =~ /^$HS*#$HS*include[^\r\n]+\b\Q$ppport\E\b/m;

    my $func;

    for $func (keys %API) {
        my $match = $func;
        $match .= "$revreplace{$func}" if exists $revreplace{$func};
        if ($c =~ /\b(?:Perl_)?($match)\b/) {
            $file{uses_replace}{ $1 }++ if exists $revreplace{$func} && $1 eq $revreplace{$func};
        }
    }
}

```

```

$file{uses_Perl}{$func}++ if $c =~ /\bPerl_$func\b/;
if (exists $API{$func}{provided}) {
    $file{uses_provided}{$func}++;
    if (!exists $API{$func}{base} || $API{$func}{base} > $opt{'compat-version'}) {
        $file{uses}{$func}++;
        my @deps = rec_depend($func);
        if (@deps) {
            $file{uses_deps}{$func} = \@deps;
            for (@deps) {
                $file{uses}{$_} = 0 unless exists $file{uses}{$_};
            }
        }
        for ($func, @deps) {
            $file{needs}{$_} = 'static' if exists $need{$_};
        }
    }
}
if (exists $API{$func}{todo} && $API{$func}{todo} > $opt{'compat-version'}) {
    if ($c =~ /\b$func\b/) {
        $file{uses_todo}{$func}++;
    }
}
}

```

```

while ($c =~ /^$HS*#$HS*define$HS+(NEED_(\w+?)(_GLOBAL)?)\b/mg) {
    if (exists $need{$2}) {
        $file{defined $3 ? 'needed_global' : 'needed_static'}{$2}++;
    }
    else { warning("Possibly wrong #define $1 in $filename") }
}

```

```

for (qw(uses needs uses_todo needed_global needed_static)) {
    for $func (keys %{$file{$_}}) {
        push @{$global{$_}{$func}}, $filename;
    }
}

```

```

$files{$filename} = \%file;
}

```

```

# Globally resolve NEED_'s
my $need;
for $need (keys %{$global{needs}}) {
    if (@{$global{needs}{$need}} > 1) {
        my @targets = @{$global{needs}{$need}};
        my @t = grep $files{$_}{needed_global}{$need}, @targets;
        @targets = @t if @t;
    }
}

```

```

    @t = grep /\.xs$/i, @targets;
    @targets = @t if @t;
    my $target = shift @targets;
    $files{$target}{needs}{$need} = 'global';
    for (@{$global{needs}{$need}}) {
        $files{$_}{needs}{$need} = 'extern' if $_ ne $target;
    }
}
}

for $filename (@files) {
    exists $files{$filename} or next;

    info("=== Analyzing $filename ===");

    my %file = %{$files{$filename}};
    my $func;
    my $c = $file{code};
    my $warnings = 0;

    for $func (sort keys %{$file{uses_Perl}}) {
        if ($API{$func}{varargs}) {
            unless ($API{$func}{nothxarg}) {
                my $changes = ($c =~ s{\b(Perl_$func\s*\(\s*(?!aTHX_?)\(\)[^\s]*)\)}
                    { $1 . ($2 eq ') ' ? 'aTHX': 'aTHX_') . $2 }ge);
                if ($changes) {
                    warning("Doesn't pass interpreter argument aTHX to Perl_$func");
                    $file{changes} += $changes;
                }
            }
        }
        else {
            warning("Uses Perl_$func instead of $func");
            $file{changes} += ($c =~ s{\bPerl_$func(\s*)(\(\s*aTHX_?\)\s*)}
                {$func$1($2)}g);
        }
    }

    for $func (sort keys %{$file{uses_replace}}) {
        warning("Uses $func instead of $replace{$func}");
        $file{changes} += ($c =~ s{\b$func\b/$replace{$func}/g});
    }

    for $func (sort keys %{$file{uses_provided}}) {
        if ($file{uses}{$func}) {
            if (exists $file{uses_deps}{$func}) {
                diag("Uses $func, which depends on ", join(', ', @{$file{uses_deps}{$func}}));
            }
        }
    }
}

```



```

else {
    diag("Uses $func");
}
}
$warnings += hint($func);
}

unless ($opt{quiet}) {
    for $func (sort keys %{$file{uses_todo}}) {
        print "*** WARNING: Uses $func, which may not be portable below perl ",
            format_version($API{$func}{todo}), ", even with '$ppport'\n";
        $warnings++;
    }
}

for $func (sort keys %{$file{needed_static}}) {
    my $message = "";
    if (not exists $file{uses}{$func}) {
        $message = "No need to define NEED_$func if $func is never used";
    }
    elsif (exists $file{needs}{$func} && $file{needs}{$func} ne 'static') {
        $message = "No need to define NEED_$func when already needed globally";
    }
    if ($message) {
        diag($message);
        $file{changes} += ($c =~ s/^\$HS*#\$HS*define\$HS+NEED_$func\b.*$LF//mg);
    }
}

for $func (sort keys %{$file{needed_global}}) {
    my $message = "";
    if (not exists $global{uses}{$func}) {
        $message = "No need to define NEED_${func}_GLOBAL if $func is never used";
    }
    elsif (exists $file{needs}{$func}) {
        if ($file{needs}{$func} eq 'extern') {
            $message = "No need to define NEED_${func}_GLOBAL when already needed globally";
        }
        elsif ($file{needs}{$func} eq 'static') {
            $message = "No need to define NEED_${func}_GLOBAL when only used in this file";
        }
    }
    if ($message) {
        diag($message);
        $file{changes} += ($c =~ s/^\$HS*#\$HS*define\$HS+NEED_${func}_GLOBAL\b.*$LF//mg);
    }
}
}

```

```

$file{needs_inc_ppport} = keys % {$file{uses}};

if ($file{needs_inc_ppport}) {
    my $pp = "";

    for $func (sort keys % {$file{needs}}) {
        my $type = $file{needs}{$func};
        next if $type eq 'extern';
        my $suffix = $type eq 'global' ? '_GLOBAL' : "";
        unless (exists $file{"needed_$type"}{$func}) {
            if ($type eq 'global') {
                diag("Files [@$global{needs}{$func}] need $func, adding global request");
            }
            else {
                diag("File needs $func, adding static request");
            }
            $pp .= "#define NEED_$func$suffix\n";
        }
    }
}

if ($pp && ($c =~ s/^(?=$HS*#$HS*define$HS+NEED_\w+)/$pp/m)) {
    $pp = "";
    $file{changes}++;
}

unless ($file{has_inc_ppport}) {
    diag("Needs to include '$ppport'");
    $pp .= qq(#include "$ppport"\n)
}

if ($pp) {
    $file{changes} += ($c =~ s/^(($HS*#$HS*define$HS+NEED_\w+.*?)^/$1$pp/ms)
        || ($c =~ s/^(?=$HS*#$HS*include.*\Q$ppport\E)/$pp/m)
        || ($c =~ s/^(($HS*#$HS*include.*XSUB.*\s*?)^/$1$pp/m)
        || ($c =~ s/^\Q$pp/);
}
}

else {
    if ($file{has_inc_ppport}) {
        diag("No need to include '$ppport'");
        $file{changes} += ($c =~ s/^(($HS*?#$HS*include.*\Q$ppport\E.*?)$LF//m);
    }
}

# put back in our C comments
my $ix;
my $cpc = 0;
my @ccom = @{$file{ccom}};

```

```

for $ix (0 .. $#ccom) {
  if (!$opt{cplusplus} && $ccom[$ix] =~ s!^/!!) {
    $cppc++;
    $file{changes} += $c =~ s/$rccs$ix$rcce/$ccs$ccom[$ix] $cce/;
  }
  else {
    $c =~ s/$rccs$ix$rcce/$ccom[$ix]/;
  }
}

if ($cppc) {
  my $s = $cppc != 1 ? 's' : '';
  warning("Uses $cppc C++ style comment$s, which is not portable");
}

my $s = $warnings != 1 ? 's' : '';
my $warn = $warnings ? " ($warnings warning$s)" : "";
info("Analysis completed$warn");

if ($file{changes}) {
  if (exists $opt{copy}) {
    my $newfile = "$filename$opt{copy}";
    if (-e $newfile) {
      error("$newfile' already exists, refusing to write copy of '$filename'");
    }
    else {
      local *F;
      if (open F, ">$newfile") {
        info("Writing copy of '$filename' with changes to '$newfile'");
        print F $c;
        close F;
      }
      else {
        error("Cannot open '$newfile' for writing: $!");
      }
    }
  }
  elsif (exists $opt{patch} || $opt{changes}) {
    if (exists $opt{patch}) {
      unless ($patch_opened) {
        if (open PATCH, ">$opt{patch}") {
          $patch_opened = 1;
        }
        else {
          error("Cannot open '$opt{patch}' for writing: $!");
          delete $opt{patch};
          $opt{changes} = 1;
          goto fallback;
        }
      }
    }
  }
}

```

```

    }
  }
  mydiff(\*PATCH, $filename, $c);
}
else {
fallback:
  info("Suggested changes:");
  mydiff(\*STDOUT, $filename, $c);
}
}
else {
  my $s = $file{changes} == 1 ? " : 's';
  info("$file{changes} potentially required change$s detected");
}
}
else {
  info("Looks good");
}
}

close PATCH if $patch_opened;

exit 0;

sub try_use { eval "use @_;"; return $@ eq " }

sub mydiff
{
  local *F = shift;
  my($file, $str) = @_ ;
  my $diff;

  if (exists $opt{diff}) {
    $diff = run_diff($opt{diff}, $file, $str);
  }

  if (!defined $diff and try_use("Text::Diff")) {
    $diff = Text::Diff::diff($file, \$str, { STYLE => 'Unified' });
    $diff = <<HEADER . $diff;
--- $file
+++ $file.patched
HEADER
  }

  if (!defined $diff) {
    $diff = run_diff('diff -u', $file, $str);
  }
}

```

```

if (!defined $diff) {
    $diff = run_diff('diff', $file, $str);
}

if (!defined $diff) {
    error("Cannot generate a diff. Please install Text::Diff or use --copy.");
    return;
}

print F $diff;
}

sub run_diff
{
    my($prog, $file, $str) = @_ ;
    my $tmp = 'dppptemp';
    my $suf = 'aaa';
    my $diff = "";
    local *F;

    while (-e "$tmp.$suf") { $suf++ }
    $tmp = "$tmp.$suf";

    if (open F, ">$tmp") {
        print F $str;
        close F;

        if (open F, "$prog $file $tmp |") {
            while (<F>) {
                s/\Q$tmp\E/$file.patched/;
                $diff .= $_;
            }
            close F;
            unlink $tmp;
            return $diff;
        }

        unlink $tmp;
    }
    else {
        error("Cannot open '$tmp' for writing: $!");
    }

    return undef;
}

sub rec_depend

```

```

{
my($func, $seen) = @_;
return () unless exists $depends{$func};
$seen = {% {$seen|{}}};
return () if $seen->{$func}++;
my %s;
grep !${$_}++, map { ($_, rec_depend($_, $seen)) } @{$depends{$func}};
}

```

```

sub parse_version

```

```

{
my $ver = shift;

if ($ver =~ /^(d+)\.(d+)\.(d+)$/) {
return ($1, $2, $3);
}
elsif ($ver !~ /^d+\.[d_]+$/) {
die "cannot parse version '$ver'\n";
}

$ver =~ s/_//g;
$ver =~ s/$/000000/;

my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

```

```

$v = int $v;

```

```

$s = int $s;

```

```

if ($r < 5 || ($r == 5 && $v < 6)) {
if ($s % 10) {
die "cannot parse version '$ver'\n";
}
}

```

```

return ($r, $v, $s);
}

```

```

sub format_version

```

```

{
my $ver = shift;

$ver =~ s/$/000000/;
my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

```

```

$v = int $v;

```

```

$s = int $s;

```

```

if ($r < 5 || ($r == 5 && $v < 6)) {

```

```

if ($s % 10) {
    die "invalid version '$ver'\n";
}
$s /= 10;

$ver = sprintf "%d.%03d", $r, $v;
$s > 0 and $ver .= sprintf "_%02d", $s;

return $ver;
}

return sprintf "%d.%d.%d", $r, $v, $s;
}

sub info
{
    $opt{quiet} and return;
    print @_, "\n";
}

sub diag
{
    $opt{quiet} and return;
    $opt{diag} and print @_, "\n";
}

sub warning
{
    $opt{quiet} and return;
    print "*** ", @_, "\n";
}

sub error
{
    print "*** ERROR: ", @_, "\n";
}

my %given_hints;
my %given_warnings;
sub hint
{
    $opt{quiet} and return;
    my $func = shift;
    my $rv = 0;
    if (exists $warnings{$func} && !$given_warnings{$func}++) {
        my $warn = $warnings{$func};
        $warn =~ s/^\!*** !mg;
        print "*** WARNING: $func\n", $warn;
    }
}

```

```

    $rv++;
}
if ($opt{hints} && exists $hints{$func} && !$given_hints{$func}++) {
    my $hint = $hints{$func};
    $hint =~ s/^/ /mg;
    print " --- hint for $func ---\n", $hint;
}
$rv;
}

sub usage
{
my($usage) = do { local(@ARGV,$/)=($0); <> } =~ /^=head\d$HS+SYNOPSIS\s*^(.*?)\s*^=/ms;
my %M = ( 'T' => '*' );
$usage =~ s/\s*perl\s+\S+/$^X $0/;
$usage =~ s/([A-Z])<([>]+)>/M{$1}$2M{$1}/g;

print <<ENDUSAGE;

Usage: $usage

See perldoc $0 for details.

ENDUSAGE

exit 2;
}

sub strip
{
my $self = do { local(@ARGV,$/)=($0); <> };
my($copy) = $self =~ /^=head\d\s+COPYRIGHT\s*^(.*?)^\s*\w+/ms;
$copy =~ s/^(?=\S+)/ /gms;
$self =~ s/^\$HS+Do NOT edit.*?(?=-)/$copy/ms;
$self =~ s/^\$SKIP.*(?:=__DATA__)/SKIP
if (\@ARGV && $ARGV[0] eq '--unstrip') {
eval { require Devel::PPPort };
\$_@ and die "Cannot require Devel::PPPort, please install.\n";
if (eval $Devel::PPPort::VERSION < $VERSION) {
die "$0 was originally generated with Devel::PPPort $VERSION.\n"
. "Your Devel::PPPort is only version $Devel::PPPort::VERSION.\n"
. "Please install a newer version, or --unstrip will not work.\n";
}
Devel::PPPort::WriteFile(\$_0);
exit 0;
}
print <<END;

```



Sorry, but this is a stripped version of \\$.

To be able to use its original script and doc functionality,  
please try to regenerate this file using:

```
\$^X \$0 --unstrip
```

```
END
```

```
/ms;
```

```
my($pl, $c) = $self =~ /(.*^__DATA__)(.*)/ms;
```

```
$c =~ s{
```

```
 /(?: \*[^\*]*\*+(?:[^\$ccs][^\*]*\*+)* /|/^\r\n*)
```

```
 | ( "[^\\"]*(?:\\.["\\"])*"
```

```
 | '[^\']*?(?:\\.['\\'])*'
```

```
 | ($HS+) ){ defined $2 ? ' ' : ($1 || " ) }gsex;
```

```
$c =~ s!\s+!!mg;
```

```
$c =~ s!^$LF!!mg;
```

```
$c =~ s!\s*#\s*!#!mg;
```

```
$c =~ s!\s+!!mg;
```

```
open OUT, ">$0" or die "cannot strip $0: $!\n";
```

```
print OUT "$pl$c\n";
```

```
exit 0;
```

```
}
```

```
__DATA__
```

```
*/
```

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548127_1591903205.0/0/perl-Scalar-List-Utills-1.49-2.el8.src.rpm-cosi-  
expand-archive-yRiYhbUa/Scalar-List-Utills-1.49.tar.gz-cosi-expand-archive-J35iwRNQ/Scalar-List-Utills-  
1.49/ppport.h
```

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```
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```

```
# This program is free software; you can redistribute it and/or
```

```
# modify it under the same terms as Perl itself.
```

```
=head1 NAME
```

Scalar::Util - A selection of general-utility scalar subroutines

```
=head1 SYNOPSIS
```

```
use Scalar::Util qw(blessed dualvar isdual readonly refaddr reftype
```

```
    tainted weaken isweak isvstring looks_like_number
```

```
    set_prototype);
```

```
# and other useful utils appearing below
```

=head1 DESCRIPTION

C<Scalar::Util> contains a selection of subroutines that people have expressed would be nice to have in the perl core, but the usage would not really be high enough to warrant the use of a keyword, and the size would be so small that being individual extensions would be wasteful.

By default C<Scalar::Util> does not export any subroutines.

=cut

=head1 FUNCTIONS FOR REFERENCES

The following functions all perform some useful activity on reference values.

=head2 blessed

```
my $pkg = blessed( $ref );
```

If C<\$ref> is a blessed reference, the name of the package that it is blessed into is returned. Otherwise C<undef> is returned.

```
$scalar = "foo";  
$class = blessed $scalar;      # undef
```

```
$ref = [];  
$class = blessed $ref;        # undef
```

```
$obj = bless [], "Foo";  
$class = blessed $obj;        # "Foo"
```

Take care when using this function simply as a truth test (such as in C<if(blessed \$ref)...>) because the package name C<"0"> is defined yet false.

=head2 refaddr

```
my $addr = refaddr( $ref );
```

If C<\$ref> is reference, the internal memory address of the referenced value is returned as a plain integer. Otherwise C<undef> is returned.

```
$addr = refaddr "string";      # undef  
$addr = refaddr $var;          # eg 12345678  
$addr = refaddr [];            # eg 23456784
```

```
$obj = bless {}, "Foo";  
$addr = refaddr $obj;          # eg 88123488
```

=head2 reftype

```
my $type = reftype( $ref );
```

If C<\$ref> is a reference, the basic Perl type of the variable referenced is returned as a plain string (such as C<ARRAY> or C<HASH>). Otherwise C<undef> is returned.

```
$type = reftype "string";      # undef
$type = reftype \ $var;       # SCALAR
$type = reftype [];          # ARRAY

$obj = bless {}, "Foo";
$type = reftype $obj;        # HASH
```

=head2 weaken

```
weaken( $ref );
```

The lvalue C<\$ref> will be turned into a weak reference. This means that it will not hold a reference count on the object it references. Also, when the reference count on that object reaches zero, the reference will be set to undef. This function mutates the lvalue passed as its argument and returns no value.

This is useful for keeping copies of references, but you don't want to prevent the object being DESTROY-ed at its usual time.

```
{
  my $var;
  $ref = \ $var;
  weaken($ref);          # Make $ref a weak reference
}
# $ref is now undef
```

Note that if you take a copy of a scalar with a weakened reference, the copy will be a strong reference.

```
my $var;
my $foo = \ $var;
weaken($foo);          # Make $foo a weak reference
my $bar = $foo;        # $bar is now a strong reference
```

This may be less obvious in other situations, such as C<grep()>, for instance when grepping through a list of weakened references to objects that may have been destroyed already:

```
@object = grep { defined } @object;
```

This will indeed remove all references to destroyed objects, but the remaining references to objects will be strong, causing the remaining objects to never be destroyed because there is now always a strong reference to them in the @object array.

```
=head2 unweaken
```

```
unweaken( $ref );
```

I<Since version 1.36.>

The lvalue C<REF> will be turned from a weak reference back into a normal (strong) reference again. This function mutates the lvalue passed as its argument and returns no value. This undoes the action performed by L</weaken>.

This function is slightly neater and more convenient than the otherwise-equivalent code

```
my $tmp = $REF;
undef $REF;
$REF = $tmp;
```

(because in particular, simply assigning a weak reference back to itself does not work to unweaken it; C<\$REF = \$REF> does not work).

```
=head2 isweak
```

```
my $weak = isweak( $ref );
```

Returns true if C<\$ref> is a weak reference.

```
$ref = \foo;
$weak = isweak($ref);      # false
weaken($ref);
$weak = isweak($ref);      # true
```

B<NOTE>: Copying a weak reference creates a normal, strong, reference.

```
$copy = $ref;
$weak = isweak($copy);     # false
```

```
=head1 OTHER FUNCTIONS
```

```
=head2 dualvar
```

```
my $var = dualvar( $num, $string );
```

Returns a scalar that has the value C<\$num> in a numeric context and the value C<\$string> in a string context.

```
$foo = dualvar 10, "Hello";  
$num = $foo + 2;           # 12  
$str = $foo . " world";   # Hello world
```

```
=head2 isdual
```

```
my $dual = isdual( $var );
```

I<Since version 1.26.>

If C<\$var> is a scalar that has both numeric and string values, the result is true.

```
$foo = dualvar 86, "Nix";  
$dual = isdual($foo);     # true
```

Note that a scalar can be made to have both string and numeric content through numeric operations:

```
$foo = "10";  
$dual = isdual($foo);     # false  
$bar = $foo + 0;  
$dual = isdual($foo);     # true
```

Note that although C<\$!> appears to be a dual-valued variable, it is actually implemented as a magical variable inside the interpreter:

```
$! = 1;  
print("$!\n");            # "Operation not permitted"  
$dual = isdual($!);      # false
```

You can capture its numeric and string content using:

```
$err = dualvar $!, $!;  
$dual = isdual($err);    # true
```

```
=head2 isvstring
```

```
my $vstring = isvstring( $var );
```

If C<\$var> is a scalar which was coded as a vstring, the result is true.

```
$vs = v49.46.48;
```

```
$fmt = isvstring($vs) ? "%vd" : "%s"; #true
printf($fmt,$vs);
```

=head2 looks\_like\_number

```
my $isnum = looks_like_number( $var );
```

Returns true if perl thinks C<\$var> is a number. See L<perlapi/looks\_like\_number>.

=head2 openhandle

```
my $fh = openhandle( $fh );
```

Returns C<\$fh> itself if C<\$fh> may be used as a filehandle and is open, or is a tied handle. Otherwise C<undef> is returned.

```
$fh = openhandle(*STDIN);      # *STDIN
$fh = openhandle(\*STDIN);    # *STDIN
$fh = openhandle(*NOTOPEN);   # undef
$fh = openhandle("scalar");   # undef
```

=head2 readonly

```
my $ro = readonly( $var );
```

Returns true if C<\$var> is readonly.

```
sub foo { readonly($_[0]) }
```

```
$readonly = foo($bar);      # false
$readonly = foo(0);         # true
```

=head2 set\_prototype

```
my $code = set_prototype( $code, $prototype );
```

Sets the prototype of the function given by the C<\$code> reference, or deletes it if C<\$prototype> is C<undef>. Returns the C<\$code> reference itself.

```
set_prototype \&foo, '$$';
```

=head2 tainted

```
my $t = tainted( $var );
```

Return true if C<\$var> is tainted.

```
$taint = tainted("constant");    # false
$taint = tainted($ENV{PWD});     # true if running under -T
```

## =head1 DIAGNOSTICS

Module use may give one of the following errors during import.

=over

=item Weak references are not implemented in the version of perl

The version of perl that you are using does not implement weak references, to use L</isweak> or L</weaken> you will need to use a newer release of perl.

=item Vstrings are not implemented in the version of perl

The version of perl that you are using does not implement Vstrings, to use L</isvstring> you will need to use a newer release of perl.

=back

## =head1 KNOWN BUGS

There is a bug in perl5.6.0 with UV's that are  $\geq 1 << 31$ . This will show up as tests 8 and 9 of dualvar.t failing

=head1 SEE ALSO

L<List::Util>

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Additionally L</weaken> and L</isweak> which are

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=cut

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548127_1591903205.0/0/perl-Scalar-List-Utills-1.49-2.el8.src.rpm-cosi-expand-archive-yRiYhbUa/Scalar-List-Utills-1.49.tar.gz-cosi-expand-archive-J35iwRNQ/Scalar-List-Utills-1.49/lib/Scalar/Util.pm
```

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```
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```

```
# This program is free software; you can redistribute it and/or
```

```
# modify it under the same terms as Perl itself.
```

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548127_1591903205.0/0/perl-Scalar-List-Utills-1.49-2.el8.src.rpm-cosi-expand-archive-yRiYhbUa/Scalar-List-Utills-1.49.tar.gz-cosi-expand-archive-J35iwRNQ/Scalar-List-Utills-1.49/lib/Sub/Util.pm
```

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---

abstract: 'Common Scalar and List utility subroutines'

author:

- 'Graham Barr <gbarr@cpan.org>'

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 0

generated\_by: 'ExtUtils::MakeMaker version 7.24, CPAN::Meta::Converter version 2.150010'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: Scalar-List-Utills

no\_index:

directory:

- t

- inc

requires:

Test::More: '0'

perl: '5.006'

resources:

bugtracker: <https://rt.cpan.org/Public/Dist/Display.html?Name=Scalar-List-Utills>

repository: <https://github.com/Scalar-List-Utills/Scalar-List-Utills.git>

version: '1.49'

x\_serialization\_backend: 'CPAN::Meta::YAML version 0.018'

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548127_1591903205.0/0/perl-Scalar-List-Utills-1.49-2.el8.src.rpm-cosi-expand-archive-yRiYhbUa/Scalar-List-Utills-1.49.tar.gz-cosi-expand-archive-J35iwRNQ/Scalar-List-Utills-
```



1.49/META.yml

No license file was found, but licenses were detected in source scan.

This distribution is a replacement for the builtin distribution.

This package contains a selection of subroutines that people have expressed would be nice to have in the perl core, but the usage would not really be high enough to warrant the use of a keyword, and the size so small such that being individual extensions would be wasteful.

After unpacking the distribution, to install this module type

```
perl Makefile.PL
make
make test
make install
```

## KNOWN BUGS

There is a bug in perl5.6.0 with UV's that are  $\geq 1 << 31$ . This will show up as tests 8 and 9 of dualvar.t failing

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Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548127_1591903205.0/0/perl-Scalar-List-Utils-1.49-2.el8.src.rpm-cosi-expand-archive-yRiYhbUa/Scalar-List-Utils-1.49.tar.gz-cosi-expand-archive-J35iwRNQ/Scalar-List-Utils-1.49/README
```

# 1.152 jetty-io 9.4.26.v20200117

## 1.152.1 Available under license :

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\* org.eclipse.jetty.orbit:javax.security.auth.message

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\* org.eclipse.jetty.orbit:javafx.mail.glassfish

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Oracle

The following artifacts are CDDL + GPLv2 with classpath exception.

<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

\* javax.servlet:javax.servlet-api

\* javax.annotation:javax.annotation-api

\* javax.transaction:javax.transaction-api

\* javax.websocket:javax.websocket-api

-----

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following artifacts may be included in the distribution or downloaded when ALPN module is selected.

\* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.

<http://openjdk.java.net/legal/gplv2+ce.html>

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OW2

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org.ow2.asm:asm-commons

org.ow2.asm:asm

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Apache

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org.apache.taglibs:taglibs-standard-spec

org.apache.taglibs:taglibs-standard-impl

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org.mortbay.jasper:apache-jsp  
org.apache.tomcat:tomcat-jasper  
org.apache.tomcat:tomcat-juli  
org.apache.tomcat:tomcat-jsp-api  
org.apache.tomcat:tomcat-el-api  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-api  
org.apache.tomcat:tomcat-util-scan  
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-el-api

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org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

The UnixCrypt.java code implements the one way cryptography used by Unix systems for simple password protection. Copyright 1996 Aki Yoshida, modified April 2001 by Iris Van den Broeke, Daniel Deville.

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jar/org/codehaus/stax2/XMLStreamReader2.java  
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Found in path(s):

\* /opt/cola/permits/1129090477\_1612176217.67/0/stax2-api-3-1-4-sources-  
jar/org/codehaus/stax2/ri/typed/ValueDecoderFactory.java  
\* /opt/cola/permits/1129090477\_1612176217.67/0/stax2-api-3-1-4-sources-  
jar/org/codehaus/stax2/ri/typed/AsciiValueEncoder.java

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/\* Woodstox XML processor  
\*  
\*/

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jar/org/codehaus/stax2/ri/Stax2EventReaderImpl.java

## 1.155 hvac 0.2.17

### 1.155.1 Available under license :

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Metadata-Version: 1.1

Name: hvac

Version: 0.2.17

Summary: HashiCorp Vault API client

Home-page: <https://github.com/ianunruh/hvac>

Author: Ian Unruh

Author-email: [ianunruh@gmail.com](mailto:ianunruh@gmail.com)

License: UNKNOWN

Description: UNKNOWN

Keywords: hashicorp,vault

Platform: UNKNOWN

Classifier: License :: OSI Approved :: Apache Software License

Found in path(s):

\* /opt/cola/permits/1156127291\_1619133333.96/0/hvac-0-2-17-tar-gz/hvac-0.2.17/hvac.egg-info/PKG-INFO

\* /opt/cola/permits/1156127291\_1619133333.96/0/hvac-0-2-17-tar-gz/hvac-0.2.17/PKG-INFO

## 1.156 log4j-api 2.17.1

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Apache Log4j 1.x Compatibility API

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## 1.157 libsemanage 2.9-8.el8

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jar/org/apache/commons/validator/EmailValidator.java  
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jar/org/apache/commons/validator/util/Flags.java  
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## 1.162 jaxb-core 4.0.0

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## 1.163 binutils 2.30-113.el8

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```
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```

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(This file is under construction.) -\*- text -\*-

If you've contributed to gas and your name isn't listed here, it is not meant as a slight. I just don't know about it. Email me, nickc@redhat.com and I'll correct the situation.

This file will eventually be deleted: The general info will go into the documentation, and info on specific files will go into an AUTHORS file, as requested by the FSF.

+++++

Dean Elsner wrote the original gas for vax. [more details?]

Jay Fenlason maintained gas for a while, adding support for gdb-specific debug information and the 68k series machines, most of the preprocessing pass, and extensive changes in messages.c, input-file.c, write.c.

K. Richard Pixley maintained gas for a while, adding various enhancements and many bug fixes, including merging support for several processors, breaking gas up to handle multiple object file format backends (including heavy rewrite, testing, an integration of the coff and b.out backends), adding configuration including heavy testing and verification of cross assemblers and file splits and renaming, converted gas to strictly ansi C including full prototypes, added support for m680[34]0 & cpu32, considerable work on i960 including a coff port (including considerable amounts of reverse engineering), a sparc opcode file rewrite, decstation, rs6000, and hp300hpux host ports, updated "know" assertions and made them work, much other reorganization, cleanup, and lint.

Ken Raeburn wrote the high-level BFD interface code to replace most of the code in format-specific I/O modules.

The original Vax-VMS support was contributed by David L. Kashtan. Eric Youngdale and Pat Rankin have done much work with it since.

The Intel 80386 machine description was written by Eliot Dresselhaus.

Minh Tran-Le at IntelliCorp contributed some AIX 386 support.

The Motorola 88k machine description was contributed by Devon Bowen of Buffalo University and Torbjorn Granlund of the Swedish Institute of Computer Science.

Keith Knowles at the Open Software Foundation wrote the original MIPS back end (tc-mips.c, tc-mips.h), and contributed Rose format support

that hasn't been merged in yet. Ralph Campbell worked with the MIPS code to support a.out format.

Support for the Zilog Z8k and Hitachi H8/300, H8/500 and SH processors (tc-z8k, tc-h8300, tc-h8500, tc-sh), and IEEE 695 object file format (obj-ieee), was written by Steve Chamberlain of Cygnus Solutions. Steve also modified the COFF back end (obj-coffbfd) to use BFD for some low-level operations, for use with the Hitachi, 29k and Zilog targets.

John Gilmore built the AMD 29000 support, added .include support, and simplified the configuration of which versions accept which pseudo-ops. He updated the 68k machine description so that Motorola's opcodes always produced fixed-size instructions (e.g. jsr), while synthetic instructions remained shrinkable (jbsr). John fixed many bugs, including true tested cross-compilation support, and one bug in relaxation that took a week and required the proverbial one-bit fix.

Ian Lance Taylor of Cygnus Solutions merged the Motorola and MIT syntaxes for the 68k, completed support for some COFF targets (68k, i386 SVR3, and SCO Unix), wrote the ECOFF support based on Michael Meissner's mips-tfile program, wrote the PowerPC and RS/6000 support, and made a few other minor patches. He handled the binutils releases for versions 2.7 through 2.9.

David Edelsohn contributed fixes for the PowerPC and AIX support.

Steve Chamberlain made gas able to generate listings.

Support for the HP9000/300 was contributed by Glenn Engel of HP.

Support for ELF format files has been worked on by Mark Eichin of Cygnus Solutions (original, incomplete implementation), Pete Hoogenboom at the University of Utah (HPPA mainly), Michael Meissner of the Open Software Foundation (i386 mainly), and Ken Raeburn of Cygnus Solutions (sparc, initial 64-bit support).

Several engineers at Cygnus Solutions have also provided many small bug fixes and configuration enhancements.

The initial Alpha support was contributed by Carnegie-Mellon University. Additional work was done by Ken Raeburn of Cygnus Solutions. Richard Henderson then rewrote much of the Alpha support.

Ian Dall updated the support code for the National Semiconductor 32000 series, and added support for Mach 3 and NetBSD running on the PC532.

Klaus Kaempf ported the assembler and the binutils to openVMS/Alpha.



Steve Haworth contributed the support for the Texas Instruction c30 (tms320c30).

H.J. Lu has contributed many patches and much testing.

Alan Modra reworked much of the i386 backend, improving the error checking, updating the code, and improving the 16 bit support, using patches from the work of Martynas Kunigelis and H.J. Lu.

Many others have contributed large or small bugfixes and enhancements. If you've contributed significant work and are not mentioned on this list, and want to be, let us know. Some of the history has been lost; we aren't intentionally leaving anyone out.

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<signature of Ty Coon>, 1 April 1990  
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# 1.164 perl-mozilla-ca 20160104-7.module\_el8.5.0+2812+ed912d05

## 1.164.1 Available under license :

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```
---
abstract: "Mozilla's CA cert bundle in PEM format"
author:
- 'Gisle Aas <gisle@activestate.com>'
build_requires:
Test: '0'
configure_requires:
ExtUtils::MakeMaker: '0'
dynamic_config: 1
generated_by: 'ExtUtils::MakeMaker version 7.02, CPAN::Meta::Converter version 2.142690'
license: unknown
meta-spec:
url: http://module-build.sourceforge.net/META-spec-v1.4.html
version: '1.4'
name: Mozilla-CA
no_index:
directory:
- t
- inc
requires:
```

perl: '5.006'  
resources:  
repository: <http://github.com/gisle/mozilla-ca>  
version: '20160104'

Found in path(s):

\* /opt/cola/permits/1345494047\_1661989467.9909937/0/perl-Mozilla-CA-20160104-7.module\_el8.5.0+2812+ed912d05.src.rpm-cosi-expand-archive-xJ7vxKIY/Mozilla-CA-20160104.tar.gz-cosi-expand-archive-3Vvjon9Y/Mozilla-CA-20160104/META.yml  
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Found in path(s):

\* /opt/cola/permits/1345494047\_1661989467.9909937/0/perl-Mozilla-CA-20160104-7.module\_el8.5.0+2812+ed912d05.src.rpm-cosi-expand-archive-xJ7vxKIY/perl-Mozilla-CA.spec  
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Found in path(s):

\* /opt/cola/permits/1345494047\_1661989467.9909937/0/perl-Mozilla-CA-20160104-7.module\_el8.5.0+2812+ed912d05.src.rpm-cosi-expand-archive-xJ7vxKIY/Mozilla-CA-20160104.tar.gz-cosi-expand-archive-3Vvjon9Y/Mozilla-CA-20160104/mk-ca-bundle.pl  
No license file was found, but licenses were detected in source scan.

## NAME

Mozilla::CA - Mozilla's CA cert bundle in PEM format

## SYNOPSIS

```
use IO::Socket::SSL;  
use Mozilla::CA;
```

```
my $host = "www.paypal.com";  
my $client = IO::Socket::SSL->new(  
    PeerHost => "$host:443",  
    SSL_verify_mode => 0x02,  
    SSL_ca_file => Mozilla::CA::SSL_ca_file(),  
);  
|| die "Can't connect: $@";  
  
$client->verify_hostname($host, "http")  
|| die "hostname verification failure";
```

## DESCRIPTION

Mozilla::CA provides a copy of Mozilla's bundle of Certificate Authority certificates in a form that can be consumed by modules and libraries

based on OpenSSL.

The module provide a single function:

`SSL_ca_file()`

Returns the absolute path to the Mozilla's CA cert bundle PEM file.

#### SEE ALSO

<<http://curl.haxx.se/docs/caextract.html>>

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Found in path(s):

```
* /opt/cola/permits/1345494047_1661989467.9909937/0/perl-Mozilla-CA-20160104-7.module_el8.5.0+2812+ed912d05.src.rpm-cosi-expand-archive-xJ7vxKIY/Mozilla-CA-20160104.tar.gz-cosi-expand-archive-3Vvjon9Y/Mozilla-CA-20160104/README
```

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=head1 NAME

Mozilla::CA - Mozilla's CA cert bundle in PEM format

=head1 SYNOPSIS

```
use IO::Socket::SSL;
use Mozilla::CA;

my $host = "www.paypal.com";
my $client = IO::Socket::SSL->new(
PeerHost => "$host:443",
SSL_verify_mode => 0x02,
SSL_ca_file => Mozilla::CA::SSL_ca_file(),
)
|| die "Can't connect: $@";

$client->verify_hostname($host, "http")
|| die "hostname verification failure";
```

=head1 DESCRIPTION

Mozilla::CA provides a copy of Mozilla's bundle of Certificate Authority

certificates in a form that can be consumed by modules and libraries based on OpenSSL.

The module provide a single function:

=over

=item SSL\_ca\_file()

Returns the absolute path to the Mozilla's CA cert bundle PEM file.

=back

=head1 SEE ALSO

L<<http://curl.haxx.se/docs/caextract.html>>

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\* /opt/cola/permits/1345494047\_1661989467.9909937/0/perl-Mozilla-CA-20160104-7.module\_el8.5.0+2812+ed912d05.src.rpm-cosi-expand-archive-xJ7vxKIY/Mozilla-CA-20160104.tar.gz-cosi-expand-archive-3Vvjon9Y/Mozilla-CA-20160104/lib/Mozilla/CA.pm

## 1.165 resteasy-jax-rs 3.0.6.Final

### 1.165.1 Available under license :

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## 1.166 raml-parser 0.8.7

# 1.167 j2objc-annotations 1.1

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JSR-330

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From strings/apr\_strnatcmp.c, include/apr\_strings.h:

strnatcmp.c -- Perform 'natural order' comparisons of strings in C.  
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```

*/

package java.security;

import java.io.Serializable;

/**
 * Legacy security code; do not use.
 */
public abstract class Permission implements Guard, Serializable {
    public Permission(String name) { }

    public final String getName() { return null; }

    public void checkGuard(Object obj) throws SecurityException { }

    public PermissionCollection newPermissionCollection() {
        return new AllPermissionCollection();
    }

    public abstract String getActions();

    public abstract boolean implies(Permission permission);
}

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\* file name: UBiDiProps.java  
\* encoding: US-ASCII  
\* tab size: 8 (not used)

\* indentation:4  
\*  
\* created on: 2005jan16  
\* created by: Markus W. Scherer  
\*  
\* Low-level Unicode bidi/shaping properties access.  
\* Java port of ubidi\_props.h/c.

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<code>Replaceable</code> is an interface representing a string of characters that supports the replacement of a range of itself with a new string of characters. It is used by APIs that change a piece of text while retaining metadata. Metadata is data other than the Unicode characters returned by `char32At()`. One example of metadata is style attributes; another is an edit history, marking each character with an author and revision number.

<p>An implicit aspect of the <code>Replaceable</code> API is that during a replace operation, new characters take on the metadata of the old characters. For example, if the string "the <b>bold</b> font" has range (4, 8) replaced with "strong", then it becomes "the <b>strong</b> font".

<p><code>Replaceable</code> specifies ranges using a start offset and a limit offset. The range of characters thus specified includes the characters at offset start..limit-1. That is, the start offset is inclusive, and the limit offset is exclusive.

<p><code>Replaceable</code> also includes API to access characters in the string: <code>length()</code>, <code>charAt()</code>, <code>char32At()</code>, and <code>extractBetween()</code>.

<p>For a subclass to support metadata, typical behavior of <code>replace()</code> is the following:

<ul>

- <li>Set the metadata of the new text to the metadata of the first character replaced</li>

- <li>If no characters are replaced, use the metadata of the previous character</li>
- <li>If there is no previous character (i.e. start == 0), use the following character</li>
- <li>If there is no following character (i.e. the replaceable was empty), use default metadata<br>
- <li>If the code point U+FFFF is seen, it should be interpreted as a special marker having no metadata<li>

</li>  
</ul>  
If this is not the behavior, the subclass should document any differences.

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@author Alan Liu

@stable ICU 2.0

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<code>ReplaceableString</code> is an adapter class that implements the <code>Replaceable</code> API around an ordinary <code>StringBuffer</code>.

<p><em>Note:</em> This class does not support attributes and is not intended for general use. Most clients will need to implement { @link Replaceable} in their text representation class.

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@see Replaceable

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@stable ICU 2.0

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JUnit

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## 1.171 ima-evm-utils 1.3.2-12.el8

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Found in path(s):

```
* /opt/cola/permits/115342115_1646171445.14/0/jbcrypt-0-4-sources-5-jar/org/mindrot/jbcrypt/BCrypt.java
```

# 1.173 gawk 4.2.1-4.el8

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Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to

encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

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"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means

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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any

application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

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Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

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It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot



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The precise terms and conditions for copying, distribution and modification follow.

## TERMS AND CONDITIONS

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### 1. Source Code.

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source

form of a work.

A "Standard Interface" means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The "System Libraries" of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A "Major Component", in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

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```
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Version 2, June 1991

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## 1.174 python-certifi 2022.6.15

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ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication. Just configure this file as the SSLCACertificateFile.#

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Found in path(s):

\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/writer/DefaultMapper.java

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\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/JSONStyle.java

\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParserInputStream.java

\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParser.java

\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParserMemory.java

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\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/parser/ParseException.java

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\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/writer/FakeMapper.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/JSONAwareEx.java  
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\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/JSONStreamAware.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/JSONNavi.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParserStream.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/JSONAware.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/writer/DefaultMapperOrdered.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/JSONObject.java  
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\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/JSONArray.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/JStylerObj.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/writer/DefaultMapperCollection.java  
\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParserString.java  
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\* /opt/cola/permits/1209129301\_1633010713.35/0/json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParserReader.java

## 1.176 slf4j-log4j 1.7.5

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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

# 1.180 click 7.0

## 1.180.1 Available under license :

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:license: BSD, see LICENSE.rst for more details.

Found in path(s):

\* /opt/cola/permits/1183964583\_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/click/\_termui\_impl.py

\* /opt/cola/permits/1183964583\_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/click/\_\_init\_\_.py

No license file was found, but licenses were detected in source scan.

.. \_contrib:

```
=====  
click-contrib  
=====
```

As the userbase of Click grows, more and more major feature requests pop up in Click's bugtracker. As reasonable as it may be for those features to be bundled with Click instead of being a standalone project, many of those requested features are either highly experimental or have unproven practical use, while potentially being a burden to maintain.

This is why click-contrib\_ exists. The GitHub organization is a collection of possibly experimental third-party packages whose featureset does not belong into Click, but also a playground for major features that may be added to Click in the future. It is also meant to coordinate and concentrate effort on writing third-party extensions for Click, and to ease the effort of searching for such extensions. In that sense it could be described as a low-maintenance alternative to extension repositories of other frameworks.

Please note that the quality and stability of those packages may be different than what you expect from Click itself. While published under a common organization, they are still projects separate from Click.

.. \_click-contrib: <https://github.com/click-contrib/>

Found in path(s):

\* /opt/cola/permits/1183964583\_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/docs/contrib.rst

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License

=====

Click is licensed under a three-clause BSD License. It basically means:

do whatever you want with it as long as the copyright in Click sticks around, the conditions are not modified and the disclaimer is present.

Furthermore, you must not use the names of the authors to promote derivatives of the software without written consent.

License Text

-----

```
.. include:: ../LICENSE.rst
```

Found in path(s):

\* /opt/cola/permits/1183964583\_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/docs/license.rst

No license file was found, but licenses were detected in source scan.

```
import io
```

```
import re
```

```
from setuptools import setup
```

```
with io.open("README.rst", "rt", encoding="utf8") as f:
```

```
    readme = f.read()
```

```
with io.open("click/__init__.py", "rt", encoding="utf8") as f:
```

```
    version = re.search(r"__version__ = \"(?:.*?)\"", f.read()).group(1)
```

```
setup(
```

```
    name="Click",
```

```
    version=version,
```

```
    url="https://palletsprojects.com/p/click/",
```

```
    project_urls={
```

```
        "Documentation": "https://click.palletsprojects.com/",
```

```
        "Code": "https://github.com/pallets/click",
```

```
        "Issue tracker": "https://github.com/pallets/click/issues",
```

```
    },
```

```
    license="BSD",
```

```
    author="Armin Ronacher",
```

```
    author_email="armin.ronacher@active-4.com",
```

```

maintainer="Pallets Team",
maintainer_email="contact@palletsprojects.com",
description="Composable command line interface toolkit",
long_description=readme,
packages=["click"],
include_package_data=True,
python_requires=">=2.7, !=3.0.*, !=3.1.*, !=3.2.*, !=3.3.*",
classifiers=[
    "Development Status :: 5 - Production/Stable",
    "Intended Audience :: Developers",
    "License :: OSI Approved :: BSD License",
    "Operating System :: OS Independent",
    "Programming Language :: Python",
    "Programming Language :: Python :: 2",
    "Programming Language :: Python :: 2.7",
    "Programming Language :: Python :: 3",
    "Programming Language :: Python :: 3.4",
    "Programming Language :: Python :: 3.5",
    "Programming Language :: Python :: 3.6",
    "Programming Language :: Python :: 3.7",
],
)

```

Found in path(s):

```
* /opt/cola/permits/1183964583_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/setup.py
```

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# binary only, patch it back to the system, and then use a wrapper

Found in path(s):

```
* /opt/cola/permits/1183964583_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/click/_compat.py
```

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Including attribution to #612

Found in path(s):

```
* /opt/cola/permits/1183964583_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/tests/test_formatting.py
```

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```
\$ click\_  
=====
```

Click is a Python package for creating beautiful command line interfaces in a composable way with as little code as necessary. It's the "Command Line Interface Creation Kit". It's highly configurable but comes with

sensible defaults out of the box.

It aims to make the process of writing command line tools quick and fun while also preventing any frustration caused by the inability to implement an intended CLI API.

Click in three points:

- Arbitrary nesting of commands
- Automatic help page generation
- Supports lazy loading of subcommands at runtime

## Installing

-----

Install and update using `pip`\_:

```
.. code-block:: text
```

```
$ pip install click
```

Click supports Python 3.4 and newer, Python 2.7, and PyPy.

```
.. _pip: https://pip.pypa.io/en/stable/quickstart/
```

## A Simple Example

-----

What does it look like? Here is an example of a simple Click program:

```
.. code-block:: python
```

```
import click

@click.command()
@click.option("--count", default=1, help="Number of greetings.")
@click.option("--name", prompt="Your name",
              help="The person to greet.")
def hello(count, name):
    """Simple program that greets NAME for a total of COUNT times."""
    for _ in range(count):
        click.echo("Hello, %s!" % name)

if __name__ == '__main__':
    hello()
```



And what it looks like when run:

```
.. code-block:: text
```

```
$ python hello.py --count=3
Your name: Click
Hello, Click!
Hello, Click!
Hello, Click!
```

Donate

-----

The Pallets organization develops and supports Click and other popular packages. In order to grow the community of contributors and users, and allow the maintainers to devote more time to the projects, `please donate today`\_.

```
.. _please donate today: https://palletsprojects.com/donate
```

Links

-----

- \* Website: <https://palletsprojects.com/p/click/>
- \* Documentation: <https://click.palletsprojects.com/>
- \* License: `BSD <<https://github.com/pallets/click/blob/master/LICENSE.rst>>`\_
- \* Releases: <https://pypi.org/project/click/>
- \* Code: <https://github.com/pallets/click>
- \* Issue tracker: <https://github.com/pallets/click/issues>
- \* Test status:
  
- \* Linux, Mac: <https://travis-ci.org/pallets/click>
- \* Windows: <https://ci.appveyor.com/project/pallets/click>
  
- \* Test coverage: <https://codecov.io/gh/pallets/click>

Found in path(s):

```
* /opt/cola/permits/1183964583_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/README.rst
```

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----

Click uses parts of optparse written by Gregory P. Ward and maintained by the Python Software Foundation. This is limited to code in parser.py.

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\* /opt/cola/permits/1183964583\_1627499467.81/0/pallets-click-7-0-0-ga936b99-1-tar-gz/pallets-click-a936b99/LICENSE.rst

## 1.181 perl-getopt-long 2.50 4.e18

### 1.181.1 Available under license :

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The End

## 1.182 audit 3.0.7-2.e18.2

### 1.182.1 Available under license :

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Version 2.1, February 1999

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In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must

be combined with the library in order to run.

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A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

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If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be

linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is

interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

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6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit

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a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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## 1.187 tar 1.30 5.el8

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NAME

Carp - alternative warn and die for modules

DESCRIPTION

The Carp routines are useful in your own modules because they act like `die()` or `warn()`, but with a message which is more likely to be useful to a user of your module. In the case of `cluck`, `confess`, and `longmess` that context is a summary of every call in the call-stack. For a shorter message you can use `carp` or `croak` which report the error as being from where your module was called. There is no guarantee that that is where the error was, but it is a good educated guess.

You can also alter the way the output and logic of Carp works, by changing some global variables in the Carp namespace.

## INSTALLATION

```
perl Makefile.PL
make
make test
make install
```

## AUTHOR

The Carp module first appeared in Larry Wall's perl 5.000 distribution. Since then it has been modified by several of the perl 5 porters. Andrew Main (Zefram) <zefram@fysh.org> divested Carp into an independent distribution.

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```
* /opt/ws_local/PERMITS_SQL/1009548115_1591901898.54/0/perl-Carp-1.42-396.el8.src.rpm-cosi-expand-
archive-6G9eXuF1/Carp-1.38.tar.gz-cosi-expand-archive-ok6zis0t/Carp-1.38/README
```

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---

abstract: 'alternative warn and die for modules'

author:

- unknown

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.1, CPAN::Meta::Converter version 2.150005'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: Carp  
no\_index:  
directory:  
- t  
- inc  
requires:  
Config: '0'  
Exporter: '0'  
ExtUtils::MakeMaker: '0'  
IPC::Open3: '1.0103'  
Test::More: '0.47'  
overload: '0'  
strict: '0'  
warnings: '0'  
version: '1.38'  
x\_serialization\_backend: 'CPAN::Meta::YAML version 0.017'

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\* /opt/ws\_local/PERMITS\_SQL/1009548115\_1591901898.54/0/perl-Carp-1.42-396.el8.src.rpm-cosi-expand-archive-6G9eXuF1/Carp-1.38.tar.gz-cosi-expand-archive-ok6zis0t/Carp-1.38/META.yml

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=head1 NAME

Carp - alternative warn and die for modules

=head1 SYNOPSIS

```
use Carp;

# warn user (from perspective of caller)
carp "string trimmed to 80 chars";

# die of errors (from perspective of caller)
croak "We're outta here!";

# die of errors with stack backtrace
confess "not implemented";

# cluck, longmess and shortmess not exported by default
use Carp qw(cluck longmess shortmess);
```

```
cluck "This is how we got here!";
$long_message = longmess( "message from cluck() or confess()" );
$short_message = shortmess( "message from carp() or croak()" );
```

=head1 DESCRIPTION

The Carp routines are useful in your own modules because they act like C<die()> or C<warn()>, but with a message which is more likely to be useful to a user of your module. In the case of C<cluck()> and C<confess()>, that context is a summary of every call in the call-stack; C<longmess()> returns the contents of the error message.

For a shorter message you can use C<carp()> or C<croak()> which report the error as being from where your module was called. C<shortmess()> returns the contents of this error message. There is no guarantee that that is where the error was, but it is a good educated guess.

C<Carp> takes care not to clobber the status variables C<\$!> and C<\${^E}> in the course of assembling its error messages. This means that a C<\${SIG{\_\_DIE\_\_}}> or C<\${SIG{\_\_WARN\_\_}}> handler can capture the error information held in those variables, if it is required to augment the error message, and if the code calling C<Carp> left useful values there. Of course, C<Carp> can't guarantee the latter.

You can also alter the way the output and logic of C<Carp> works, by changing some global variables in the C<Carp> namespace. See the section on C<GLOBAL VARIABLES> below.

Here is a more complete description of how C<carp> and C<croak> work. What they do is search the call-stack for a function call stack where they have not been told that there shouldn't be an error. If every call is marked safe, they give up and give a full stack backtrace instead. In other words they presume that the first likely looking potential suspect is guilty. Their rules for telling whether a call shouldn't generate errors work as follows:

=over 4

=item 1.

Any call from a package to itself is safe.

=item 2.

Packages claim that there won't be errors on calls to or from packages explicitly marked as safe by inclusion in C<@CARP\_NOT>, or (if that array is empty) C<@ISA>. The ability to override what

@ISA says is new in 5.8.

=item 3.

The trust in item 2 is transitive. If A trusts B, and B trusts C, then A trusts C. So if you do not override C<@ISA> with C<@CARP\_NOT>, then this trust relationship is identical to, "inherits from".

=item 4.

Any call from an internal Perl module is safe. (Nothing keeps user modules from marking themselves as internal to Perl, but this practice is discouraged.)

=item 5.

Any call to Perl's warning system (eg Carp itself) is safe. (This rule is what keeps it from reporting the error at the point where you call C<carp> or C<croak>.)

=item 6.

C<\$Carp::CarpLevel> can be set to skip a fixed number of additional call levels. Using this is not recommended because it is very difficult to get it to behave correctly.

=back

=head2 Forcing a Stack Trace

As a debugging aid, you can force Carp to treat a croak as a confess and a carp as a cluck across I<all> modules. In other words, force a detailed stack trace to be given. This can be very helpful when trying to understand why, or from where, a warning or error is being generated.

This feature is enabled by 'importing' the non-existent symbol 'verbose'. You would typically enable it by saying

```
perl -MCarp=verbose script.pl
```

or by including the string C<-MCarp=verbose> in the PERL5OPT environment variable.

Alternately, you can set the global variable C<\$Carp::Verbose> to true. See the C<GLOBAL VARIABLES> section below.

=head2 Stack Trace formatting

At each stack level, the subroutine's name is displayed along with its parameters. For simple scalars, this is sufficient. For complex data types, such as objects and other references, this can simply display C<'HASH(0x1ab36d8)'\>.

Carp gives two ways to control this.

=over 4

=item 1.

For objects, a method, C<CARP\_TRACE>, will be called, if it exists. If this method doesn't exist, or it recurses into C<Carp>, or it otherwise throws an exception, this is skipped, and Carp moves on to the next option, otherwise checking stops and the string returned is used. It is recommended that the object's type is part of the string to make debugging easier.

=item 2.

For any type of reference, C<\$Carp::RefArgFormatter> is checked (see below). This variable is expected to be a code reference, and the current parameter is passed in. If this function doesn't exist (the variable is undef), or it recurses into C<Carp>, or it otherwise throws an exception, this is skipped, and Carp moves on to the next option, otherwise checking stops and the string returned is used.

=item 3.

Otherwise, if neither C<CARP\_TRACE> nor C<\$Carp::RefArgFormatter> is available, stringify the value ignoring any overloading.

=back

=head1 GLOBAL VARIABLES

=head2 \$Carp::MaxEvalLen

This variable determines how many characters of a string-eval are to be shown in the output. Use a value of C<0> to show all text.

Defaults to C<0>.

=head2 \$Carp::MaxArgLen

This variable determines how many characters of each argument to a function to print. Use a value of C<0> to show the full length of the argument.

Defaults to C<64>.

```
=head2 $Carp::MaxArgNums
```

This variable determines how many arguments to each function to show. Use a false value to show all arguments to a function call. To suppress all arguments, use C<-1> or C<'0 but true'>.

Defaults to C<8>.

```
=head2 $Carp::Verbose
```

This variable makes C<carp()> and C<croak()> generate stack backtraces just like C<cluck()> and C<confess()>. This is how C<use Carp 'verbose'> is implemented internally.

Defaults to C<0>.

```
=head2 $Carp::RefArgFormatter
```

This variable sets a general argument formatter to display references. Plain scalars and objects that implement C<CARP\_TRACE> will not go through this formatter. Calling C<Carp> from within this function is not supported.

```
local $Carp::RefArgFormatter = sub {  
    require Data::Dumper;  
    Data::Dumper::Dump($_[0]); # not necessarily safe  
};
```

```
=head2 @CARP_NOT
```

This variable, I<in your package>, says which packages are I<not> to be considered as the location of an error. The C<carp()> and C<cluck()> functions will skip over callers when reporting where an error occurred.

NB: This variable must be in the package's symbol table, thus:

```
# These work  
our @CARP_NOT; # file scope  
use vars qw(@CARP_NOT); # package scope  
@My::Package::CARP_NOT = ... ; # explicit package variable  
  
# These don't work  
sub xyz { ... @CARP_NOT = ... } # w/o declarations above  
my @CARP_NOT; # even at top-level
```

Example of use:



```

package My::Carping::Package;
use Carp;
our @CARP_NOT;
sub bar { ... or _error('Wrong input') }
sub _error {
    # temporary control of where'ness, __PACKAGE__ is implicit
    local @CARP_NOT = qw(My::Friendly::Caller);
    carp(@_)
}

```

This would make C<Carp> report the error as coming from a caller not in C<My::Carping::Package>, nor from C<My::Friendly::Caller>.

Also read the L</DESCRIPTION> section above, about how C<Carp> decides where the error is reported from.

Use C<@CARP\_NOT>, instead of C<\$Carp::CarpLevel>.

Overrides C<Carp>'s use of C<@ISA>.

```
=head2 %Carp::Internal
```

This says what packages are internal to Perl. C<Carp> will never report an error as being from a line in a package that is internal to Perl. For example:

```

$Carp::Internal{ (__PACKAGE__ ) }++;
# time passes...
sub foo { ... or confess("whatever") };

```

would give a full stack backtrace starting from the first caller outside of \_\_PACKAGE\_\_. (Unless that package was also internal to Perl.)

```
=head2 %Carp::CarpInternal
```

This says which packages are internal to Perl's warning system. For generating a full stack backtrace this is the same as being internal to Perl, the stack backtrace will not start inside packages that are listed in C<%Carp::CarpInternal>. But it is slightly different for the summary message generated by C<carp> or C<croak>. There errors will not be reported on any lines that are calling packages in C<%Carp::CarpInternal>.

For example C<Carp> itself is listed in C<%Carp::CarpInternal>. Therefore the full stack backtrace from C<confess> will not start inside of C<Carp>, and the short message from calling C<croak> is

not placed on the line where `C<croak>` was called.

```
=head2 $Carp::CarpLevel
```

This variable determines how many additional call frames are to be skipped that would not otherwise be when reporting where an error occurred on a call to one of `C<Carp>`'s functions. It is fairly easy to count these call frames on calls that generate a full stack backtrace. However it is much harder to do this accounting for calls that generate a short message. Usually people skip too many call frames. If they are lucky they skip enough that `C<Carp>` goes all of the way through the call stack, realizes that something is wrong, and then generates a full stack backtrace. If they are unlucky then the error is reported from somewhere misleading very high in the call stack.

Therefore it is best to avoid `C<$Carp::CarpLevel>`. Instead use `C<@CARP_NOT>`, `C<%Carp::Internal>` and `C<%Carp::CarpInternal>`.

Defaults to `C<0>`.

```
=head1 BUGS
```

The Carp routines don't handle exception objects currently. If called with a first argument that is a reference, they simply call `die()` or `warn()`, as appropriate.

```
=head1 SEE ALSO
```

`L<Carp::Always>`,  
`L<Carp::Clan>`

```
=head1 AUTHOR
```

The Carp module first appeared in Larry Wall's perl 5.000 distribution. Since then it has been modified by several of the perl 5 porters. Andrew Main (Zefram) <zefram@fysh.org> divested Carp into an independent distribution.

```
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```

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Eclipse

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\* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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\* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.

\* org.eclipse.jetty.orbit:javax.mail.glassfish

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Oracle

The following artifacts are CDDL + GPLv2 with classpath exception.

<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

- \* javax.servlet:javax.servlet-api
- \* javax.annotation:javax.annotation-api
- \* javax.transaction:javax.transaction-api
- \* javax.websocket:javax.websocket-api

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#### Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following artifacts may be included in the distribution or downloaded when ALPN module is selected.

- \* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.

<http://openjdk.java.net/legal/gplv2+ce.html>

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#### OW2

The following artifacts are licensed by the OW2 Foundation according to the terms of <http://asm.ow2.org/license.html>

- org.ow2.asm:asm-commons
- org.ow2.asm:asm

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#### Apache

The following artifacts are ASL2 licensed.

- org.apache.taglibs:taglibs-standard-spec
- org.apache.taglibs:taglibs-standard-impl

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#### MortBay

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- org.mortbay.jasper:apache-jsp



org.apache.tomcat:tomcat-jasper  
org.apache.tomcat:tomcat-juli  
org.apache.tomcat:tomcat-jsp-api  
org.apache.tomcat:tomcat-el-api  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-api  
org.apache.tomcat:tomcat-util-scan  
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-el-api

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<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

The UnixCrypt.java code implements the one way cryptography used by Unix systems for simple password protection. Copyright 1996 Aki Yoshida, modified April 2001 by Iris Van den Broeke, Daniel Deville.

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## 1.192 libpng 1.6.34 5.el8

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## 1.198 python-requests 2.27.1

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/\*

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\*

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\*

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""""

A library to support the Internationalised Domain Names in Applications (IDNA) protocol as specified in RFC 5890 et.al. This new methodology, known as IDNA 2008, can generate materially different results to the previous standard. The library can act as a drop-in replacement for the "encodings.idna" module.

""""

```
import io, sys
from setuptools import setup
```

```
def main():
```

```
    python_version = sys.version_info[:2]
    if python_version < (2,7):
        raise SystemExit("Sorry, Python 2.7 or newer required")
```

```
    package_data = {}
    exec(open('idna/package_data.py').read(), package_data)
```

```
    arguments = {
        'name': 'idna',
        'packages': ['idna'],
        'version': package_data['__version__'],
        'description': 'Internationalized Domain Names in Applications (IDNA)',
        'long_description': io.open("README.rst", encoding="UTF-8").read(),
        'author': 'Kim Davies',
        'author_email': 'kim@cynosure.com.au',
        'license': 'BSD-like',
        'url': 'https://github.com/kjd/idna',
        'classifiers': [
            'Development Status :: 5 - Production/Stable',
            'Intended Audience :: Developers',
            'Intended Audience :: System Administrators',
            'License :: OSI Approved :: BSD License',
            'Operating System :: OS Independent',
            'Programming Language :: Python',
            'Programming Language :: Python :: 2',
```

```

'Programming Language :: Python :: 2.7',
'Programming Language :: Python :: 3',
'Programming Language :: Python :: 3.4',
'Programming Language :: Python :: 3.5',
'Programming Language :: Python :: 3.6',
'Topic :: Internet :: Name Service (DNS)',
'Topic :: Software Development :: Libraries :: Python Modules',
'Topic :: Utilities',
],
'python_requires': '>=2.7, !=3.0.*, !=3.1.*, !=3.2.*, !=3.3.*',
'test_suite': 'tests',
}

setup(**arguments)

if __name__ == '__main__':
    main()

```

Found in path(s):

\* /opt/cola/permits/1110810307\_1606855956.29/0/kjd-idna-v2-8-0-g1cdf175-1-tar-gz/kjd-idna-375dc46/setup.py

## 1.202 perl-file-path 2.15-2.el8

### 1.202.1 Available under license :

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---

abstract: 'Create or remove directory trees'

author:

- unknown

build\_requires:

Carp: '0'

Config: '0'

Errno: '0'

ExtUtils::MakeMaker: '0'

Fcntl: '0'

File::Spec::Functions: '0'

SelectSaver: '0'

Test::Simple: '0.44'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.24, CPAN::Meta::Converter version 2.150010'

license: unknown

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: File-Path  
no\_index:  
directory:  
- t  
- inc  
requires:  
Cwd: '0'  
Exporter: '0'  
File::Basename: '0'  
File::Spec: '0'  
resources:  
repository: <https://github.com/jkeenan/File-Path.git>  
version: '2.15'  
x\_serialization\_backend: 'CPAN::Meta::YAML version 0.018'

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548092\_1591379514.95/0/perl-File-Path-2.15-2.el8.src.rpm-cosi-expand-archive-AW8PKhem/File-Path-2.15.tar.gz-cosi-expand-archive-jmkwhKy1/File-Path-2.15/META.yml

No license file was found, but licenses were detected in source scan.

NAME

File::Path - Create or remove directory trees

INSTALLATION

perl Makefile.PL  
make  
make test  
make install

PREREQUISITES

All prerequisites are found in the Perl 5 core distribution.

To configure:

ExtUtils::MakeMaker

To build:

Cwd                   File::Basename  
Exporter               File::Spec

To test:

Carp                   File::Spec::Functions  
Config                 SelectSaver  
Cwd                    Test::More  
Errno                  Win32    # Windows only  
Fcntl

BUGS

The File-Path bug tracker is located at:

<<http://rt.cpan.org/NoAuth/Bugs.html?Dist=File-Path>>

File reports by sending email to:

bug-File-Path@rt.cpan.org

Include test programs or patches as email attachments.

## AUTHORS

Prior authors and maintainers: Tim Bunce, Charles Bailey, and David Landgren (david at landgren dot net).

Current maintainers are Richard Elberger (riche at cpan dot org) and James E Keenan (jkeenan at cpan dot org).

## COPYRIGHT

This module is copyright (C) Charles Bailey, Tim Bunce, David Landgren, James Keenan, and Richard Elberger 1995-2017. All rights reserved.

## LICENSE

This library is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548092_1591379514.95/0/perl-File-Path-2.15-2.el8.src.rpm-cosi-expand-  
archive-AW8PKhem/File-Path-2.15.tar.gz-cosi-expand-archive-jmkwhKy1/File-Path-2.15/README
```

No license file was found, but licenses were detected in source scan.

=head1 NAME

File::Path - Create or remove directory trees

=head1 VERSION

2.15 - released June 07 2017.

=head1 SYNOPSIS

```
use File::Path qw(make_path remove_tree);

@created = make_path('foo/bar/baz', '/zug/zwang');
@created = make_path('foo/bar/baz', '/zug/zwang', {
    verbose => 1,
    mode => 0711,
});
make_path('foo/bar/baz', '/zug/zwang', {
    chmod => 0777,
```



```

});

$removed_count = remove_tree('foo/bar/baz', '/zug/zwang', {
    verbose => 1,
    error => \my $err_list,
    safe => 1,
});

# legacy (interface promoted before v2.00)
@created = mkpath('/foo/bar/baz');
@created = mkpath('/foo/bar/baz', 1, 0711);
@created = mkpath(['/foo/bar/baz', 'blurfl/quux'], 1, 0711);
$removed_count = rmtree('foo/bar/baz', 1, 1);
$removed_count = rmtree(['/foo/bar/baz', 'blurfl/quux'], 1, 1);

# legacy (interface promoted before v2.06)
@created = mkpath('foo/bar/baz', '/zug/zwang', { verbose => 1, mode => 0711 });
$removed_count = rmtree('foo/bar/baz', '/zug/zwang', { verbose => 1, mode => 0711 });

```

=head1 DESCRIPTION

This module provides a convenient way to create directories of arbitrary depth and to delete an entire directory subtree from the filesystem.

The following functions are provided:

=over

=item make\_path( \$dir1, \$dir2, .... )

=item make\_path( \$dir1, \$dir2, ....., \%opts )

The C<make\_path> function creates the given directories if they don't exist before, much like the Unix command C<mkdir -p>.

The function accepts a list of directories to be created. Its behaviour may be tuned by an optional hashref appearing as the last parameter on the call.

The function returns the list of directories actually created during the call; in scalar context the number of directories created.

The following keys are recognised in the option hash:

=over

=item mode => \$num

The numeric permissions mode to apply to each created directory (defaults to C<0777>), to be modified by the current C<umask>. If the directory already exists (and thus does not need to be created), the permissions will not be modified.

C<mask> is recognised as an alias for this parameter.

=item chmod => \$num

Takes a numeric mode to apply to each created directory (not modified by the current C<umask>). If the directory already exists (and thus does not need to be created), the permissions will not be modified.

=item verbose => \$bool

If present, will cause C<make\_path> to print the name of each directory as it is created. By default nothing is printed.

=item error => \ \$err

If present, it should be a reference to a scalar.

This scalar will be made to reference an array, which will be used to store any errors that are encountered. See the L</"ERROR HANDLING"> section for more information.

If this parameter is not used, certain error conditions may raise a fatal error that will cause the program to halt, unless trapped in an C<eval> block.

=item owner => \$owner

=item user => \$owner

=item uid => \$owner

If present, will cause any created directory to be owned by C<\$owner>. If the value is numeric, it will be interpreted as a uid; otherwise a username is assumed. An error will be issued if the username cannot be mapped to a uid, the uid does not exist or the process lacks the privileges to change ownership.

Ownership of directories that already exist will not be changed.

C<user> and C<uid> are aliases of C<owner>.

=item group => \$group

If present, will cause any created directory to be owned by the group C<\$group>. If the value is numeric, it will be interpreted as a gid; otherwise a group name is assumed. An error will be issued if the group name cannot be mapped to a gid, the gid does not exist or the process lacks the privileges to change group ownership.

Group ownership of directories that already exist will not be changed.

```
make_path '/var/tmp/webcache', { owner=>'nobody', group=>'nogroup'};
```

=back

=item mkpath( \$dir )

=item mkpath( \$dir, \$verbose, \$mode )

=item mkpath( [\$dir1, \$dir2,...], \$verbose, \$mode )

=item mkpath( \$dir1, \$dir2,..., \%opt )

The C<mkpath()> function provide the legacy interface of C<make\_path()> with a different interpretation of the arguments passed. The behaviour and return value of the function is otherwise identical to C<make\_path()>.

=item remove\_tree( \$dir1, \$dir2, .... )

=item remove\_tree( \$dir1, \$dir2, ...., \%opts )

The C<remove\_tree> function deletes the given directories and any files and subdirectories they might contain, much like the Unix command C<rm -rf> or the Windows commands C<rmdir /s> and C<rd /s>.

The function accepts a list of directories to be removed. (In point of fact, it will also accept filesystem entries which are not directories, such as regular files and symlinks. But, as its name suggests, its intent is to remove trees rather than individual files.)

C<remove\_tree()>'s behaviour may be tuned by an optional hashref appearing as the last parameter on the call. If an empty string is passed to C<remove\_tree>, an error will occur.

B<NOTE:> For security reasons, we strongly advise use of the hashref-as-final-argument syntax -- specifically, with a setting of the C<safe> element to a true value.

```
remove_tree( $dir1, $dir2, ....,
```

```

    {
      safe => 1,
      ...    # other key-value pairs
    },
  );

```

The function returns the number of files successfully deleted.

The following keys are recognised in the option hash:

=over

=item verbose => \$bool

If present, will cause C<remove\_tree> to print the name of each file as it is unlinked. By default nothing is printed.

=item safe => \$bool

When set to a true value, will cause C<remove\_tree> to skip the files for which the process lacks the required privileges needed to delete files, such as delete privileges on VMS. In other words, the code will make no attempt to alter file permissions. Thus, if the process is interrupted, no filesystem object will be left in a more permissive mode.

=item keep\_root => \$bool

When set to a true value, will cause all files and subdirectories to be removed, except the initially specified directories. This comes in handy when cleaning out an application's scratch directory.

```

  remove_tree( '/tmp', {keep_root => 1} );

```

=item result => \ \$res

If present, it should be a reference to a scalar.

This scalar will be made to reference an array, which will be used to store all files and directories unlinked during the call. If nothing is unlinked, the array will be empty.

```

  remove_tree( '/tmp', {result => \my $list} );
  print "unlinked $_\n" for @$list;

```

This is a useful alternative to the C<verbose> key.

=item error => \ \$err

If present, it should be a reference to a scalar.

This scalar will be made to reference an array, which will be used to store any errors that are encountered. See the `L</"ERROR HANDLING">` section for more information.

Removing things is a much more dangerous proposition than creating things. As such, there are certain conditions that `C<remove_tree>` may encounter that are so dangerous that the only sane action left is to kill the program.

Use `C<error>` to trap all that is reasonable (problems with permissions and the like), and let it die if things get out of hand. This is the safest course of action.

=back

=item `rmtree( $dir )`

=item `rmtree( $dir, $verbose, $safe )`

=item `rmtree( [$dir1, $dir2,...], $verbose, $safe )`

=item `rmtree( $dir1, $dir2,..., \%opt )`

The `C<rmtree()>` function provide the legacy interface of `C<remove_tree()>` with a different interpretation of the arguments passed. The behaviour and return value of the function is otherwise identical to `C<remove_tree()>`.

**B<NOTE:>** For security reasons, we strongly advise use of the `hashref-as-final-argument` syntax, specifically with a setting of the `C<safe>` element to a true value.

```
rmtree( $dir1, $dir2, ...,
  {
    safe => 1,
    ...    # other key-value pairs
  },
);
```

=back

=head2 ERROR HANDLING

=over 4

=item **B<NOTE:>**

The following error handling mechanism is consistent throughout all code paths EXCEPT in cases where the ROOT node is nonexistent. In version 2.11 the maintainers attempted to rectify this inconsistency but too many downstream modules encountered problems. In such case, if you require root node evaluation or error checking prior to calling C<make\_path> or C<remove\_tree>, you should take additional precautions.

=back

If C<make\_path> or C<remove\_tree> encounters an error, a diagnostic message will be printed to C<STDERR> via C<carp> (for non-fatal errors) or via C<croak> (for fatal errors).

If this behaviour is not desirable, the C<error> attribute may be used to hold a reference to a variable, which will be used to store the diagnostics. The variable is made a reference to an array of hash references. Each hash contain a single key/value pair where the key is the name of the file, and the value is the error message (including the contents of C<\$!> when appropriate). If a general error is encountered the diagnostic key will be empty.

An example usage looks like:

```
remove_tree( 'foo/bar', 'bar/rat', {error => \my $err} );
if ($err && @$err) {
    for my $diag (@$err) {
        my ($file, $message) = %$diag;
        if ($file eq "") {
            print "general error: $message\n";
        }
        else {
            print "problem unlinking $file: $message\n";
        }
    }
}
else {
    print "No error encountered\n";
}
```

Note that if no errors are encountered, C<\$err> will reference an empty array. This means that C<\$err> will always end up TRUE; so you need to test C<@\$err> to determine if errors occurred.

=head2 NOTES

C<File::Path> blindly exports C<mkpath> and C<rmtree> into the current namespace. These days, this is considered bad style, but to change it now would break too much code. Nonetheless, you are

invited to specify what it is you are expecting to use:

```
use File::Path 'rmtree';
```

The routines `C<make_path>` and `C<remove_tree>` are `B<not>` exported by default. You must specify which ones you want to use.

```
use File::Path 'remove_tree';
```

Note that a side-effect of the above is that `C<mkpath>` and `C<rmtree>` are no longer exported at all. This is due to the way the `C<Exporter>` module works. If you are migrating a codebase to use the new interface, you will have to list everything explicitly. But that's just good practice anyway.

```
use File::Path qw(remove_tree rmtree);
```

### =head3 API CHANGES

The API was changed in the 2.0 branch. For a time, `C<mkpath>` and `C<rmtree>` tried, unsuccessfully, to deal with the two different calling mechanisms. This approach was considered a failure.

The new semantics are now only available with `C<make_path>` and `C<remove_tree>`. The old semantics are only available through `C<mkpath>` and `C<rmtree>`. Users are strongly encouraged to upgrade to at least 2.08 in order to avoid surprises.

### =head3 SECURITY CONSIDERATIONS

There were race conditions in the 1.x implementations of `File::Path`'s `C<rmtree>` function (although sometimes patched depending on the OS distribution or platform). The 2.0 version contains code to avoid the problem mentioned in CVE-2002-0435.

See the following pages for more information:

<http://bugs.debian.org/cgi-bin/bugreport.cgi?bug=286905>  
<http://www.nntp.perl.org/group/perl.perl5.porters/2005/01/msg97623.html>  
<http://www.debian.org/security/2005/dsa-696>

Additionally, unless the `C<safe>` parameter is set (or the third parameter in the traditional interface is `TRUE`), should a `C<remove_tree>` be interrupted, files that were originally in read-only mode may now have their permissions set to a read-write (or "delete OK") mode.

The following CVE reports were previously filed against File-Path and are

believed to have been addressed:

=over 4

=item \* [L<http://cve.circl.lu/cve/CVE-2004-0452>](http://cve.circl.lu/cve/CVE-2004-0452)

=item \* [L<http://cve.circl.lu/cve/CVE-2005-0448>](http://cve.circl.lu/cve/CVE-2005-0448)

=back

In February 2017 the cPanel Security Team reported an additional vulnerability in File-Path. The `C<chmod()>` logic to make directories traversable can be abused to set the mode on an attacker-chosen file to an attacker-chosen value. This is due to the time-of-check-to-time-of-use (TOCTTOU) race condition ([L<https://en.wikipedia.org/wiki/Time\\_of\\_check\\_to\\_time\\_of\\_use>](https://en.wikipedia.org/wiki/Time_of_check_to_time_of_use)) between the `C<stat()>` that decides the inode is a directory and the `C<chmod()>` that tries to make it user-rwx. CPAN versions 2.13 and later incorporate a patch provided by John Lightsey to address this problem. This vulnerability has been reported as CVE-2017-6512.

=head1 DIAGNOSTICS

FATAL errors will cause the program to halt (`C<croak>`), since the problem is so severe that it would be dangerous to continue. (This can always be trapped with `C<eval>`, but it's not a good idea. Under the circumstances, dying is the best thing to do).

SEVERE errors may be trapped using the modern interface. If they are not trapped, or if the old interface is used, such an error will cause the program will halt.

All other errors may be trapped using the modern interface, otherwise they will be `C<carp>`ed about. Program execution will not be halted.

=over 4

=item `mkdir [path]: [errmsg] (SEVERE)`

`C<make_path>` was unable to create the path. Probably some sort of permissions error at the point of departure or insufficient resources (such as free inodes on Unix).

=item No root path(s) specified

`C<make_path>` was not given any paths to create. This message is only emitted if the routine is called with the traditional interface.

The modern interface will remain silent if given nothing to do.



=item No such file or directory

On Windows, if C<make\_path> gives you this warning, it may mean that you have exceeded your filesystem's maximum path length.

=item cannot fetch initial working directory: [errmsg]

C<remove\_tree> attempted to determine the initial directory by calling C<Cwd::getcwd>, but the call failed for some reason. No attempt will be made to delete anything.

=item cannot stat initial working directory: [errmsg]

C<remove\_tree> attempted to stat the initial directory (after having successfully obtained its name via C<getcwd>), however, the call failed for some reason. No attempt will be made to delete anything.

=item cannot chdir to [dir]: [errmsg]

C<remove\_tree> attempted to set the working directory in order to begin deleting the objects therein, but was unsuccessful. This is usually a permissions issue. The routine will continue to delete other things, but this directory will be left intact.

=item directory [dir] changed before chdir, expected dev=[n] ino=[n], actual dev=[n] ino=[n], aborting. (FATAL)

C<remove\_tree> recorded the device and inode of a directory, and then moved into it. It then performed a C<stat> on the current directory and detected that the device and inode were no longer the same. As this is at the heart of the race condition problem, the program will die at this point.

=item cannot make directory [dir] read+writeable: [errmsg]

C<remove\_tree> attempted to change the permissions on the current directory to ensure that subsequent unlinkings would not run into problems, but was unable to do so. The permissions remain as they were, and the program will carry on, doing the best it can.

=item cannot read [dir]: [errmsg]

C<remove\_tree> tried to read the contents of the directory in order to acquire the names of the directory entries to be unlinked, but was unsuccessful. This is usually a permissions issue. The program will continue, but the files in this directory will remain after the call.

=item cannot reset chmod [dir]: [errmsg]

C<remove\_tree>, after having deleted everything in a directory, attempted to restore its permissions to the original state but failed. The directory may wind up being left behind.

=item cannot remove [dir] when cwd is [dir]

The current working directory of the program is F</some/path/to/here> and you are attempting to remove an ancestor, such as F</some/path>. The directory tree is left untouched.

The solution is to C<chdir> out of the child directory to a place outside the directory tree to be removed.

=item cannot chdir to [parent-dir] from [child-dir]: [errmsg], aborting. (FATAL)

C<remove\_tree>, after having deleted everything and restored the permissions of a directory, was unable to chdir back to the parent. The program halts to avoid a race condition from occurring.

=item cannot stat prior working directory [dir]: [errmsg], aborting. (FATAL)

C<remove\_tree> was unable to stat the parent directory after having returned from the child. Since there is no way of knowing if we returned to where we think we should be (by comparing device and inode) the only way out is to C<croak>.

=item previous directory [parent-dir] changed before entering [child-dir], expected dev=[n] ino=[n], actual dev=[n] ino=[n], aborting. (FATAL)

When C<remove\_tree> returned from deleting files in a child directory, a check revealed that the parent directory it returned to wasn't the one it started out from. This is considered a sign of malicious activity.

=item cannot make directory [dir] writeable: [errmsg]

Just before removing a directory (after having successfully removed everything it contained), C<remove\_tree> attempted to set the permissions on the directory to ensure it could be removed and failed. Program execution continues, but the directory may possibly not be deleted.

=item cannot remove directory [dir]: [errmsg]

C<remove\_tree> attempted to remove a directory, but failed. This may be because some objects that were unable to be removed remain in the directory, or it could be a permissions issue. The directory will be left behind.

=item cannot restore permissions of [dir] to [0nnn]: [errmsg]

After having failed to remove a directory, C<remove\_tree> was unable to restore its permissions from a permissive state back to a possibly more restrictive setting. (Permissions given in octal).

=item cannot make file [file] writeable: [errmsg]

C<remove\_tree> attempted to force the permissions of a file to ensure it could be deleted, but failed to do so. It will, however, still attempt to unlink the file.

=item cannot unlink file [file]: [errmsg]

C<remove\_tree> failed to remove a file. Probably a permissions issue.

=item cannot restore permissions of [file] to [0nnn]: [errmsg]

After having failed to remove a file, C<remove\_tree> was also unable to restore the permissions on the file to a possibly less permissive setting. (Permissions given in octal).

=item unable to map [owner] to a uid, ownership not changed");

C<make\_path> was instructed to give the ownership of created directories to the symbolic name [owner], but C<getpwnam> did not return the corresponding numeric uid. The directory will be created, but ownership will not be changed.

=item unable to map [group] to a gid, group ownership not changed

C<make\_path> was instructed to give the group ownership of created directories to the symbolic name [group], but C<getgrnam> did not return the corresponding numeric gid. The directory will be created, but group ownership will not be changed.

=back

=head1 SEE ALSO

=over 4

=item \*

L<File::Remove>

Allows files and directories to be moved to the Trashcan/Recycle Bin (where they may later be restored if necessary) if the operating system supports such functionality. This feature may one day be

made available directly in `C<File::Path>`.

=item \*

L<File::Find::Rule>

When removing directory trees, if you want to examine each file to decide whether to delete it (and possibly leaving large swathes alone), `F<File::Find::Rule>` offers a convenient and flexible approach to examining directory trees.

=back

=head1 BUGS AND LIMITATIONS

The following describes `F<File::Path>` limitations and how to report bugs.

=head2 MULTITHREADED APPLICATIONS

`F<File::Path>` `C<rmmtree>` and `C<remove_tree>` will not work with multithreaded applications due to its use of `C<chdir>`. At this time, no warning or error is generated in this situation. You will certainly encounter unexpected results.

The implementation that surfaces this limitation will not be changed. See the `F<File::Path::Tiny>` module for functionality similar to `F<File::Path>` but which does not `C<chdir>`.

=head2 NFS Mount Points

`F<File::Path>` is not responsible for triggering the automounts, mirror mounts, and the contents of network mounted filesystems. If your NFS implementation requires an action to be performed on the filesystem in order for `F<File::Path>` to perform operations, it is strongly suggested you assure filesystem availability by reading the root of the mounted filesystem.

=head2 REPORTING BUGS

Please report all bugs on the RT queue, either via the web interface:

L<<http://rt.cpan.org/NoAuth/Bugs.html?Dist=File-Path>>

or by email:

bug-File-Path@rt.cpan.org

In either case, please `B<attach>` patches to the bug report rather than including them inline in the web post or the body of the email.

You can also send pull requests to the Github repository:

L<<https://github.com/rpcme/File-Path>>

## =head1 ACKNOWLEDGEMENTS

Paul Szabo identified the race condition originally, and Brendan O'Dea wrote an implementation for Debian that addressed the problem. That code was used as a basis for the current code. Their efforts are greatly appreciated.

Gisle Aas made a number of improvements to the documentation for 2.07 and his advice and assistance is also greatly appreciated.

## =head1 AUTHORS

Prior authors and maintainers: Tim Bunce, Charles Bailey, and David Landgren <F<[david@landgren.net](mailto:david@landgren.net)>>.

Current maintainers are Richard Elberger <F<[riche@cpan.org](mailto:riche@cpan.org)>> and James (Jim) Keenan <F<[jkeenan@cpan.org](mailto:jkeenan@cpan.org)>>.

## =head1 CONTRIBUTORS

Contributors to File::Path, in alphabetical order by first name.

=over 1

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=item Tom Lutz <F<[tommylutz@gmail.com](mailto:tommylutz@gmail.com)>>

=item Will Sheppard <F<willsheppard@github>>

=back

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## 1.203 libxrandr 1.5.2-1.el8

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\* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.  
\* org.eclipse.jetty.orbit:javax.mail.glassfish

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<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

- \* javax.servlet:javax.servlet-api
- \* javax.annotation:javax.annotation-api
- \* javax.transaction:javax.transaction-api
- \* javax.websocket:javax.websocket-api

-----

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<http://openjdk.java.net/legal/gplv2+ce.html>

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OW2

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org.ow2.asm:asm-commons  
org.ow2.asm:asm

-----

Apache

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org.apache.taglibs:taglibs-standard-spec  
org.apache.taglibs:taglibs-standard-impl

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org.mortbay.jasper:apache-jsp  
org.apache.tomcat:tomcat-jasper  
org.apache.tomcat:tomcat-juli  
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org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-api  
org.apache.tomcat:tomcat-util-scan  
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-el-api

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<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

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## 1.207 perl-digest-md5 2.55-396.el8

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abstract: 'Perl interface to the MD-5 algorithm'

author:

- 'Gisle Aas <gisle@activestate.com>'

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.0401, CPAN::Meta::Converter version 2.150001'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: Digest-MD5

no\_index:

directory:

- t

- inc

requires:

Digest::base: '1.00'

XSLoader: '0'  
perl: '5.006'  
resources:  
repository: <https://github.com/gisle/digest-md5>  
version: '2.55'

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548130\_1591379411.76/0/perl-Digest-MD5-2.55-396.el8.src.rpm-cosi-expand-archive-qfwrDrJx/Digest-MD5-2.55.tar.gz-cosi-expand-archive-xOrAnhrN/Digest-MD5-2.55/META.yml  
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Network Working Group R. Rivest  
Request for Comments: 1321 MIT Laboratory for Computer Science  
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April 1992

## The MD5 Message-Digest Algorithm

### Status of this Memo

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### Acknowledgements

We would like to thank Don Coppersmith, Burt Kaliski, Ralph Merkle, David Chaum, and Noam Nisan for numerous helpful comments and suggestions.

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### 1. Executive Summary

This document describes the MD5 message-digest algorithm. The algorithm takes as input a message of arbitrary length and produces as output a 128-bit "fingerprint" or "message digest" of the input.

It is conjectured that it is computationally infeasible to produce two messages having the same message digest, or to produce any message having a given prespecified target message digest. The MD5 algorithm is intended for digital signature applications, where a large file must be "compressed" in a secure manner before being encrypted with a private (secret) key under a public-key cryptosystem such as RSA.

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RFC 1321

MD5 Message-Digest Algorithm

April 1992

The MD5 algorithm is designed to be quite fast on 32-bit machines. In addition, the MD5 algorithm does not require any large substitution tables; the algorithm can be coded quite compactly.

The MD5 algorithm is an extension of the MD4 message-digest algorithm [1,2]. MD5 is slightly slower than MD4, but is more "conservative" in design. MD5 was designed because it was felt that MD4 was perhaps being adopted for use more quickly than justified by the existing critical review; because MD4 was designed to be exceptionally fast, it is "at the edge" in terms of risking successful cryptanalytic attack. MD5 backs off a bit, giving up a little in speed for a much greater likelihood of ultimate security. It incorporates some suggestions made by various reviewers, and contains additional optimizations. The MD5 algorithm is being placed in the public domain for review and possible adoption as a standard.

For OSI-based applications, MD5's object identifier is

```
md5 OBJECT IDENTIFIER ::=
    iso(1) member-body(2) US(840) rsadsi(113549) digestAlgorithm(2) 5 }
```

In the X.509 type AlgorithmIdentifier [3], the parameters for MD5 should have type NULL.

## 2. Terminology and Notation

In this document a "word" is a 32-bit quantity and a "byte" is an eight-bit quantity. A sequence of bits can be interpreted in a natural manner as a sequence of bytes, where each consecutive group

of eight bits is interpreted as a byte with the high-order (most significant) bit of each byte listed first. Similarly, a sequence of bytes can be interpreted as a sequence of 32-bit words, where each consecutive group of four bytes is interpreted as a word with the low-order (least significant) byte given first.

Let  $x_i$  denote "x sub i". If the subscript is an expression, we surround it in braces, as in  $x_{i+1}$ . Similarly, we use  $^$  for superscripts (exponentiation), so that  $x^i$  denotes x to the i-th power.

Let the symbol "+" denote addition of words (i.e., modulo- $2^{32}$  addition). Let  $X \lll s$  denote the 32-bit value obtained by circularly shifting (rotating) X left by s bit positions. Let  $\text{not}(X)$  denote the bit-wise complement of X, and let  $X \vee Y$  denote the bit-wise OR of X and Y. Let  $X \oplus Y$  denote the bit-wise XOR of X and Y, and let  $XY$  denote the bit-wise AND of X and Y.

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RFC 1321

MD5 Message-Digest Algorithm

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### 3. MD5 Algorithm Description

We begin by supposing that we have a b-bit message as input, and that we wish to find its message digest. Here b is an arbitrary nonnegative integer; b may be zero, it need not be a multiple of eight, and it may be arbitrarily large. We imagine the bits of the message written down as follows:

$$m_0 m_1 \dots m_{b-1}$$

The following five steps are performed to compute the message digest of the message.

#### 3.1 Step 1. Append Padding Bits

The message is "padded" (extended) so that its length (in bits) is congruent to 448, modulo 512. That is, the message is extended so that it is just 64 bits shy of being a multiple of 512 bits long. Padding is always performed, even if the length of the message is already congruent to 448, modulo 512.

Padding is performed as follows: a single "1" bit is appended to the message, and then "0" bits are appended so that the length in bits of the padded message becomes congruent to 448, modulo 512. In all, at least one bit and at most 512 bits are appended.

### 3.2 Step 2. Append Length

A 64-bit representation of  $b$  (the length of the message before the padding bits were added) is appended to the result of the previous step. In the unlikely event that  $b$  is greater than  $2^{64}$ , then only the low-order 64 bits of  $b$  are used. (These bits are appended as two 32-bit words and appended low-order word first in accordance with the previous conventions.)

At this point the resulting message (after padding with bits and with  $b$ ) has a length that is an exact multiple of 512 bits. Equivalently, this message has a length that is an exact multiple of 16 (32-bit words). Let  $M[0 \dots N-1]$  denote the words of the resulting message, where  $N$  is a multiple of 16.

### 3.3 Step 3. Initialize MD Buffer

A four-word buffer (A,B,C,D) is used to compute the message digest. Here each of A, B, C, D is a 32-bit register. These registers are initialized to the following values in hexadecimal, low-order bytes first):

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word A: 01 23 45 67

word B: 89 ab cd ef

word C: fe dc ba 98

word D: 76 54 32 10

### 3.4 Step 4. Process Message in 16-Word Blocks

We first define four auxiliary functions that each take as input three 32-bit words and produce as output one 32-bit word.

$$F(X,Y,Z) = XY \vee \text{not}(X) Z$$

$$G(X,Y,Z) = XZ \vee Y \text{not}(Z)$$

$$H(X,Y,Z) = X \text{ xor } Y \text{ xor } Z$$

$$I(X,Y,Z) = Y \text{ xor } (X \vee \text{not}(Z))$$

In each bit position F acts as a conditional: if X then Y else Z. The function F could have been defined using + instead of  $\vee$  since XY and not(X)Z will never have 1's in the same bit position.) It is interesting to note that if the bits of X, Y, and Z are independent and unbiased, the each bit of F(X,Y,Z) will be independent and unbiased.

The functions G, H, and I are similar to the function F, in that they act in "bitwise parallel" to produce their output from the bits of X, Y, and Z, in such a manner that if the corresponding bits of X, Y, and Z are independent and unbiased, then each bit of G(X,Y,Z), H(X,Y,Z), and I(X,Y,Z) will be independent and unbiased. Note that the function H is the bit-wise "xor" or "parity" function of its inputs.

This step uses a 64-element table T[1 ... 64] constructed from the sine function. Let T[i] denote the i-th element of the table, which is equal to the integer part of 4294967296 times abs(sin(i)), where i is in radians. The elements of the table are given in the appendix.

Do the following:

```
/* Process each 16-word block. */
For i = 0 to N/16-1 do

    /* Copy block i into X. */
    For j = 0 to 15 do
        Set X[j] to M[i*16+j].
    end /* of loop on j */

    /* Save A as AA, B as BB, C as CC, and D as DD. */
    AA = A
    BB = B
```

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CC = C

DD = D

/\* Round 1. \*/

/\* Let [abcd k s i] denote the operation

```

    a = b + ((a + F(b,c,d) + X[k] + T[i]) <<< s). */
/* Do the following 16 operations. */
[ABCD 0 7 1] [DABC 1 12 2] [CDAB 2 17 3] [BCDA 3 22 4]
[ABCD 4 7 5] [DABC 5 12 6] [CDAB 6 17 7] [BCDA 7 22 8]
[ABCD 8 7 9] [DABC 9 12 10] [CDAB 10 17 11] [BCDA 11 22 12]
[ABCD 12 7 13] [DABC 13 12 14] [CDAB 14 17 15] [BCDA 15 22 16]

/* Round 2. */
/* Let [abcd k s i] denote the operation
    a = b + ((a + G(b,c,d) + X[k] + T[i]) <<< s). */
/* Do the following 16 operations. */
[ABCD 1 5 17] [DABC 6 9 18] [CDAB 11 14 19] [BCDA 0 20 20]
[ABCD 5 5 21] [DABC 10 9 22] [CDAB 15 14 23] [BCDA 4 20 24]
[ABCD 9 5 25] [DABC 14 9 26] [CDAB 3 14 27] [BCDA 8 20 28]
[ABCD 13 5 29] [DABC 2 9 30] [CDAB 7 14 31] [BCDA 12 20 32]

/* Round 3. */
/* Let [abcd k s t] denote the operation
    a = b + ((a + H(b,c,d) + X[k] + T[i]) <<< s). */
/* Do the following 16 operations. */
[ABCD 5 4 33] [DABC 8 11 34] [CDAB 11 16 35] [BCDA 14 23 36]
[ABCD 1 4 37] [DABC 4 11 38] [CDAB 7 16 39] [BCDA 10 23 40]
[ABCD 13 4 41] [DABC 0 11 42] [CDAB 3 16 43] [BCDA 6 23 44]
[ABCD 9 4 45] [DABC 12 11 46] [CDAB 15 16 47] [BCDA 2 23 48]

/* Round 4. */
/* Let [abcd k s t] denote the operation
    a = b + ((a + I(b,c,d) + X[k] + T[i]) <<< s). */
/* Do the following 16 operations. */
[ABCD 0 6 49] [DABC 7 10 50] [CDAB 14 15 51] [BCDA 5 21 52]
[ABCD 12 6 53] [DABC 3 10 54] [CDAB 10 15 55] [BCDA 1 21 56]
[ABCD 8 6 57] [DABC 15 10 58] [CDAB 6 15 59] [BCDA 13 21 60]
[ABCD 4 6 61] [DABC 11 10 62] [CDAB 2 15 63] [BCDA 9 21 64]

/* Then perform the following additions. (That is increment each
    of the four registers by the value it had before this block
    was started.) */
A = A + AA
B = B + BB
C = C + CC
D = D + DD

end /* of loop on i */

```

### 3.5 Step 5. Output

The message digest produced as output is A, B, C, D. That is, we begin with the low-order byte of A, and end with the high-order byte of D.

This completes the description of MD5. A reference implementation in C is given in the appendix.

## 4. Summary

The MD5 message-digest algorithm is simple to implement, and provides a "fingerprint" or message digest of a message of arbitrary length. It is conjectured that the difficulty of coming up with two messages having the same message digest is on the order of  $2^{64}$  operations, and that the difficulty of coming up with any message having a given message digest is on the order of  $2^{128}$  operations. The MD5 algorithm has been carefully scrutinized for weaknesses. It is, however, a relatively new algorithm and further security analysis is of course justified, as is the case with any new proposal of this sort.

## 5. Differences Between MD4 and MD5

The following are the differences between MD4 and MD5:

1. A fourth round has been added.
2. Each step now has a unique additive constant.
3. The function  $g$  in round 2 was changed from  $(XY \vee XZ \vee YZ)$  to  $(XZ \vee Y \text{ not}(Z))$  to make  $g$  less symmetric.
4. Each step now adds in the result of the previous step. This promotes a faster "avalanche effect".
5. The order in which input words are accessed in rounds 2 and 3 is changed, to make these patterns less like each other.
6. The shift amounts in each round have been approximately optimized, to yield a faster "avalanche effect." The shifts in different rounds are distinct.



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## References

- [1] Rivest, R., "The MD4 Message Digest Algorithm", RFC 1320, MIT and RSA Data Security, Inc., April 1992.
- [2] Rivest, R., "The MD4 message digest algorithm", in A.J. Menezes and S.A. Vanstone, editors, *Advances in Cryptology - CRYPTO '90 Proceedings*, pages 303-311, Springer-Verlag, 1991.
- [3] CCITT Recommendation X.509 (1988), "The Directory - Authentication Framework."

## APPENDIX A - Reference Implementation

This appendix contains the following files taken from RSAREF: A Cryptographic Toolkit for Privacy-Enhanced Mail:

global.h -- global header file

md5.h -- header file for MD5

md5c.c -- source code for MD5

For more information on RSAREF, send email to <rsaref@rsa.com>.

The appendix also includes the following file:

mddriver.c -- test driver for MD2, MD4 and MD5

The driver compiles for MD5 by default but can compile for MD2 or MD4 if the symbol MD is defined on the C compiler command line as 2 or 4.

The implementation is portable and should work on many different platforms. However, it is not difficult to optimize the implementation on particular platforms, an exercise left to the reader. For example, on "little-endian" platforms where the lowest-addressed byte in a 32-bit word is the least significant and there are no alignment

restrictions, the call to Decode in MD5Transform can be replaced with a typecast.

## A.1 global.h

```
/* GLOBAL.H - RSAREF types and constants
*/
```

```
/* PROTOTYPES should be set to one if and only if the compiler supports
function argument prototyping.
```

```
The following makes PROTOTYPES default to 0 if it has not already
```

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```
been defined with C compiler flags.
```

```
*/
```

```
#ifndef PROTOTYPES
#define PROTOTYPES 0
#endif
```

```
/* POINTER defines a generic pointer type */
typedef unsigned char *POINTER;
```

```
/* UINT2 defines a two byte word */
typedef unsigned short int UINT2;
```

```
/* UINT4 defines a four byte word */
typedef unsigned long int UINT4;
```

```
/* PROTO_LIST is defined depending on how PROTOTYPES is defined above.
If using PROTOTYPES, then PROTO_LIST returns the list, otherwise it
returns an empty list.
```

```
*/
```

```
#if PROTOTYPES
#define PROTO_LIST(list) list
#else
#define PROTO_LIST(list) ()
#endif
```

## A.2 md5.h

```
/* MD5.H - header file for MD5C.C
*/
```

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\*/

/\* MD5 context. \*/

```
typedef struct {
    UINT4 state[4];          /* state (ABCD) */
    UINT4 count[2];         /* number of bits, modulo 2^64 (lsb first) */
    unsigned char buffer[64]; /* input buffer */
} MD5_CTX;
```

```
void MD5Init PROTO_LIST ((MD5_CTX *));
void MD5Update PROTO_LIST
((MD5_CTX *, unsigned char *, unsigned int));
void MD5Final PROTO_LIST ((unsigned char [16], MD5_CTX *));
```

A.3 md5c.c

```
/* MD5C.C - RSA Data Security, Inc., MD5 message-digest algorithm
*/
```

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\*/

```
#include "global.h"
```

```
#include "md5.h"
```

```
/* Constants for MD5Transform routine.
```

```
*/
```

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```
#define S11 7
```

```
#define S12 12
```

```
#define S13 17
```

```
#define S14 22
```

```
#define S21 5
```

```
#define S22 9
```

```
#define S23 14
```

```
#define S24 20
```

```
#define S31 4
```

```
#define S32 11
```

```
#define S33 16
```

```
#define S34 23
```

```
#define S41 6
```

```

#define S42 10
#define S43 15
#define S44 21

static void MD5Transform PROTO_LIST ((UINT4 [4], unsigned char [64]));
static void Encode PROTO_LIST
((unsigned char *, UINT4 *, unsigned int));
static void Decode PROTO_LIST
((UINT4 *, unsigned char *, unsigned int));
static void MD5_memcpy PROTO_LIST ((POINTER, POINTER, unsigned int));
static void MD5_memset PROTO_LIST ((POINTER, int, unsigned int));

static unsigned char PADDING[64] = {
0x80, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
};

/* F, G, H and I are basic MD5 functions.
*/
#define F(x, y, z) (((x) & (y)) | ((~x) & (z)))
#define G(x, y, z) (((x) & (z)) | ((y) & (~z)))
#define H(x, y, z) ((x) ^ (y) ^ (z))
#define I(x, y, z) ((y) ^ ((x) | (~z)))

/* ROTATE_LEFT rotates x left n bits.
*/
#define ROTATE_LEFT(x, n) (((x) << (n)) | ((x) >> (32-(n))))

/* FF, GG, HH, and II transformations for rounds 1, 2, 3, and 4.
Rotation is separate from addition to prevent recomputation.
*/
#define FF(a, b, c, d, x, s, ac) { \
(a) += F ((b), (c), (d)) + (x) + (UINT4)(ac); \
(a) = ROTATE_LEFT ((a), (s)); \

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(a) += (b); \
}
#define GG(a, b, c, d, x, s, ac) { \
(a) += G ((b), (c), (d)) + (x) + (UINT4)(ac); \
(a) = ROTATE_LEFT ((a), (s)); \

```

```

(a) += (b); \
}
#define HH(a, b, c, d, x, s, ac) { \
(a) += H ((b), (c), (d)) + (x) + (UINT4)(ac); \
(a) = ROTATE_LEFT ((a), (s)); \
(a) += (b); \
}
#define II(a, b, c, d, x, s, ac) { \
(a) += I ((b), (c), (d)) + (x) + (UINT4)(ac); \
(a) = ROTATE_LEFT ((a), (s)); \
(a) += (b); \
}

/* MD5 initialization. Begins an MD5 operation, writing a new context.
*/
void MD5Init (context)
MD5_CTX *context;          /* context */
{
context->count[0] = context->count[1] = 0;
/* Load magic initialization constants.
*/
context->state[0] = 0x67452301;
context->state[1] = 0xefcdab89;
context->state[2] = 0x98badcfe;
context->state[3] = 0x10325476;
}

/* MD5 block update operation. Continues an MD5 message-digest
operation, processing another message block, and updating the
context.
*/
void MD5Update (context, input, inputLen)
MD5_CTX *context;          /* context */
unsigned char *input;      /* input block */
unsigned int inputLen;     /* length of input block */
{
unsigned int i, index, partLen;

/* Compute number of bytes mod 64 */
index = (unsigned int)((context->count[0] >> 3) & 0x3F);

/* Update number of bits */
if ((context->count[0] += ((UINT4)inputLen << 3))

```

```
< ((UINT4)inputLen << 3))
context->count[1]++;
context->count[1] += ((UINT4)inputLen >> 29);

partLen = 64 - index;

/* Transform as many times as possible.
*/
if (inputLen >= partLen) {
MD5_memcpy
  ((POINTER)&context->buffer[index], (POINTER)input, partLen);
MD5Transform (context->state, context->buffer);

for (i = partLen; i + 63 < inputLen; i += 64)
  MD5Transform (context->state, &input[i]);

index = 0;
}
else
i = 0;

/* Buffer remaining input */
MD5_memcpy
((POINTER)&context->buffer[index], (POINTER)&input[i],
inputLen-i);
}

/* MD5 finalization. Ends an MD5 message-digest operation, writing the
the message digest and zeroizing the context.
*/
void MD5Final (digest, context)
unsigned char digest[16];          /* message digest */
MD5_CTX *context;                /* context */
{
  unsigned char bits[8];
  unsigned int index, padLen;

  /* Save number of bits */
  Encode (bits, context->count, 8);

  /* Pad out to 56 mod 64.
  */
  index = (unsigned int)((context->count[0] >> 3) & 0x3f);
  padLen = (index < 56) ? (56 - index) : (120 - index);
  MD5Update (context, PADDING, padLen);
```

```
/* Append length (before padding) */
MD5Update (context, bits, 8);
```

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```
/* Store state in digest */
Encode (digest, context->state, 16);
```

```
/* Zeroize sensitive information.
*/
MD5_memset ((POINTER)context, 0, sizeof (*context));
}
```

```
/* MD5 basic transformation. Transforms state based on block.
*/
```

```
static void MD5Transform (state, block)
UINT4 state[4];
unsigned char block[64];
{
    UINT4 a = state[0], b = state[1], c = state[2], d = state[3], x[16];
```

```
Decode (x, block, 64);
```

```
/* Round 1 */
FF (a, b, c, d, x[ 0], S11, 0xd76aa478); /* 1 */
FF (d, a, b, c, x[ 1], S12, 0xe8c7b756); /* 2 */
FF (c, d, a, b, x[ 2], S13, 0x242070db); /* 3 */
FF (b, c, d, a, x[ 3], S14, 0xc1bdceee); /* 4 */
FF (a, b, c, d, x[ 4], S11, 0xf57c0faf); /* 5 */
FF (d, a, b, c, x[ 5], S12, 0x4787c62a); /* 6 */
FF (c, d, a, b, x[ 6], S13, 0xa8304613); /* 7 */
FF (b, c, d, a, x[ 7], S14, 0xfd469501); /* 8 */
FF (a, b, c, d, x[ 8], S11, 0x698098d8); /* 9 */
FF (d, a, b, c, x[ 9], S12, 0x8b44f7af); /* 10 */
FF (c, d, a, b, x[10], S13, 0xffff5bb1); /* 11 */
FF (b, c, d, a, x[11], S14, 0x895cd7be); /* 12 */
FF (a, b, c, d, x[12], S11, 0x6b901122); /* 13 */
FF (d, a, b, c, x[13], S12, 0xfd987193); /* 14 */
FF (c, d, a, b, x[14], S13, 0xa679438e); /* 15 */
FF (b, c, d, a, x[15], S14, 0x49b40821); /* 16 */
```

```
/* Round 2 */
```



```
GG (a, b, c, d, x[ 1], S21, 0xf61e2562); /* 17 */
GG (d, a, b, c, x[ 6], S22, 0xc040b340); /* 18 */
GG (c, d, a, b, x[11], S23, 0x265e5a51); /* 19 */
GG (b, c, d, a, x[ 0], S24, 0xe9b6c7aa); /* 20 */
GG (a, b, c, d, x[ 5], S21, 0xd62f105d); /* 21 */
GG (d, a, b, c, x[10], S22, 0x2441453); /* 22 */
GG (c, d, a, b, x[15], S23, 0xd8a1e681); /* 23 */
GG (b, c, d, a, x[ 4], S24, 0xe7d3fbc8); /* 24 */
GG (a, b, c, d, x[ 9], S21, 0x21e1cde6); /* 25 */
GG (d, a, b, c, x[14], S22, 0xc33707d6); /* 26 */
GG (c, d, a, b, x[ 3], S23, 0xf4d50d87); /* 27 */
```

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```
GG (b, c, d, a, x[ 8], S24, 0x455a14ed); /* 28 */
GG (a, b, c, d, x[13], S21, 0xa9e3e905); /* 29 */
GG (d, a, b, c, x[ 2], S22, 0xfcefa3f8); /* 30 */
GG (c, d, a, b, x[ 7], S23, 0x676f02d9); /* 31 */
GG (b, c, d, a, x[12], S24, 0x8d2a4c8a); /* 32 */
```

/\* Round 3 \*/

```
HH (a, b, c, d, x[ 5], S31, 0xfffa3942); /* 33 */
HH (d, a, b, c, x[ 8], S32, 0x8771f681); /* 34 */
HH (c, d, a, b, x[11], S33, 0x6d9d6122); /* 35 */
HH (b, c, d, a, x[14], S34, 0xfde5380c); /* 36 */
HH (a, b, c, d, x[ 1], S31, 0xa4beea44); /* 37 */
HH (d, a, b, c, x[ 4], S32, 0x4bdecfa9); /* 38 */
HH (c, d, a, b, x[ 7], S33, 0xf6bb4b60); /* 39 */
HH (b, c, d, a, x[10], S34, 0xbefbfc70); /* 40 */
HH (a, b, c, d, x[13], S31, 0x289b7ec6); /* 41 */
HH (d, a, b, c, x[ 0], S32, 0xeaa127fa); /* 42 */
HH (c, d, a, b, x[ 3], S33, 0xd4ef3085); /* 43 */
HH (b, c, d, a, x[ 6], S34, 0x4881d05); /* 44 */
HH (a, b, c, d, x[ 9], S31, 0xd9d4d039); /* 45 */
HH (d, a, b, c, x[12], S32, 0xe6db99e5); /* 46 */
HH (c, d, a, b, x[15], S33, 0x1fa27cf8); /* 47 */
HH (b, c, d, a, x[ 2], S34, 0xc4ac5665); /* 48 */
```

/\* Round 4 \*/

```
II (a, b, c, d, x[ 0], S41, 0xf4292244); /* 49 */
II (d, a, b, c, x[ 7], S42, 0x432aff97); /* 50 */
II (c, d, a, b, x[14], S43, 0xab9423a7); /* 51 */
II (b, c, d, a, x[ 5], S44, 0xfc93a039); /* 52 */
```

```

II (a, b, c, d, x[12], S41, 0x655b59c3); /* 53 */
II (d, a, b, c, x[ 3], S42, 0x8f0ccc92); /* 54 */
II (c, d, a, b, x[10], S43, 0xffeff47d); /* 55 */
II (b, c, d, a, x[ 1], S44, 0x85845dd1); /* 56 */
II (a, b, c, d, x[ 8], S41, 0x6fa87e4f); /* 57 */
II (d, a, b, c, x[15], S42, 0xfe2ce6e0); /* 58 */
II (c, d, a, b, x[ 6], S43, 0xa3014314); /* 59 */
II (b, c, d, a, x[13], S44, 0x4e0811a1); /* 60 */
II (a, b, c, d, x[ 4], S41, 0xf7537e82); /* 61 */
II (d, a, b, c, x[11], S42, 0xbd3af235); /* 62 */
II (c, d, a, b, x[ 2], S43, 0x2ad7d2bb); /* 63 */
II (b, c, d, a, x[ 9], S44, 0xeb86d391); /* 64 */

```

```

state[0] += a;
state[1] += b;
state[2] += c;
state[3] += d;

```

```

/* Zeroize sensitive information.

```

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```

*/
MD5_memset ((POINTER)x, 0, sizeof (x));
}

/* Encodes input (UINT4) into output (unsigned char). Assumes len is
a multiple of 4.
*/
static void Encode (output, input, len)
unsigned char *output;
UINT4 *input;
unsigned int len;
{
    unsigned int i, j;

    for (i = 0, j = 0; j < len; i++, j += 4) {
        output[j] = (unsigned char)(input[i] & 0xff);
        output[j+1] = (unsigned char)((input[i] >> 8) & 0xff);
        output[j+2] = (unsigned char)((input[i] >> 16) & 0xff);
        output[j+3] = (unsigned char)((input[i] >> 24) & 0xff);
    }
}

```

```

/* Decodes input (unsigned char) into output (UINT4). Assumes len is
a multiple of 4.
*/
static void Decode (output, input, len)
UINT4 *output;
unsigned char *input;
unsigned int len;
{
    unsigned int i, j;

    for (i = 0, j = 0; j < len; i++, j += 4)
output[i] = ((UINT4)input[j]) | (((UINT4)input[j+1]) << 8) |
    (((UINT4)input[j+2]) << 16) | (((UINT4)input[j+3]) << 24);
}

/* Note: Replace "for loop" with standard memcpy if possible.
*/

```

```

static void MD5_memcpy (output, input, len)
POINTER output;
POINTER input;
unsigned int len;
{
    unsigned int i;

    for (i = 0; i < len; i++)

```

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```

output[i] = input[i];
}

```

```

/* Note: Replace "for loop" with standard memset if possible.
*/

```

```

static void MD5_memset (output, value, len)
POINTER output;
int value;
unsigned int len;
{
    unsigned int i;

    for (i = 0; i < len; i++)

```

```
((char *)output)[i] = (char)value;
}
```

#### A.4 mddriver.c

```
/* MDDRIVER.C - test driver for MD2, MD4 and MD5
*/
```

```
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```

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```
*/
```

```
/* The following makes MD default to MD5 if it has not already been
defined with C compiler flags.
```

```
*/
```

```
#ifndef MD
#define MD MD5
#endif
```

```
#include <stdio.h>
#include <time.h>
#include <string.h>
#include "global.h"
#if MD == 2
#include "md2.h"
#endif
#if MD == 4
```

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```
#include "md4.h"
#endif
#if MD == 5
#include "md5.h"
#endif
```

```

/* Length of test block, number of test blocks.
*/
#define TEST_BLOCK_LEN 1000
#define TEST_BLOCK_COUNT 1000

static void MDString PROTO_LIST ((char *));
static void MDTimeTrial PROTO_LIST ((void));
static void MDTestSuite PROTO_LIST ((void));
static void MDFile PROTO_LIST ((char *));
static void MDFilter PROTO_LIST ((void));
static void MDPrint PROTO_LIST ((unsigned char [16]));

#if MD == 2
#define MD_CTX MD2_CTX
#define MDInit MD2Init
#define MDUpdate MD2Update
#define MDFinal MD2Final
#endif
#if MD == 4
#define MD_CTX MD4_CTX
#define MDInit MD4Init
#define MDUpdate MD4Update
#define MDFinal MD4Final
#endif
#if MD == 5
#define MD_CTX MD5_CTX
#define MDInit MD5Init
#define MDUpdate MD5Update
#define MDFinal MD5Final
#endif

/* Main driver.

Arguments (may be any combination):
-sstring - digests string
-t      - runs time trial
-x      - runs test script
filename - digests file
(none)  - digests standard input
*/
int main (argc, argv)
int argc;

```

```
char *argv[];
{
int i;

if (argc > 1)
for (i = 1; i < argc; i++)
if (argv[i][0] == '-' && argv[i][1] == 's')
    MDString (argv[i] + 2);
else if (strcmp (argv[i], "-t") == 0)
    MDTimeTrial ();
else if (strcmp (argv[i], "-x") == 0)
    MDTestSuite ();
else
    MDFile (argv[i]);
else
MDFilter ();

return (0);
}

/* Digests a string and prints the result.
*/
static void MDString (string)
char *string;
{
MD_CTX context;
unsigned char digest[16];
unsigned int len = strlen (string);

MDInit (&context);
MDUpdate (&context, string, len);
MDFinal (digest, &context);

printf ("MD%d (%s) = ", MD, string);
MDPrint (digest);
printf ("\n");
}

/* Measures the time to digest TEST_BLOCK_COUNT TEST_BLOCK_LEN-byte
blocks.
*/
static void MDTimeTrial ()
{
MD_CTX context;
time_t endTime, startTime;
```

```
unsigned char block[TEST_BLOCK_LEN], digest[16];
unsigned int i;
```

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```
printf
("MD%d time trial. Digesting %d %d-byte blocks ...", MD,
TEST_BLOCK_LEN, TEST_BLOCK_COUNT);

/* Initialize block */
for (i = 0; i < TEST_BLOCK_LEN; i++)
block[i] = (unsigned char)(i & 0xff);

/* Start timer */
time (&startTime);

/* Digest blocks */
MDInit (&context);
for (i = 0; i < TEST_BLOCK_COUNT; i++)
MDUpdate (&context, block, TEST_BLOCK_LEN);
MDFinal (digest, &context);

/* Stop timer */
time (&endTime);

printf (" done\n");
printf ("Digest = ");
MDPrint (digest);
printf ("\nTime = %ld seconds\n", (long)(endTime-startTime));
printf
("Speed = %ld bytes/second\n",
(long)TEST_BLOCK_LEN * (long)TEST_BLOCK_COUNT/(endTime-startTime));
}

/* Digests a reference suite of strings and prints the results.
*/
static void MDTestSuite ()
{
printf ("MD%d test suite:\n", MD);

MDString ("");
MDString ("a");
```

```

MDString ("abc");
MDString ("message digest");
MDString ("abcdefghijklmnopqrstuvwxy");
MDString
("ABCDEFGHJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxy0123456789");
MDString
("12345678901234567890123456789012345678901234567890\
1234567890123456789012345678901234567890");
}

```

/\* Digests a file and prints the result.

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```

*/
static void MDFile (filename)
char *filename;
{
FILE *file;
MD_CTX context;
int len;
unsigned char buffer[1024], digest[16];

if ((file = fopen (filename, "rb")) == NULL)
printf ("%s can't be opened\n", filename);

else {
MDInit (&context);
while (len = fread (buffer, 1, 1024, file))
MDUpdate (&context, buffer, len);
MDFinal (digest, &context);

fclose (file);

printf ("MD%d (%s) = ", MD, filename);
MDPrint (digest);
printf ("\n");
}
}

/* Digests the standard input and prints the result.
*/
static void MDFilter ()

```



```

{
MD_CTX context;
int len;
unsigned char buffer[16], digest[16];

MDInit (&context);
while (len = fread (buffer, 1, 16, stdin))
MDUpdate (&context, buffer, len);
MDFinal (digest, &context);

MDPrint (digest);
printf ("\n");
}

/* Prints a message digest in hexadecimal.
*/
static void MDPrint (digest)
unsigned char digest[16];
{

```

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```

unsigned int i;

for (i = 0; i < 16; i++)
printf ("%02x", digest[i]);
}

```

#### A.5 Test suite

The MD5 test suite (driver option "-x") should print the following results:

MD5 test suite:

```

MD5 ("") = d41d8cd98f00b204e9800998ecf8427e
MD5 ("a") = 0cc175b9c0f1b6a831c399e269772661
MD5 ("abc") = 900150983cd24fb0d6963f7d28e17f72
MD5 ("message digest") = f96b697d7cb7938d525a2f31aaf161d0
MD5 ("abcdefghijklmnopqrstuvwxyz") = c3fcd3d76192e4007dfb496cca67e13b
MD5 ("ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789") =
d174ab98d277d9f5a5611c2c9f419d9f
MD5 ("123456789012345678901234567890123456789012345678901234567890123456
78901234567890") = 57edf4a22be3c955ac49da2e2107b67a

```

## Security Considerations

The level of security discussed in this memo is considered to be sufficient for implementing very high security hybrid digital-signature schemes based on MD5 and a public-key cryptosystem.

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Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548130_1591379411.76/0/perl-Digest-MD5-2.55-396.el8.src.rpm-cosi-  
expand-archive-qfwrDrJx/Digest-MD5-2.55.tar.gz-cosi-expand-archive-xOrAnhrN/Digest-MD5-2.55/rfc1321.txt  
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```

=head1 NAME

Digest::MD5 - Perl interface to the MD5 Algorithm

=head1 SYNOPSIS

# Functional style

```
use Digest::MD5 qw(md5 md5_hex md5_base64);
```

```
$digest = md5($data);
```

```
$digest = md5_hex($data);
```

```
$digest = md5_base64($data);
```

```
# OO style  
use Digest::MD5;
```

```
$ctx = Digest::MD5->new;
```

```
$ctx->add($data);  
$ctx->addfile($file_handle);
```

```
$digest = $ctx->digest;  
$digest = $ctx->hexdigest;  
$digest = $ctx->b64digest;
```

=head1 DESCRIPTION

The C<Digest::MD5> module allows you to use the RSA Data Security Inc. MD5 Message Digest algorithm from within Perl programs. The algorithm takes as input a message of arbitrary length and produces as output a 128-bit "fingerprint" or "message digest" of the input.

Note that the MD5 algorithm is not as strong as it used to be. It has since 2005 been easy to generate different messages that produce the same MD5 digest. It still seems hard to generate messages that produce a given digest, but it is probably wise to move to stronger algorithms for applications that depend on the digest to uniquely identify a message.

The C<Digest::MD5> module provide a procedural interface for simple use, as well as an object oriented interface that can handle messages of arbitrary length and which can read files directly.

=head1 FUNCTIONS

The following functions are provided by the C<Digest::MD5> module. None of these functions are exported by default.

=over 4

=item md5(\$data,...)

This function will concatenate all arguments, calculate the MD5 digest of this "message", and return it in binary form. The returned string will be 16 bytes long.

The result of md5("a", "b", "c") will be exactly the same as the result of md5("abc").

=item md5\_hex(\$data,...)

Same as md5(), but will return the digest in hexadecimal form. The length of the returned string will be 32 and it will only contain characters from this set: '0'..'9' and 'a'..'f'.

=item md5\_base64(\$data,...)

Same as md5(), but will return the digest as a base64 encoded string. The length of the returned string will be 22 and it will only contain characters from this set: 'A'..'Z', 'a'..'z', '0'..'9', '+' and '/'.

Note that the base64 encoded string returned is not padded to be a multiple of 4 bytes long. If you want interoperability with other base64 encoded md5 digests you might want to append the redundant string "==" to the result.

=back

=head1 METHODS

The object oriented interface to C<Digest::MD5> is described in this section. After a C<Digest::MD5> object has been created, you will add data to it and finally ask for the digest in a suitable format. A single object can be used to calculate multiple digests.

The following methods are provided:

=over 4

=item \$md5 = Digest::MD5->new

The constructor returns a new C<Digest::MD5> object which encapsulate the state of the MD5 message-digest algorithm.

If called as an instance method (i.e. \$md5->new) it will just reset the state the object to the state of a newly created object. No new object is created in this case.

=item \$md5->reset

This is just an alias for \$md5->new.

=item \$md5->clone

This a copy of the \$md5 object. It is useful when you do not want to destroy the digests state, but need an intermediate value of the

digest, e.g. when calculating digests iteratively on a continuous data stream. Example:

```
my $md5 = Digest::MD5->new;
while (<>) {
$md5->add($_);
print "Line $.: ", $md5->clone->hexdigest, "\n";
}
```

```
=item $md5->add($data,...)
```

The `$data` provided as argument are appended to the message we calculate the digest for. The return value is the `$md5` object itself.

All these lines will have the same effect on the state of the `$md5` object:

```
$md5->add("a"); $md5->add("b"); $md5->add("c");
$md5->add("a")->add("b")->add("c");
$md5->add("a", "b", "c");
$md5->add("abc");
```

```
=item $md5->addfile($io_handle)
```

The `$io_handle` will be read until EOF and its content appended to the message we calculate the digest for. The return value is the `$md5` object itself.

The `addfile()` method will croak() if it fails reading data for some reason. If it croaks it is unpredictable what the state of the `$md5` object will be in. The `addfile()` method might have been able to read the file partially before it failed. It is probably wise to discard or reset the `$md5` object if this occurs.

In most cases you want to make sure that the `$io_handle` is in `C<binmode>` before you pass it as argument to the `addfile()` method.

```
=item $md5->add_bits($data, $nbits)
```

```
=item $md5->add_bits($bitstring)
```

Since the MD5 algorithm is byte oriented you might only add bits as multiples of 8, so you probably want to just use `add()` instead. The `add_bits()` method is provided for compatibility with other digest implementations. See `L<Digest>` for description of the arguments that `add_bits()` take.

```
=item $md5->digest
```

Return the binary digest for the message. The returned string will be 16 bytes long.

Note that the `C<digest>` operation is effectively a destructive, read-once operation. Once it has been performed, the `C<Digest::MD5>` object is automatically `C<reset>` and can be used to calculate another digest value. Call `$md5->clone->digest` if you want to calculate the digest without resetting the digest state.

=item `$md5->hexdigest`

Same as `$md5->digest`, but will return the digest in hexadecimal form. The length of the returned string will be 32 and it will only contain characters from this set: '0'..'9' and 'a'..'f'.

=item `$md5->b64digest`

Same as `$md5->digest`, but will return the digest as a base64 encoded string. The length of the returned string will be 22 and it will only contain characters from this set: 'A'..'Z', 'a'..'z', '0'..'9', '+' and '/'.

The base64 encoded string returned is not padded to be a multiple of 4 bytes long. If you want interoperability with other base64 encoded md5 digests you might want to append the string "==" to the result.

=item `@ctx = $md5->context`

=item `$md5->context(@ctx)`

Saves or restores the internal state. When called with no arguments, returns a 3-element list: number of blocks processed, a 16-byte internal state buffer, then up to 63 bytes of unprocessed data. When passed those same arguments, restores the state. This is only useful for specialised operations.

=back

=head1 EXAMPLES

The simplest way to use this library is to import the `md5_hex()` function (or one of its cousins):

```
use Digest::MD5 qw(md5_hex);
print "Digest is ", md5_hex("foobarbaz"), "\n";
```

The above example would print out the message:

```
Digest is 6df23dc03f9b54cc38a0fc1483df6e21
```

The same checksum can also be calculated in OO style:

```
use Digest::MD5;

$md5 = Digest::MD5->new;
$md5->add('foo', 'bar');
$md5->add('baz');
$digest = $md5->hexdigest;

print "Digest is $digest\n";
```

With OO style, you can break the message arbitrarily. This means that we are no longer limited to have space for the whole message in memory, i.e. we can handle messages of any size.

This is useful when calculating checksum for files:

```
use Digest::MD5;

my $filename = shift || "/etc/passwd";
open (my $fh, '<', $filename) or die "Can't open '$filename': $!";
binmode($fh);

$md5 = Digest::MD5->new;
while (<$fh>) {
    $md5->add($_);
}
close($fh);
print $md5->b64digest, " $filename\n";
```

Or we can use the `addfile` method for more efficient reading of the file:

```
use Digest::MD5;

my $filename = shift || "/etc/passwd";
open (my $fh, '<', $filename) or die "Can't open '$filename': $!";
binmode ($fh);

print Digest::MD5->new->addfile($fh)->hexdigest, " $filename\n";
```

Since the MD5 algorithm is only defined for strings of bytes, it can not be used on strings that contains chars with ordinal number above 255 (Unicode

strings). The MD5 functions and methods will croak if you try to feed them such input data:

```
use Digest::MD5 qw(md5_hex);

my $str = "abc\x{300}";
print md5_hex($str, "\n"; # croaks
# Wide character in subroutine entry
```

What you can do is calculate the MD5 checksum of the UTF-8 representation of such strings. This is achieved by filtering the string through `encode_utf8()` function:

```
use Digest::MD5 qw(md5_hex);
use Encode qw(encode_utf8);

my $str = "abc\x{300}";
print md5_hex(encode_utf8($str)), "\n";
# 8c2d46911f3f5a326455f0ed7a8ed3b3
```

=head1 SEE ALSO

L<Digest>,  
L<Digest::MD2>,  
L<Digest::SHA>,  
L<Digest::HMAC>

L<md5sum(1)>

RFC 1321

<http://en.wikipedia.org/wiki/MD5>

The paper "How to Break MD5 and Other Hash Functions" by Xiaoyun Wang and Hongbo Yu.

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=head1 AUTHORS

The original C<MD5> interface was written by Neil Winton (C<N.Winton@axion.bt.co.uk>).

The C<Digest::MD5> module is written by Gisle Aas <gisle@ActiveState.com>.

=cut

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\* /opt/ws\_local/PERMITS\_SQL/1009548130\_1591379411.76/0/perl-Digest-MD5-2.55-396.el8.src.rpm-cosi-expand-archive-qfwrDrJx/Digest-MD5-2.55.tar.gz-cosi-expand-archive-xOrAnhrN/Digest-MD5-2.55/MD5.pm

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## 4.1.35.Final

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```
 * /opt/cola/permits/1381525578_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/PeerCredentials.java
 * /opt/cola/permits/1381525578_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/ErrorsStaticallyReferencedJniMethods.java
 * /opt/cola/permits/1381525578_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/SocketWritableByteChannel.java
 * /opt/cola/permits/1381525578_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/Limits.java
 * /opt/cola/permits/1381525578_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/LimitsStaticallyReferencedJniMethods.java
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\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/UnixChannelOption.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/IovArray.java

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\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/DatagramSocketAddress.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/Socket.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/UnixChannel.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/NativeInetAddress.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/DomainSocketChannelConfig.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/FileDescriptor.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-

2-jar/io/netty/channel/unix/Errors.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/DomainSocketChannel.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/ServerDomainSocketChannel.java  
\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/DomainSocketReadMode.java  
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\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/io/netty/channel/unix/PreferredDirectByteBufferAllocator.java  
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\* /opt/cola/permits/1381525578\_1659660693.717194/0/netty-transport-native-unix-common-4-1-35-final-sources-2-jar/META-INF/maven/io.netty/netty-transport-native-unix-common/pom.xml

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## 1.211 libjpeg-turbo 1.5.3-12.el8

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\* /opt/cola/permits/1262704582\_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-jar/io/netty/internal/tcnative/CertificateRequestedCallback.java

\* /opt/cola/permits/1262704582\_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-jar/io/netty/internal/tcnative/SessionTicketKey.java

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\* /opt/cola/permits/1262704582\_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-jar/io/netty/internal/tcnative/SSL.java  
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\* /opt/cola/permits/1262704582\_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-jar/io/netty/internal/tcnative/Library.java

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Manifest-Version: 1.0

BoringSSL-Revision: 8e8f250422663106d478f6927beefba289a95b37

Bundle-Description: A Mavenized fork of Tomcat Native which incorporates various patches. This artifact is statically linked to BoringSSL and Apache APR.

Apr-Version: 1.6.5

Automatic-Module-Name: io.netty.tcnative.boringssl

Bundle-License: <http://www.apache.org/licenses/LICENSE-2.0>

Bundle-SymbolicName: io.netty.tcnative-boringssl-static

Archiver-Version: Plexus Archiver

Built-By: norman

Bnd-LastModified: 1555012097509

Bundle-ManifestVersion: 2

Bundle-DocURL: <http://netty.io/>

Bundle-Vendor: The Netty Project

Import-Package: sun.nio.ch;resolution:=optional,org.eclipse.jetty.alpn;version="[1,2)";resolution:=optional,org.eclipse.jetty.npn;version="[1,2)";resolution:=optional

Tool: Bnd-2.1.0.20130426-122213

Export-Package: io.netty.internal.tcnative;version="2.0.25.Final"

Bundle-Name: Netty/TomcatNative [BoringSSL - Static]

Bundle-Version: 2.0.25.Final

BoringSSL-Branch: chromium-stable

Bundle-NativeCode: META-INF/native/libnetty\_tcnative.jnilib;osname=mac

osx;;processor=x86\_64

Created-By: Apache Maven Bundle Plugin

Build-Jdk: 1.8.0\_181

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\* /opt/cola/permits/1262704582\_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-jar/io/netty/internal/tcnative/SSLPrivateKeyMethodTask.java

\* /opt/cola/permits/1262704582\_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-jar/io/netty/internal/tcnative/CertificateCallbackTask.java

\* /opt/cola/permits/1262704582\_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-jar/io/netty/internal/tcnative/CertificateVerifierTask.java

\* /opt/cola/permits/1262704582\_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-jar/io/netty/internal/tcnative/SSLTask.java

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* /opt/cola/permits/1262704582_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-
jar/io/netty/internal/tcnative/NativeStaticallyReferencedJniMethods.java
* /opt/cola/permits/1262704582_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-
jar/io/netty/internal/tcnative/SniHostNameMatcher.java

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* /opt/cola/permits/1262704582_1643432056.08/0/netty-tcnative-boringssl-static-2-0-25-final-sources-
jar/io/netty/internal/tcnative/CertificateCallback.java

```

# 1.213 json-java 20180130

## 1.213.1 Available under license :

=====

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## 1.214 rootfiles 8.1-22.el8

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\* /opt/ws\_local/PERMITS\_SQL/1009541302\_1591901904.49/0/rootfiles-8.1-22.el8.src.rpm-cosi-expand-archive-8uQKwO6W/rootfiles.spec

## 1.215 error\_prone\_annotations 2.3.2

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\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/MustBeClosed.java

\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/FormatMethod.java

\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/CompatibleWith.java

\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/RestrictedApi.java

\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/FormatString.java

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\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/CheckReturnValue.java

\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/OverridingMethodsMustInvokeSuper.java

\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/DoNotCall.java

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\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/NoAllocation.java  
\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/concurrent/UnlockMethod.java  
\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/concurrent/LockMethod.java  
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\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/CompileTimeConstant.java  
\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/RequiredModifiers.java  
\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/concurrent/LazyInit.java  
\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/Var.java  
\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-jar/com/google/errorprone/annotations/ForOverride.java  
\* /opt/cola/permits/1258803950\_1643112888.66/0/error-prone-annotations-2-3-2-sources-

```
jar/com/google/errorprone/annotations/CanIgnoreReturnValue.java
* /opt/cola/permits/1258803950_1643112888.66/0/error-prone-annotations-2-3-2-sources-
jar/com/google/errorprone/annotations/Immutable.java
* /opt/cola/permits/1258803950_1643112888.66/0/error-prone-annotations-2-3-2-sources-
jar/com/google/errorprone/annotations/IncompatibleModifiers.java
* /opt/cola/permits/1258803950_1643112888.66/0/error-prone-annotations-2-3-2-sources-
jar/com/google/errorprone/annotations/SuppressPackageLocation.java
```

## 1.216 jaxrs-ri 2.5.1

### 1.216.1 Available under license :

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 * Convert the supplied value to a String.
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 * Users should be aware that any such support for the method comes at the expense of producing
 * non-portable code.
 * </p>
 *
 * @param value the value of type { @code T }.
 * @return a String representation of the value.
 * @throws IllegalArgumentException if the supplied object cannot be
 *         serialized or is { @code null }.
 */

```

Found in path(s):

```

* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/javax/ws/rs/ext/ParamConverter.java

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jar/org/glassfish/jersey/server/internal/monitoring/MonitoringStatisticsProcessor.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/BackgroundScheduler.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/monitoring/ResourceStatistics.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/monitoring/ResponseMXBean.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/filter/internal/ServerFiltersAutoDiscoverable.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/javax/ws/rs/core/NoContentException.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/monitoring/TimeWindowStatistics.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/HttpUrlConnectorProvider.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/TracingConfig.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/collection/ByteBufferInputStream.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/servlet/internal/ServletContainerProviderFactory.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/servlet/internal/spi/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/Severity.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/monitoring/ResourceMethodMXBean.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/collection/Settable.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-

jar/org/glassfish/jersey/server/internal/monitoring/jmx/ResourceMxBeanImpl.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/message/internal/TracingAwarePropertiesDelegate.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/jmx/ExceptionMapperMXBeanImpl.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/monitoring/ExceptionMapperStatistics.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/ApplicationEventImpl.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/spi/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/servlet/init/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/JerseyRequestTimeoutHandler.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/ExecutionStatisticsImpl.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/message/internal/MsgTraceEvent.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/monitoring/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/MappableExceptionWrapperInterceptor.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/monitoring/ExecutionStatistics.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/InternalServerProperties.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/JerseyErrorService.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/MonitoringAutodiscoverable.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/monitoring/ApplicationStatistics.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/RequestEntityProcessing.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/model/ExtendedResource.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/jmx/ResourceMethodMXBeanImpl.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/ExceptionMapperStatisticsImpl.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/ResourceStatisticsImpl.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/authentication/HttpAuthenticationFeature.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-

jar/org/glassfish/jersey/message/internal/JerseyLink.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/collection/LazyUnsafeValue.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/collection/LazyValue.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/EmptyRequestEventBuilder.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/jmx/ExecutionStatisticsDynamicBean.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/wadl/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/servlet/internal/spi/ServletContainerProvider.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/jmx/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/CommonProperties.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/monitoring/CompositeApplicationEventListener.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/wadl/internal/generators/resourcedoc/model/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/process/package-info.java  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/javax/ws/rs/Priorities.java  
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jar/org/glassfish/jersey/server/wadl/WadlFeature.java  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/internal/inject/JerseyClassAnalyzer.java

\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/client/spi/ConnectorProvider.java

\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/internal/monitoring/TimeWindowStatisticsImpl.java

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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/TracingUtils.java

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jar/org/glassfish/jersey/server/filter/internal/package-info.java  
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 \* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/model/internal/ResourceModelBinder.java  
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 \* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/internal/RuntimeDelegateImpl.java  
 \* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/message/internal/VariantSelector.java  
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 \* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/filter/LoggingFilter.java  
 \* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/javax/ws/rs/client/WebTarget.java

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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/javax/ws/rs/RuntimeType.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/Producer.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/spi/ComponentProvider.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/uri/PathTemplate.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/LazyUid.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/ChunkedResponseWriter.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/model/NameBound.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/routing/Route.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/javax/ws/rs/ConstrainedTo.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/spi/RequestScopedInitializer.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/routing/Routers.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/Tokenizer.java

\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/javax/ws/rs/BeanParam.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/model/ResourceMethodConfig.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/internal/inject/Custom.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/internal/inject/ParamInjectionResolver.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/model/Inflecting.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/process/internal/AbstractChainableStage.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/client/ChunkedReader.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/internal/util/Base64.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/process/internal/Stage.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/internal/MapPropertiesDelegate.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/servlet/WebFilterConfig.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/client/filter/package-info.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/javax/ws/rs/container/CompletionCallback.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/client/filter/EncodingFilter.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/internal/util/Closing.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/internal/scanning/ResourceFinderException.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/message/internal/AbstractXmlFactory.java  
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* holder.
*/
/**
 * Obtain a {@link InputStream} of the jar file.
 * <p>
 * For most platforms the format for the zip or jar follows the form of
 * the <a href="http://docs.sun.com/source/819-0913/author/jar.html#jarprotocol">jar protocol.</a></p>
 * <ul>
 * <li><code>jar:file:///tmp/fishfingers.zip!/example.txt</code></li>
 * <li><code>zip:http://www.example.com/fishfingers.zip!/example.txt</code></li>
 * </ul>
 * <p>
 * On versions of the WebLogic application server a proprietary format is
 * supported of the following form, which assumes a zip file located on
 * the local file system:
 * <p>
 * <ul>
 * <li><code>zip:/tmp/fishfingers.zip!/example.txt</code></li>
 * <li><code>zip:d:/tempfishfingers.zip!/example.txt</code></li>
 * </ul>
 * <p>
 * This method will first attempt to create a {@link InputStream} as follows:
 * <pre>
 * new URL(jarUrlString).openStream();

```



```

* </pre>
* if that fails with a {@link java.net.MalformedURLException} then the method will
* attempt to create a {@link InputStream} instance as follows:
* <pre>
* return new new FileInputStream(
*     UriComponent.decode(jarUrlString, UriComponent.Type.PATH));
* </pre>
*
* @param jarUrlString the raw scheme specific part of a URI minus the jar
*     entry
* @return a {@link InputStream}.
* @throws IOException if there is an error opening the stream.
*/

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* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/org/glassfish/jersey/server/internal/scanning/JarZipSchemeResourceFinderFactory.java
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*/
/**
* Used to annotate SPI provider contracts recognized by Jersey (in addition to the JAX-RS providers).
*
* All proprietary Jersey extension APIs are annotated with the {@code @Contract} annotation.
* <p>
* Similarly, any custom (i.e. not JAX-RS or Jersey) extension provider contract must be annotated with this
* annotation otherwise concrete service classes implementing the provider contract would not be recognized
* and treated as extension service provider by Jersey runtime.
* </p>
*
* @author Miroslav Fuksa (miroslav.fuksa at oracle.com)
* @author Marek Potociar (marek.potociar at oracle.com)
*/

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* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/org/glassfish/jersey/spi/Contract.java

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jar/org/glassfish/jersey/client/internal/localization.properties
* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/org/glassfish/jersey/servlet/internal/localization.properties
* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/org/glassfish/jersey/server/internal/localization.properties
* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/org/glassfish/jersey/internal/localization.properties

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* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/org/glassfish/jersey/model/internal/ComponentBag.java
* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/javax/ws/rs/NotFoundException.java
* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-
jar/org/glassfish/jersey/server/internal/inject/ParamConverters.java
* /opt/cola/permits/1381525592_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-

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jar/org/glassfish/jersey/client/CustomProvidersFeature.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/ChunkedInput.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/routing/MethodAcceptorPair.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/ClientFilteringStages.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/message/internal/MessagingBinders.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/message/internal/MessageBodyProviderNotFoundException.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/InboundJaxrsResponse.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/ChunkedOutput.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/JerseyResourceContext.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/JerseyWebTarget.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/ExtendedLogger.java  
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jar/org/glassfish/jersey/client/ClientBinder.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/uri/internal/UriParser.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/JSONP.java  
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jar/org/glassfish/jersey/internal/Errors.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/javax/ws/rs/container/ContainerResponseFilter.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/spi/ContentEncoder.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/ContainerException.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/JaxrsProviders.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/internal/JsonWithPaddingInterceptor.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
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jar/org/glassfish/jersey/client/JerseyClientBuilder.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/servlet/spi/AsyncContextDelegate.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-

jar/javax/ws/rs/ServerErrorException.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/spi/RequestExecutorProvider.java  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
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jar/org/glassfish/jersey/internal/util/collection/ImmutableMultivaluedMap.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/RequestProcessingInitializationStage.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/message/MessageProperties.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/message/internal/HeaderValueException.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/client/ClientRuntime.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/message/internal/BasicTypesMessageProvider.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/wadl/processor/WadlModelProcessor.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/server/filter/RolesAllowedDynamicFeature.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/javax/ws/rs/BadRequestException.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/process/internal/RequestExecutorFactory.java  
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jar/javax/ws/rs/core/Configuration.java  
\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
jar/org/glassfish/jersey/internal/util/SimpleNamespaceResolver.java  
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jar/org/glassfish/jersey/internal/util/SaxHelper.java  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-  
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jar/org/glassfish/jersey/server/model/Parameterized.java  
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jar/org/glassfish/jersey/message/internal/StringMessageProvider.java  
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- \* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/process/internal/Inflecting.java
- \* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/server/internal/package-info.java
- \* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/org/glassfish/jersey/internal/package-info.java
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\* /opt/cola/permits/1381525592\_1659660735.8510919/0/jaxrs-ri-2-5-1-sources-1-jar/javax/ws/rs/container/DynamicFeature.java

## 1.217 haproxy 2.2.25-50b5f5d

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That's all there is to it!  
HAPROXY's license - 2006/06/15

Historically, haproxy has been covered by GPL version 2. However, an issue appeared in GPL which will prevent external non-GPL code from being built using the headers provided with haproxy. My long-term goal is to build a core system able to load external modules to support specific application protocols.

Since some protocols are found in rare environments (finance, industry, ...), some of them might be accessible only after signing an NDA. Enforcing GPL on such modules would only prevent them from ever being implemented, while not providing anything useful to ordinary users.

For this reason, I \*want\* to be able to support binary only external modules when needed, with a GPL core and GPL modules for standard protocols, so that people fixing bugs don't keep them secretly to try to stay over competition.

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Willy Tarreau - w@lwt.eu

# 1.218 importlib-metadata 4.12.0

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# 1.219 jetty 9.4.26.v20200117

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-----  
Eclipse

The following artifacts are EPL.  
\* org.eclipse.jetty.orbit:org.eclipse.jdt.core

The following artifacts are EPL and ASL2.  
\* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.

\* org.eclipse.jetty.orbit:javafx.mail.glassfish

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Oracle

The following artifacts are CDDL + GPLv2 with classpath exception.

<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

\* javax.servlet:javax.servlet-api

\* javax.annotation:javax.annotation-api

\* javax.transaction:javax.transaction-api

\* javax.websocket:javax.websocket-api

-----

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following artifacts may be included in the distribution or downloaded when ALPN module is selected.

\* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.

<http://openjdk.java.net/legal/gplv2+ce.html>

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OW2

The following artifacts are licensed by the OW2 Foundation according to the terms of <http://asm.ow2.org/license.html>

org.ow2.asm:asm-commons

org.ow2.asm:asm

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Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec

org.apache.taglibs:taglibs-standard-impl

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MortBay

The following artifacts are ASL2 licensed. Based on selected classes from following Apache Tomcat jars, all ASL2 licensed.

org.mortbay.jasper:apache-jsp  
org.apache.tomcat:tomcat-jasper  
org.apache.tomcat:tomcat-juli  
org.apache.tomcat:tomcat-jsp-api  
org.apache.tomcat:tomcat-el-api  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-api  
org.apache.tomcat:tomcat-util-scan  
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-el-api

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Mortbay

The following artifacts are CDDL + GPLv2 with classpath exception.

<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

org.eclipse.jetty.toolchain:jetty-schemas

-----

Assorted

The UnixCrypt.java code implements the one way cryptography used by Unix systems for simple password protection. Copyright 1996 Aki Yoshida, modified April 2001 by Iris Van den Broeke, Daniel Deville.

Permission to use, copy, modify and distribute UnixCrypt for non-commercial or commercial purposes and without fee is granted provided that the copyright notice appears in all copies.

## 1.220 wtforms 3.0.1

### 1.220.1 Available under license :

No license file was found, but licenses were detected in source scan.

[metadata]

```
name = WTForms
version = 3.0.1
url = https://wtforms.readthedocs.io/
project_urls =
    Documentation = https://wtforms.readthedocs.io/
    Code = https://github.com/wtforms/wtforms
    Issue Tracker = https://github.com/wtforms/wtforms/issues
license = BSD-3-Clause
license_files = LICENSE.rst
maintainer = WTForms
maintainer_email = davidism@gmail.com
description = Form validation and rendering for Python web development.
long_description = file: README.rst
long_description_content_type = text/x-rst
classifiers =
    Development Status :: 5 - Production/Stable
    Environment :: Web Environment
    Intended Audience :: Developers
    License :: OSI Approved :: BSD License
    Operating System :: OS Independent
    Programming Language :: Python
    Topic :: Internet :: WWW/HTTP :: Dynamic Content
```

```
[options]
```

```
packages = find:
package_dir = = src
include_package_data = true
python_requires = >= 3.7
setup_requires = Babel >= 2.6.0
install_requires = MarkupSafe
```

```
[options.packages.find]
```

```
where = src
```

```
[options.extras_require]
```

```
email = email_validator
```

```
[extract_messages]
```

```
copyright_holder = WTForms Team
input_paths = src/wtforms
output_file = src/wtforms/locale/wtforms.pot
```

```
[init_catalog]
```

```
input_file = src/wtforms/locale/wtforms.pot
output_dir = src/wtforms/locale/
domain = wtforms
```

```
[update_catalog]
```

```
input_file = src/wtforms/locale/wtforms.pot
output_dir = src/wtforms/locale/
domain = wtforms
update-header-comment = true
no-fuzzy-matching = true
ignore-obsolete = true
```

```
[compile_catalog]
directory = src/wtforms/locale/
domain = wtforms
statistics = true
```

```
[tool:pytest]
testpaths = tests
filterwarnings =
    error
```

```
[coverage:run]
branch = true
source =
    wtforms
```

```
[coverage:paths]
source =
    src
    .tox/*/site-packages
```

```
[coverage:report]
exclude_lines =
    pragma: no cover
    except ImportError:
```

```
[flake8]
select = B, E, F, W, B9, ISC
ignore =
    E203
    E501
    E722
    W503
max-line-length = 80
per-file-ignores =
    **/__init__.py: F401, F403
```

```
[egg_info]
tag_build =
tag_date = 0
```

Found in path(s):



\* /opt/cola/permits/1254250733\_1642227571.68/0/wtforms-3-0-1-tar-gz/WTForms-3.0.1/setup.cfg

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Metadata-Version: 2.1

Name: WTForms

Version: 3.0.1

Summary: Form validation and rendering for Python web development.

Home-page: <https://wtforms.readthedocs.io/>

Maintainer: WTForms

Maintainer-email: [davidism@gmail.com](mailto:davidism@gmail.com)

License: BSD-3-Clause

Project-URL: Documentation, <https://wtforms.readthedocs.io/>

Project-URL: Code, <https://github.com/wtforms/wtforms>

Project-URL: Issue Tracker, <https://github.com/wtforms/wtforms/issues>

Platform: UNKNOWN

Classifier: Development Status :: 5 - Production/Stable

Classifier: Environment :: Web Environment

Classifier: Intended Audience :: Developers

Classifier: License :: OSI Approved :: BSD License

Classifier: Operating System :: OS Independent

Classifier: Programming Language :: Python

Classifier: Topic :: Internet :: WWW/HTTP :: Dynamic Content

Requires-Python: >=3.7

Description-Content-Type: text/x-rst

Provides-Extra: email

License-File: LICENSE.rst

WTForms

=====

WTForms is a flexible forms validation and rendering library for Python web development. It can work with whatever web framework and template engine you choose. It supports data validation, CSRF protection, internationalization (I18N), and more. There are various community libraries that provide closer integration with popular frameworks.

Installation

-----

Install and update using pip:

.. code-block:: text

```
pip install -U WTForms
```

Third-Party Library Integrations

-----

WTForms is designed to work with any web framework and template engine. There are a number of community-provided libraries that make integrating with frameworks even better.

- `Flask-WTF`\_ integrates with the Flask framework. It can automatically load data from the request, uses Flask-Babel to translate based on user-selected locale, provides full-application CSRF, and more.
- `WTForms-Alchemy`\_ provides rich support for generating forms from SQLAlchemy models, including an expanded set of fields and validators.
- `WTForms-SQLAlchemy`\_ provides ORM-backed fields and form generation from SQLAlchemy models.
- `WTForms-AppEngine`\_ provides ORM-backed fields and form generation from AppEngine db/ndb schema
- `WTForms-Django`\_ provides ORM-backed fields and form generation from Django models, as well as integration with Django's I18N support.
- `Starlette-WTF`\_ integrates with Starlette and the FastAPI framework, based on the features of Flask-WTF.

.. \_Flask-WTF: <https://flask-wtf.readthedocs.io/>  
.. \_WTForms-Alchemy: <https://wtforms-alchemy.readthedocs.io/>  
.. \_WTForms-SQLAlchemy: <https://github.com/wtforms/wtforms-sqlalchemy>  
.. \_WTForms-AppEngine: <https://github.com/wtforms/wtforms-appengine>  
.. \_WTForms-Django: <https://github.com/wtforms/wtforms-django>  
.. \_Starlette-WTF: <https://github.com/muicss/starlette-wtf>

## Links

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- Documentation: <https://wtforms.readthedocs.io/>
- Releases: <https://pypi.org/project/WTForms/>
- Code: <https://github.com/wtforms/wtforms>
- Issue tracker: <https://github.com/wtforms/wtforms/issues>
- Discord Chat: <https://discord.gg/F65P7Z9>

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# 1.221 which 2.21-17.e18

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Version 3, 29 June 2007

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Julian Seward, jseward@bzip.org  
bzip2/libbzip2 version 1.0.6 of 6 September 2010

# 1.223 jasper 2.0.14-5.el8

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## 1.224 jctools-core 2.1.1

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\*/

Found in path(s):

- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/BaseLinkedList.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/SpmcAtomicArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/MpscChunkedAtomicArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/maps/NonBlockingHashMap.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/util/UnsafeAccess.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/SpSCUnboundedArrayQueue.java

- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/LinkedQueueNode.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/MpscAtomicArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MpscChunkedArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/SpscArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/SpscUnboundedAtomicArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/MpscGrowableAtomicArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/AtomicReferenceArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/SpscLinkedAtomicQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/maps/ConcurrentAutoTable.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/maps/NonBlockingSetInt.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MessagePassingQueueUtil.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/SpscChunkedArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/SpscAtomicArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MpscGrowableArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/ConcurrentCircularArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/SpmcArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/util/RangeUtil.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/LinkedQueueAtomicNode.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/SequencedAtomicReferenceArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/spec/Preference.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/spec/Ordering.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MpscLinkedQueue7.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/BaseMpscLinkedArrayQueue.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/maps/NonBlockingIdentityHashMap.java
- \* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-

jar/org/jctools/queues/QueueFactory.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/maps/NonBlockingHashSet.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MpscLinkedQueue8.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MessagePassingQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/util/Pow2.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/MpscUnboundedAtomicArrayQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/BaseSpSCLinkedAtomicArrayQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/SpSCGrowableArrayQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MpmcArrayQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/spec/ConcurrentQueueSpec.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/SpSCLinkedQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/util/UnsafeRefArrayAccess.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/package-info.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/maps/AbstractEntry.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MpscCompoundQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/MpscLinkedAtomicQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/BaseMpscLinkedAtomicArrayQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/maps/NonBlockingHashMapLong.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/BaseSpSCLinkedArrayQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/SpSCChunkedAtomicArrayQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/MpmcAtomicArrayQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/atomic/BaseLinkedAtomicQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/IndexedQueueSizeUtil.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MpscLinkedQueue.java  
\* /opt/cola/permits/1257262349\_1642793356.2/0/jctools-core-2-1-1-sources-jar/org/jctools/queues/MpscArrayQueue.java

```
* /opt/cola/permits/1257262349_1642793356.2/0/jctools-core-2-1-1-sources-
jar/org/jctools/queues/ConcurrentSequencedCircularArrayQueue.java
* /opt/cola/permits/1257262349_1642793356.2/0/jctools-core-2-1-1-sources-
jar/org/jctools/queues/atomic/SpSCGrowableAtomicArrayQueue.java
* /opt/cola/permits/1257262349_1642793356.2/0/jctools-core-2-1-1-sources-
jar/org/jctools/queues/atomic/AtomicQueueFactory.java
* /opt/cola/permits/1257262349_1642793356.2/0/jctools-core-2-1-1-sources-
jar/org/jctools/queues/MpscUnboundedArrayQueue.java
```

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```
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/maven-v4_0_0.xsd">
  <modelVersion>4.0.0</modelVersion>
```

```
  <artifactId>jctools-core</artifactId>
  <groupId>org.jctools</groupId>
  <version>2.1.1</version>
  <name>Java Concurrency Tools Core Library</name>
  <description>Java Concurrency Tools Core Library</description>
  <packaging>bundle</packaging>
```

```
  <dependencies>
    <dependency>
      <groupId>org.hamcrest</groupId>
      <artifactId>hamcrest-all</artifactId>
      <version>${hamcrest.version}</version>
      <scope>test</scope>
    </dependency>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>${junit.version}</version>
      <scope>test</scope>
    </dependency>
```

```
    <dependency>
      <groupId>com.google.guava</groupId>
      <artifactId>guava-testlib</artifactId>
      <version>${guava-testlib.version}</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
```

```
  <build>
    <plugins>
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-surefire-plugin</artifactId>
        <version>2.19.1</version>
```



```

<configuration>
  <includes>
    <include>*</include>
  </includes>
</configuration>
</plugin>
<plugin>
  <groupId>org.apache.felix</groupId>
  <artifactId>maven-bundle-plugin</artifactId>
  <version>2.5.4</version>
  <extensions>>true</extensions>
  <configuration>
    <instructions>
      <Import-Package>sun.misc;resolution:=optional</Import-Package>
    </instructions>
  </configuration>
</plugin>
<plugin>
  <groupId>org.apache.maven.plugins</groupId>
  <artifactId>maven-source-plugin</artifactId>
  <version>3.0.1</version>
  <executions>
    <execution>
      <id>attach-sources</id>
      <phase>verify</phase>
      <goals>
        <goal>jar-no-fork</goal>
      </goals>
    </execution>
  </executions>
</plugin>
<plugin>
  <groupId>org.apache.maven.plugins</groupId>
  <artifactId>maven-javadoc-plugin</artifactId>
  <version>3.0.0-M1</version>
  <configuration>
    <additionalparam>-Xdoclint:none</additionalparam>
  </configuration>
  <executions>
    <execution>
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      <goals>
        <goal>jar</goal>
      </goals>
    </execution>
  </executions>
</plugin>
</plugins>

```

```
</build>

<distributionManagement>
  <repository>
    <id>bintray-jctools-jctools</id>
    <name>jctools-jctools</name>
    <url>https://api.bintray.com/maven/jctools/jctools/jctools-core/?publish=1</url>
  </repository>
</distributionManagement>

<url>https://github.com/JCTools</url>
<inceptionYear>2013</inceptionYear>

<licenses>
  <license>
    <name>Apache License, Version 2.0</name>
    <url>http://www.apache.org/licenses/LICENSE-2.0.txt</url>
    <distribution>repo</distribution>
  </license>
</licenses>

<scm>
  <url>https://github.com/JCTools/JCTools</url>
  <connection>scm:git:https://github.com/JCTools/JCTools</connection>
  <tag>HEAD</tag>
</scm>

<developers>
  <developer>
    <url>https://github.com/nitsanw</url>
  </developer>
  <developer>
    <url>https://github.com/mjpt777</url>
  </developer>
  <developer>
    <url>https://github.com/RichardWarburton</url>
  </developer>
  <developer>
    <url>https://github.com/Kay</url>
  </developer>
</developers>

<prerequisites>
  <maven>3.3.9</maven>
</prerequisites>

<properties>
  <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
```

```

<java.version>1.6</java.version>
<java.test.version>1.8</java.test.version>

<maven.compiler.source>${java.version}</maven.compiler.source>
<maven.compiler.target>${java.version}</maven.compiler.target>
<maven.compiler.testSource>${java.test.version}</maven.compiler.testSource>
<maven.compiler.testTarget>${java.test.version}</maven.compiler.testTarget>

<hamcrest.version>1.3</hamcrest.version>
<junit.version>4.12</junit.version>
<guava-testlib.version>21.0</guava-testlib.version>
</properties>
</project>

```

Found in path(s):

```

* /opt/cola/permits/1257262349_1642793356.2/0/jctools-core-2-1-1-sources-jar/META-
INF/maven/org.jctools/jctools-core/pom.xml

```

## 1.225 jedis 2.8.1

## 1.226 python-certifi 2021.10.08

### 1.226.1 Available under license :

This package contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication.

Just configure this file as the SSLCACertificateFile.#

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@(#) \$RCSfile: certdata.txt,v \$ \$Revision: 1.80 \$ \$Date: 2011/11/03 15:11:58 \$

# 1.227 xerces-j 2.7.1

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## 1.228 perl-parent 0.237-1.el8

### 1.228.1 Available under license :

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Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548129\_1591379747.05/0/perl-parent-0.237-1.el8.src.rpm-cosi-expand-  
archive-Q995NCX6/perl-parent.spec

No license file was found, but licenses were detected in source scan.

---

abstract: 'Establish an ISA relationship with base classes at compile time'

author:

- 'Max Maischein <corion@cpan.org>'

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.34, CPAN::Meta::Converter version 2.150005'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

```
version: '1.4'
name: parent
no_index:
directory:
  - t
  - inc
requires:
Test::More: '0.4'
perl: '5.006'
resources:
  repository: https://github.com/Corion/parent
version: '0.237'
x_serialization_backend: 'CPAN::Meta::YAML version 0.018'
```

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548129_1591379747.05/0/perl-parent-0.237-1.el8.src.rpm-cosi-expand-
archive-Q995NCX6/parent-0.237.tar.gz-cosi-expand-archive-VnAWPUBe/parent-0.237/META.yml
```

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=encoding utf8

=head1 NAME

parent - Establish an ISA relationship with base classes at compile time

=head1 SYNOPSIS

```
package Baz;
use parent qw(Foo Bar);
```

=head1 DESCRIPTION

Allows you to both load one or more modules, while setting up inheritance from those modules at the same time. Mostly similar in effect to

```
package Baz;
BEGIN {
  require Foo;
  require Bar;
  push @ISA, qw(Foo Bar);
}
```

By default, every base class needs to live in a file of its own.

If you want to have a subclass and its parent class in the same file, you can tell C<parent> not to load any modules by using the C<-norequire> switch:

```
package Foo;
sub exclaim { "I CAN HAS PERL" }
```



```
package DoesNotLoadFooBar;
use parent -norequire, 'Foo', 'Bar';
# will not go looking for Foo.pm or Bar.pm
```

This is equivalent to the following code:

```
package Foo;
sub exclaim { "I CAN HAS PERL" }

package DoesNotLoadFooBar;
push @DoesNotLoadFooBar::ISA, 'Foo', 'Bar';
```

This is also helpful for the case where a package lives within a differently named file:

```
package MyHash;
use Tie::Hash;
use parent -norequire, 'Tie::StdHash';
```

This is equivalent to the following code:

```
package MyHash;
require Tie::Hash;
push @ISA, 'Tie::StdHash';
```

If you want to load a subclass from a file that C<require> would not consider an eligible filename (that is, it does not end in either C<.pm> or C<.pmc>), use the following code:

```
package MySecondPlugin;
require './plugins/custom.plugin'; # contains Plugin::Custom
use parent -norequire, 'Plugin::Custom';
```

=head1 HISTORY

This module was forked from L<base> to remove the cruft that had accumulated in it.

=head1 CAVEATS

=head1 SEE ALSO

L<base>

=head1 AUTHORS AND CONTRIBUTORS

Rafaël Garcia-Suarez, Bart Lateur, Max Maischein, Anno Siegel, Michael Schwern

=head1 MAINTAINER

Max Maischein C< corion@cpan.org >

Copyright (c) 2007-2017 Max Maischein C<< <corion@cpan.org> >>

Based on the idea of C<base.pm>, which was introduced with Perl 5.004\_04.

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=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548129\_1591379747.05/0/perl-parent-0.237-1.el8.src.rpm-cosi-expand-archive-Q995NCX6/parent-0.237.tar.gz-cosi-expand-archive-VnAWPUBe/parent-0.237/lib/parent.pm

## 1.229 perl-text-parsewords 3.30-395.el8

### 1.229.1 Available under license :

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---

abstract: parse text into an array of tokens or array of arrays

author:

- 'Alexandr Ciornii <alexchorny@gmail.com>'

build\_requires:

ExtUtils::MakeMaker: 0

Scalar::Util: 0

configure\_requires:

ExtUtils::MakeMaker: 0

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 6.78, CPAN::Meta::Converter version 2.143240'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: 1.4

name: Text-ParseWords

no\_index:

directory:

- t

- inc

requires:

perl: 5.006

resources:

repository: <http://github.com/chorny/Text-ParseWords>

version: 3.30

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548109\_1591379857.65/0/perl-Text-ParseWords-3.30-395.el8.src.rpm-cosi-expand-archive-hLfeekCO/Text-ParseWords-3.30.tar.gz-cosi-expand-archive-d5OpwjES/Text-ParseWords-3.30/META.yml

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=head1 NAME

Text::ParseWords - parse text into an array of tokens or array of arrays

=head1 SYNOPSIS

```
use Text::ParseWords;
@lists = nested_quotewords($delim, $keep, @lines);
@words = quotewords($delim, $keep, @lines);
@words = shellwords(@lines);
@words = parse_line($delim, $keep, $line);
@words = old_shellwords(@lines); # DEPRECATED!
```

=head1 DESCRIPTION

The `&nested_quotewords()` and `&quotewords()` functions accept a delimiter (which can be a regular expression) and a list of lines and then breaks those lines up into a list of words ignoring delimiters that appear inside quotes. `&quotewords()` returns all of the tokens in a single long list, while `&nested_quotewords()` returns a list of token lists corresponding to the elements of `@lines`. `&parse_line()` does tokenizing on a single string. The `&*quotewords()` functions simply call `&parse_line()`, so if you're only splitting one line you can call `&parse_line()` directly and save a function call.

The `$keep` argument is a boolean flag. If true, then the tokens are split on the specified delimiter, but all other characters (including quotes and backslashes) are kept in the tokens. If `$keep` is false then the `&*quotewords()` functions remove all quotes and backslashes that are not themselves backslash-escaped or inside of single quotes (i.e., `&quotewords()` tries to interpret these characters just like the Bourne shell). NB: these semantics are significantly different from the original version of this module shipped with Perl 5.000 through 5.004. As an additional feature, `$keep` may be the keyword "delimiters" which causes the functions to preserve the delimiters in each string as tokens in the token lists, in addition to preserving quote and backslash characters.

`&shellwords()` is written as a special case of `&quotewords()`, and it

does token parsing with whitespace as a delimiter-- similar to most Unix shells.

=head1 EXAMPLES

The sample program:

```
use Text::ParseWords;
@words = quotewords('\s+', 0, q{this is "a test" of\ quotewords \"for you});
$i = 0;
foreach (@words) {
    print "$i: <$_>\n";
    $i++;
}
```

produces:

```
0: <this>
1: <is>
2: <a test>
3: <of quotewords>
4: <"for>
5: <you>
```

demonstrating:

=over 4

=item 0Z<>

a simple word

=item 1Z<>

multiple spaces are skipped because of our \$delim

=item 2Z<>

use of quotes to include a space in a word

=item 3Z<>

use of a backslash to include a space in a word

=item 4Z<>

use of a backslash to remove the special meaning of a double-quote

=item 5Z<>

another simple word (note the lack of effect of the  
backslashed double-quote)

=back

Replacing C<quotewords("\s+', 0, q{this is...})>  
with C<shellwords(q{this is...})>  
is a simpler way to accomplish the same thing.

=head1 SEE ALSO

L<Text::CSV> - for parsing CSV files

=head1 AUTHORS

Maintainer: Alexandr Ciornii <alexchornyATgmail.com>.

Previous maintainer: Hal Pomeranz <pomeranz@netcom.com>, 1994-1997 (Original  
author unknown). Much of the code for &parse\_line() (including the  
primary regexp) from Joerk Behrends <jbehrends@multimediaproduzenten.de>.

Examples section another documentation provided by John Heidemann  
<johnh@ISI.EDU>

Bug reports, patches, and nagging provided by lots of folks-- thanks  
everybody! Special thanks to Michael Schwern <schwern@envirolink.org>  
for assuring me that a &nested\_quotewords() would be useful, and to  
Jeff Friedl <jfriedl@yahoo-inc.com> for telling me not to worry about  
error-checking (sort of-- you had to be there).

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Found in path(s):

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expand-archive-hLfeekCO/Text-ParseWords-3.30.tar.gz-cosi-expand-archive-d5OpwjES/Text-ParseWords-  
3.30/lib/Text/ParseWords.pm

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Version 2.1, February 1999

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## 1.231 pycparser 2.21

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pycparser -- A C parser in Python

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## 1.233 bean-validation-api 1.1.0.Final

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\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/metadata/CascadableDescriptor.java  
\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/ConstraintTarget.java  
\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/metadata/GroupConversionDescriptor.java  
\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/metadata/CrossParameterDescriptor.java  
\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/spi/package-info.java  
\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/executable/package-info.java  
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\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/package-info.java  
\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/metadata/package-info.java  
\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/constraintvalidation/ValidationTarget.java  
\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/constraintvalidation/package-info.java  
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jar/javax/validation/spi/ConfigurationState.java
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jar/javax/validation/ConstraintViolationException.java
* /opt/cola/permits/1005661449_1651084993.5/0/validation-api-1-1-0-final-sources-
jar/javax/validation/ConstraintValidatorFactory.java
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jar/javax/validation/ValidatorFactory.java

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jar/javax/validation/bootstrap/GenericBootstrap.java  
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jar/javax/validation/constraints/Digits.java  
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jar/javax/validation/bootstrap/ProviderSpecificBootstrap.java  
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jar/javax/validation/constraints/Past.java  
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jar/javax/validation/ValidationProviderResolver.java  
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jar/javax/validation/metadata/PropertyDescriptor.java  
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jar/javax/validation/metadata/ElementDescriptor.java  
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jar/javax/validation/constraints/NotNull.java  
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\* /opt/cola/permits/1005661449\_1651084993.5/0/validation-api-1-1-0-final-sources-jar/javax/validation/groups/ConvertGroup.java

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## 1.242 jetty-client 9.4.26.v20200117

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\* org.eclipse.jetty.orbit:javax.security.auth.message

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\* org.eclipse.jetty.orbit:javax.mail.glassfish

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<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

\* javax.servlet:javax.servlet-api

\* javax.annotation:javax.annotation-api

\* javax.transaction:javax.transaction-api

\* javax.websocket:javax.websocket-api

-----

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following artifacts may be included in the distribution or downloaded when ALPN module is selected.

\* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.

<http://openjdk.java.net/legal/gplv2+ce.html>

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org.ow2.asm:asm-commons

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org.apache.taglibs:taglibs-standard-spec

org.apache.taglibs:taglibs-standard-impl

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org.mortbay.jasper:apache-jsp

org.apache.tomcat:tomcat-jasper

org.apache.tomcat:tomcat-juli

org.apache.tomcat:tomcat-jsp-api

org.apache.tomcat:tomcat-el-api

org.apache.tomcat:tomcat-jasper-el

org.apache.tomcat:tomcat-api

org.apache.tomcat:tomcat-util-scan

org.apache.tomcat:tomcat-util

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org.apache.tomcat:tomcat-el-api

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org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

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Found in path(s):

```
* /opt/cola/permits/1272678079_1645032965.58/0/jackson-module-jschema-2-4-4-sources-jar/com/fasterxml/jackson/module/jsonSchema/types/AdditionalPropertiesDeserializer.java
```

## 1.244 cyrus-sasl 2.1.27-6.el8\_5

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<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en">
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<head>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<title>EasyMock License</title>
<link rel="stylesheet" href="easymock.css" />
</head>
```

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<body><div class="bodywidth">
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<h2>
EasyMock 2 License (MIT License)
</h2>
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<em>Copyright (c) 2001-2006 <a href="http://www.offis.de">OFFIS</a>, <a href="http://www.tammofreese.de">Tammo Freese</a>.</em>
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</p>

</div>

</body>

</html>

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## 1.246 flask-testing 0.6.2

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# 1.247 pytz-deprecation-shim 0.1.0.post0

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Upstream-Name: liblz4

Upstream-Contact: Yann Collet <Cyan4973@github.com>

Source: <https://github.com/lz4/lz4>

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# 1.253 html5lib 1.0b10

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# 1.254 audit 3.0.7-2.el8.2

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# 1.259 iconv 2.28

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If the program does terminal interaction, make it output a short notice like this when it starts in an interactive mode:

```
<program> Copyright (C) <year> <name of author>  
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```

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Version 2, June 1991

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However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the

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# 1.260 systemd 239-58.el8\_6.3

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## 1.261 openssl 3.0.5

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## 1.263 ansible 2.9.1

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```

- when: vcsim is not defined

block:

- name: Add a vCenter evaluation license

```
vcenter_license: &vcenter_lic_data
  hostname: "{{ vcenter_hostname }}"
  username: "{{ vcenter_username }}"
  password: "{{ vcenter_password }}"
  validate_certs: no
  license: 00000-00000-00000-00000-00000
  state: present
```

- name: Remove an (unused) vCenter evaluation license

```
vcenter_license:
  <<: *vcenter_lic_data
  state: absent
```

- name: Add an invalid vCenter license

```
vcenter_license:
  <<: *vcenter_lic_data
  license: 00000-00000-00000-00000-00001
  state: present
  register: vcenter_license_output
  failed_when: "'is not existing or can not be added'" not in vcenter_license_output.msg'
```

dependencies:

- prepare\_vmware\_tests

This package was debianized by Henry Graham (hzgraham) <Henry.Graham@mail.wvu.edu> on Tue, 17 Apr 2012 12:19:47 -0400.

It was downloaded from <https://github.com/ansible/ansible.git>

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## 1.264 gir1.2-gdkpixbuf-2.0 2.36.12 5.el8

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## 1.265 gunicorn 19.7.1

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gunicorn.debug

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unicorn.reload

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doc/sitemap\_gen.py

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util/unlink.py

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backport from python3 Lib/test/support.py

unicorn/selectors.py

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## 1.266 jboss-annotations-api 1.0.1.Final

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jar/io/netty/handler/codec/socks/UnknownSocksRequest.java
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* /opt/cola/permits/1258803745_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-
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jar/io/netty/handler/codec/socks/SocksInitResponseDecoder.java
* /opt/cola/permits/1258803745_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-
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jar/io/netty/handler/codec/socks/SocksResponse.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
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\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
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jar/io/netty/handler/codec/socksx/v4/Socks4CommandRequest.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socksx/v5/Socks5PasswordAuthResponse.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socksx/v4/Socks4CommandStatus.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socks/SocksCommonUtils.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socksx/v5/Socks5InitialResponse.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socksx/v5/Socks5PasswordAuthRequest.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socks/SocksInitRequest.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socksx/v4/Socks4CommandResponse.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socksx/v4/Socks4ClientDecoder.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socks/SocksCmdResponseDecoder.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socksx/v5/DefaultSocks5CommandResponse.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-  
jar/io/netty/handler/codec/socks/SocksCmdRequest.java

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jar/io/netty/handler/codec/socksx/v5/Socks5InitialRequestDecoder.java

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\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v5/Socks5ClientEncoder.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/package-info.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v4/AbstractSocks4Message.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/AbstractSocksMessage.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v4/Socks4ClientEncoder.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v5/Socks5CommandRequestDecoder.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v5/Socks5CommandResponseDecoder.java  
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\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v4/Socks4ServerEncoder.java  
\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v4/package-info.java

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\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/SocksVersion.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v5/Socks5PasswordAuthStatus.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socks/SocksAuthScheme.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socks/SocksAuthStatus.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socks/SocksAddressType.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v5/Socks5AuthMethod.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socks/SocksCmdType.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socks/SocksMessageType.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socks/SocksCmdStatus.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v5/Socks5CommandStatus.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socks/SocksSubnegotiationVersion.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v5/Socks5AddressType.java

\* /opt/cola/permits/1258803745\_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-jar/io/netty/handler/codec/socksx/v5/Socks5CommandType.java

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jar/io/netty/handler/codec/socks/SocksResponseType.java
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jar/io/netty/handler/codec/socks/SocksProtocolVersion.java
* /opt/cola/permits/1258803745_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-
jar/io/netty/handler/codec/socks/SocksRequestType.java
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* /opt/cola/permits/1258803745_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-
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* /opt/cola/permits/1258803745_1643112978.03/0/netty-codec-socks-4-1-35-final-sources-
jar/io/netty/handler/codec/socksx/SocksPortUnificationServerHandler.java
```

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Metadata-Version: 2.1

Name: WTForms

Version: 3.0.0

Summary: Form validation and rendering for Python web development.

Home-page: <https://wtforms.readthedocs.io/>

Maintainer: WTForms

Maintainer-email: [davidism@gmail.com](mailto:davidism@gmail.com)

License: BSD-3-Clause

Project-URL: Documentation, <https://wtforms.readthedocs.io/>

Project-URL: Code, <https://github.com/wtforms/wtforms>

Project-URL: Issue Tracker, <https://github.com/wtforms/wtforms/issues>

Platform: UNKNOWN

Classifier: Development Status :: 5 - Production/Stable

Classifier: Environment :: Web Environment

Classifier: Intended Audience :: Developers

Classifier: License :: OSI Approved :: BSD License

Classifier: Operating System :: OS Independent

Classifier: Programming Language :: Python

Classifier: Topic :: Internet :: WWW/HTTP :: Dynamic Content

Requires-Python: >=3.6

Description-Content-Type: text/x-rst

Provides-Extra: email

License-File: LICENSE.rst

WTForms

=====

WTForms is a flexible forms validation and rendering library for Python web development. It can work with whatever web framework and template engine you choose. It supports data validation, CSRF protection, internationalization (I18N), and more. There are various community libraries that provide closer integration with popular frameworks.

Installation

-----

Install and update using pip:

.. code-block:: text

```
pip install -U WTForms
```

Third-Party Library Integrations

-----

WTForms is designed to work with any web framework and template engine. There are a number of community-provided libraries that make integrating with frameworks even better.

- `Flask-WTF`\_ integrates with the Flask framework. It can automatically load data from the request, uses Flask-Babel to translate based on user-selected locale, provides full-application CSRF, and more.
- `WTForms-Alchemy`\_ provides rich support for generating forms from SQLAlchemy models, including an expanded set of fields and validators.
- `WTForms-SQLAlchemy`\_ provides ORM-backed fields and form generation from SQLAlchemy models.
- `WTForms-AppEngine`\_ provides ORM-backed fields and form generation from AppEngine db/ndb schema
- `WTForms-Django`\_ provides ORM-backed fields and form generation from Django models, as well as integration with Django's I18N support.
- `Starlette-WTF`\_ integrates with Starlette and the FastAPI framework, based on the features of Flask-WTF.

.. \_Flask-WTF: <https://flask-wtf.readthedocs.io/>  
 .. \_WTForms-Alchemy: <https://wtforms-alchemy.readthedocs.io/>  
 .. \_WTForms-SQLAlchemy: <https://github.com/wtforms/wtforms-sqlalchemy>  
 .. \_WTForms-AppEngine: <https://github.com/wtforms/wtforms-appengine>  
 .. \_WTForms-Django: <https://github.com/wtforms/wtforms-django>  
 .. \_Starlette-WTF: <https://github.com/muicss/starlette-wtf>

## Links

-----

- Documentation: <https://wtforms.readthedocs.io/>
- Releases: <https://pypi.org/project/WTForms/>
- Code: <https://github.com/wtforms/wtforms>
- Issue tracker: <https://github.com/wtforms/wtforms/issues>
- Discord Chat: <https://discord.gg/F65P7Z9>

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```
* /opt/cola/permits/1225152645_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-3.0.0/PKG-INFO
* /opt/cola/permits/1225152645_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-3.0.0/src/WTForms.egg-info/PKG-INFO
```

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[metadata]

name = WTForms

version = 3.0.0

url = <https://wtforms.readthedocs.io/>

project\_urls =

Documentation = <https://wtforms.readthedocs.io/>

Code = <https://github.com/wtforms/wtforms>

Issue Tracker = <https://github.com/wtforms/wtforms/issues>

license = BSD-3-Clause  
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maintainer = WTForms  
maintainer\_email = davidism@gmail.com  
description = Form validation and rendering for Python web development.  
long\_description = file: README.rst  
long\_description\_content\_type = text/x-rst  
classifiers =  
Development Status :: 5 - Production/Stable  
Environment :: Web Environment  
Intended Audience :: Developers  
License :: OSI Approved :: BSD License  
Operating System :: OS Independent  
Programming Language :: Python  
Topic :: Internet :: WWW/HTTP :: Dynamic Content

[options]

packages = find:  
package\_dir = = src  
include\_package\_data = true  
python\_requires = >= 3.6  
setup\_requires = Babel >= 2.6.0  
install\_requires = MarkupSafe

[options.packages.find]

where = src

[options.extras\_require]

email = email\_validator

[extract\_messages]

copyright\_holder = WTForms Team  
input\_paths = src/wtforms  
output\_file = src/wtforms/locale/wtforms.pot

[init\_catalog]

input\_file = src/wtforms/locale/wtforms.pot  
output\_dir = src/wtforms/locale/  
domain = wtforms

[update\_catalog]

input\_file = src/wtforms/locale/wtforms.pot  
output\_dir = src/wtforms/locale/  
domain = wtforms  
update-header-comment = true  
no-fuzzy-matching = true  
ignore-obsolete = true



```
[compile_catalog]
directory = src/wtforms/locale/
domain = wtforms
statistics = true
```

```
[tool:pytest]
testpaths = tests
filterwarnings =
    error
```

```
[coverage:run]
branch = true
source =
    wtforms
```

```
[coverage:paths]
source =
    src
    .tox/*/site-packages
```

```
[coverage:report]
exclude_lines =
    pragma: no cover
    except ImportError:
```

```
[flake8]
select = B, E, F, W, B9, ISC
ignore =
    E203
    E501
    E722
    W503
max-line-length = 80
per-file-ignores =
    **/__init__.py: F401, F403
```

```
[egg_info]
tag_build =
tag_date = 0
```

```
Found in path(s):
* /opt/cola/permits/1225152645_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-3.0.0/setup.cfg
No license file was found, but licenses were detected in source scan.
```

```
# This file is distributed under the same license as the WTForms project.
```

```
Found in path(s):
* /opt/cola/permits/1225152645_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-
```

3.0.0/src/wtforms/locale/sv/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/zh\_TW/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/it/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/ca/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/ar/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/fa/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/tr/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/zh/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/ko/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/fr/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/et/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/de\_CH/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/wtforms.pot  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/bg/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/nb/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/de/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/hu/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/cy/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/uk/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/nl/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/sk/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/he/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/es/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-  
3.0.0/src/wtforms/locale/ja/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTFForms-

3.0.0/src/wtforms/locale/ru/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-  
3.0.0/src/wtforms/locale/pt/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-  
3.0.0/src/wtforms/locale/cs\_CZ/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-  
3.0.0/src/wtforms/locale/en/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-  
3.0.0/src/wtforms/locale/el/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-  
3.0.0/src/wtforms/locale/fi/LC\_MESSAGES/wtforms.po  
\* /opt/cola/permits/1225152645\_1636365662.86/0/wtforms-3-0-0-tar-gz/WTForms-  
3.0.0/src/wtforms/locale/pl/LC\_MESSAGES/wtforms.po

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Version 2, June 1991

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```

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```

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<signature of Ty Coon>, 1 April 1989  
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The End

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Version 2, June 1991

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## 1.271 animal-sniffer-annotation 1.14

### 1.271.1 Available under license :

```
<!DOCTYPE html>
<html lang="en" dir="ltr">
<head profile="http://www.w3.org/1999/xhtml/vocab">
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
  <meta name="viewport" content="width=device-width, initial-scale=1" />
  <link rel="shortcut icon" href="https://opensource.org/files/osi_favicon.png" type="image/png" />
  <meta name="HandheldFriendly" content="true" />
  <link rel="shortlink" href="/node/66" />
  <meta name="Generator" content="Drupal 7 (http://drupal.org)" />
  <link rel="canonical" href="/licenses/MIT" />
  <meta name="MobileOptimized" content="width" />
  <title>The MIT License | Open Source Initiative</title>
  <link type="text/css" rel="stylesheet" href="https://opensource.org/files/css/css_xE-rWrJf-fncB6ztZfd2huxqgxu4WO-qwma6Xer30m4.css" media="all" />
  <link type="text/css" rel="stylesheet"
href="https://opensource.org/files/css/css_4p37TiWeuzRfdymI_IPgCuu6wEwSDhUquxUkHLI7QnU.css"
media="all" />
  <link type="text/css" rel="stylesheet"
href="https://opensource.org/files/css/css_MnXiytJtb186Ydycnpwpw34cuUsHaKc80ey5LiQXhSY.css"
media="all" />
  <link type="text/css" rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.2.0/css/bootstrap.min.css"
media="all" />
  <link type="text/css" rel="stylesheet" href="https://opensource.org/files/css/css_KGZcOm3i1wmtbgZsjo-3V9FM4wZ-5UDcpJ7Vfzmt45E.css" media="all" />
  <link type="text/css" rel="stylesheet"
```

```
href="https://opensource.org/files/css/css_G9cu63kkDQ56GYuF3QrqJxma5HT-bUVZckUWKUzFCF4.css"
media="all" />
```

```
<!--[if (lt IE 9)]>
```

```
<link type="text/css" rel="stylesheet" href="https://opensource.org/sites/all/themes/bootstrap-
business/css/ie8.css?ooglib" media="all" />
```

```
<![endif]-->
```

```
<!-- HTML5 element support for IE6-8 -->
```

```
<!--[if lt IE 9]>
```

```
<script src="//html5shiv.googlecode.com/svn/trunk/html5.js"></script>
```

```
<![endif]-->
```

```
<script type="text/javascript" src="//code.jquery.com/jquery-1.10.2.min.js"></script>
```

```
<script type="text/javascript">
```

```
<!--/--><![CDATA[//><!--
```

```
window.jQuery || document.write("<script
```

```
src='/sites/all/modules/jquery_update/replace/jquery/1.10/jquery.min.js'\>\x3C/script>")
```

```
//--><![]]>
```

```
</script>
```

```
<script type="text/javascript"
```

```
src="https://opensource.org/files/js/js_aczm2rRgH_slWBPnvD3KMrK7rwa1i99HOq8IUAb99Co.js"></script>
```

```
<script type="text/javascript" src="//maxcdn.bootstrapcdn.com/bootstrap/3.2.0/js/bootstrap.min.js"></script>
```

```
<script type="text/javascript">
```

```
<!--/--><![CDATA[//><!--
```

```
jQuery(document).ready(function($) {
```

```
$(window).scroll(function() {
```

```
if($(this).scrollTop() != 0) {
```

```
$("#toTop").fadeIn();
```

```
} else {
```

```
$("#toTop").fadeOut();
```

```
}
```

```
});
```

```
$("#toTop").click(function() {
```

```
$("#body,html").animate({scrollTop:0},800);
```

```
});
```

```
});
```

```
//--><![]]>
```

```
</script>
```

```
<script type="text/javascript"
```

```
src="https://opensource.org/files/js/js_ruOYJN6FkJU2O5L1dAKVnDloSn5R6LjnLW88zFxS1Uw.js"></script>
```

```
<script type="text/javascript" src="https://opensource.org/files/js/js_JQHTvV_SkyFIN3f2BnQwnusF-
```

```
eI6tkX8wrKAK2siiZU.js"></script>
```

```
<script type="text/javascript">
```

```
<!--/--><![CDATA[//><!--
```

```
jQuery.extend(Drupal.settings,
```

```

{"basePath":"\\","pathPrefix":"","ajaxPageState":{"theme":"bootstrap_business","theme_token":"s2vZViqeD319Fq1
EBk624uZGzbS0vJ_7HPPuTvDaaeA"},"js":{"\\code.jquery.com/jquery-
1.10.2.min.js":1,"0":1,"misc/jquery.once.js":1,"misc/drupal.js":1,"\\maxcdn.bootstrapcdn.com/bootstrap/3.2.0/js
\\bootstrap.min.js":1,"1":1,"sites\\all\\libraries\\superfish\\jquery.hoverIntent.minified.js":1,"sites\\all\\libraries\\supe
rfish\\sftouchscreen.js":1,"sites\\all\\libraries\\superfish\\sfsmallscreen.js":1,"sites\\all\\libraries\\superfish\\suppositi
on.js":1,"sites\\all\\libraries\\superfish\\superfish.js":1,"sites\\all\\libraries\\superfish\\supersubs.js":1,"sites\\all\\mod
ules\\superfish\\superfish.js":1,"sites\\all\\themes\\bootstrap-
business\\js\\jquery.browser.min.js":1},"css":{"modules\\system\\system.base.css":1,"modules\\system\\system.men
us.css":1,"modules\\system\\system.messages.css":1,"modules\\system\\system.theme.css":1,"modules\\aggregator\\
aggregator.css":1,"modules\\comment\\comment.css":1,"modules\\field\\theme\\field.css":1,"sites\\all\\modules\\mol
lom\\mollom.css":1,"modules\\node\\node.css":1,"modules\\search\\search.css":1,"modules\\user\\user.css":1,"sites\\
all\\modules\\views\\css\\views.css":1,"sites\\all\\modules\\ctools\\css\\ctools.css":1,"\\maxcdn.bootstrapcdn.com\\
bootstrap/3.2.0/css\\bootstrap.min.css":1,"sites\\all\\libraries\\superfish\\css\\superfish.css":1,"sites\\all\\themes\\bo
otstrap-business\\css\\style.css":1,"sites\\all\\themes\\bootstrap-
business\\color\\colors.css":1,"sites\\all\\themes\\bootstrap-business\\css\\local.css":1,"sites\\all\\themes\\bootstrap-
business\\css\\ie8.css":1}},"urlIsAjaxTrusted":{"\\licenses\\mit-
license.php":true},"superfish":{"1":{"id":"1","sf":{"animation":{"opacity":"show","height":"show"},"speed":"\u002
7fast\u0027","autoArrows":false,"dropShadows":true,"disableHI":false},"plugins":{"touchscreen":{"mode":"windo
w_width"},"smallscreen":{"mode":"window_width","addSelected":false,"menuClasses":false,"hyperlinkClasses":fa
lse,"title":"Navigation"},"supposition":true,"bgiframe":false,"supersubs":{"minWidth":"12","maxWidth":"27","extr
aWidth":1}}}}});
//--><![]]>
</script>
</head>
<body class="html not-front not-logged-in no-sidebars page-node page-node- page-node-66 node-type-page" >
<div id="skip-link">
  <a href="#main-content" class="element-invisible element-focusable">Skip to main content</a>
</div>
  <div id="toTop"><span class="glyphicon glyphicon-chevron-up"></span></div>

<!-- #header-top -->
<div id="header-top" class="clearfix">
  <div class="container">

    <!-- #header-top-inside -->
    <div id="header-top-inside" class="clearfix">
      <div class="row">

        <div class="col-md-8">
          <!-- #header-top-left -->
          <div id="header-top-left" class="clearfix">
            <div class="region region-header-top-left">
              <div id="block-menu-secondary-menu" class="block block-menu clearfix">

<div class="content">

```

```

    <ul class="menu"><li class="first leaf"><a href="/" title="">Home</a></li>
<li class="leaf"><a href="/blog" title="">From the Board</a></li>
<li class="leaf"><a href="/contact" title="">Contact</a></li>
<li class="last leaf"><a href="/civicrm/contribute/transact?reset=1&id=2" title="">Donate</a></li>
</ul> </div>
</div>
</div>
    <div>
        <div class="col-md-4">
            <!-- #header-top-right -->
            <div id="header-top-right" class="clearfix">
                <div class="region region-header-top-right">
                    <div id="block-search-form" class="block block-search clearfix">

<div class="content">
    <form action="/licenses/mit-license.php" method="post" id="search-block-form" accept-charset="UTF-
8"><div><div class="container-inline">
    <h2 class="element-invisible">Search form</h2>
    <div class="form-item form-type-textfield form-item-search-block-form">
<input onblur="if (this.value == &#039;&#039;) { this.value = &#039;Search this website...&#039;;}" onfocus="if
(this.value == &#039;Search this website...&#039;) {this.value = &#039;&#039;;}" type="text" id="edit-search-
block-form--2" name="search_block_form" value="Search this website..." size="15" maxlength="128"
class="form-text" />
</div>
<div class="form-actions form-wrapper" id="edit-actions"><input value="" type="submit" id="edit-submit"
name="op" class="form-submit" /></div><input type="hidden" name="form_build_id" value="form-
3fdl1mgwpFzazdhVEs8DfK2cR3DKGD4vTlh3TguBqjQ" />
<input type="hidden" name="form_id" value="search_block_form" />
</div>
</div></form> </div>
</div>
</div>
    <div>
        <div>
            <!-- EOF:#header-top-right -->
        </div>

    </div>
</div>
<!-- EOF: #header-top-inside -->

</div>
</div>
<!-- EOF: #header-top -->

```

```

<!-- header -->
<header id="header" role="banner" class="clearfix">
  <div class="container">

    <!-- #header-inside -->
    <div id="header-inside" class="clearfix">
      <div class="row">
        <div class="col-md-8">

          <div id="logo">
            <a href="/" title="Home" rel="home">  </a>
          </div>

          <div id="site-name">
            <a href="/" title="Home">Open Source Initiative</a>
          </div>

        </div>

        <div class="col-md-4">

          </div>
        </div>
      </div>
    </div>
  </div>
<!-- EOF: #header -->

</div>
</header>
<!-- EOF: #header -->

<!-- #main-navigation -->
<div id="main-navigation" class="clearfix">
  <div class="container">

    <!-- #main-navigation-inside -->
    <div id="main-navigation-inside" class="clearfix">
      <div class="row">
        <div class="col-md-12">
          <nav role="navigation">
            <div class="region region-navigation">
          <div id="block-superfish-1" class="block block-superfish clearfix">

<div class="content">
  <ul id="superfish-1" class="menu sf-menu sf-navigation sf-horizontal sf-style-none sf-total-items-6 sf-parent-

```

items-6 sf-single-items-0"><li id="menu-37-1" class="first odd sf-item-1 sf-depth-1 sf-total-children-4 sf-parent-children-2 sf-single-children-2 menuparent"><a href="/about" title="About the Open Source Initiative" class="sf-depth-1 menuparent">About</a><ul><li id="menu-75-1" class="first odd sf-item-1 sf-depth-2 sf-no-children"><a href="/history" title="History of the OSI" class="sf-depth-2">History</a></li><li id="menu-82-1" class="middle even sf-item-2 sf-depth-2 sf-total-children-7 sf-parent-children-0 sf-single-children-7 menuparent"><a href="/board" title="Board of Directors" class="sf-depth-2 menuparent">Board</a><ul><li id="menu-83-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/docs/board-annotated" title="OSI Board -- With Annotations" class="sf-depth-3">Board - Annotated</a></li><li id="menu-96-1" class="middle even sf-item-2 sf-depth-3 sf-no-children"><a href="/minutes" title="Public Minutes of Board Meetings" class="sf-depth-3">Minutes</a></li><li id="menu-185-1" class="middle odd sf-item-3 sf-depth-3 sf-no-children"><a href="/organization" title="These portfolios represent the activities of the current OSI board." class="sf-depth-3">Organization & Operations</a></li><li id="menu-95-1" class="middle even sf-item-4 sf-depth-3 sf-no-children"><a href="/articles-of-incorporation" title="OSI incorporation record" class="sf-depth-3">Articles of Incorporation</a></li><li id="menu-1475-1" class="middle odd sf-item-5 sf-depth-3 sf-no-children"><a href="/elections" class="sf-depth-3">Board Elections</a></li><li id="menu-84-1" class="middle even sf-item-6 sf-depth-3 sf-no-children"><a href="/bylaws" title="Bylaws of the Open Source Initiative" class="sf-depth-3">Bylaws</a></li><li id="menu-1317-1" class="last odd sf-item-7 sf-depth-3 sf-no-children"><a href="/conflict\_of\_interest\_policy" title="" class="sf-depth-3">Conflict of Interest</a></li></ul></li><li id="menu-1843-1" class="middle odd sf-item-3 sf-depth-2 sf-total-children-2 sf-parent-children-0 sf-single-children-2 menuparent"><a href="/trademark" title="" class="sf-depth-2 menuparent">Trademark & Logo</a><ul><li id="menu-184-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/trademark-guidelines" title="OSI's Trademark Policy" class="sf-depth-3">Trademark Guidelines</a></li><li id="menu-183-1" class="last even sf-item-2 sf-depth-3 sf-no-children"><a href="/logo-usage-guidelines" title="Guidelines for appearance and usage of OSI Logo" class="sf-depth-3">Logo Guidelines</a></li></ul></li><li id="menu-126-1" class="last even sf-item-4 sf-depth-2 sf-no-children"><a href="/ToS" title="Rules for posting content on this site" class="sf-depth-2">Terms of Service</a></li></ul></li><li id="menu-65-1" class="middle even sf-item-2 sf-depth-1 sf-total-children-5 sf-parent-children-3 sf-single-children-2 menuparent"><a href="/licenses" class="sf-depth-1 menuparent">Licenses</a><ul><li id="menu-61-1" class="first odd sf-item-1 sf-depth-2 sf-total-children-1 sf-parent-children-0 sf-single-children-1 menuparent"><a href="/osd" title="The actual OSD defining what constitutes an Open Source licence" class="sf-depth-2 menuparent">Open Source Definition</a><ul><li id="menu-62-1" class="firstandlast odd sf-item-1 sf-depth-3 sf-no-children"><a href="/osd-annotated" title="The OSD with explanations and rationale interspersed." class="sf-depth-3">OSD - Annotated</a></li></ul></li><li id="menu-77-1" class="middle even sf-item-2 sf-depth-2 sf-no-children"><a href="/licenses/category" title="Licenses by Category" class="sf-depth-2">Licenses by Category</a></li><li id="menu-72-1" class="middle odd sf-item-3 sf-depth-2 sf-no-children"><a href="/licenses/alphabetical" title="Licenses that are approved by the OSI as conforming to the OSD" class="sf-depth-2">Licenses by Name</a></li><li id="menu-66-1" class="middle even sf-item-4 sf-depth-2 sf-total-children-2 sf-parent-children-0 sf-single-children-2 menuparent"><a href="/approval" title="Certifying licences as OSD-compliant" class="sf-depth-2 menuparent">License Review Process</a><ul><li id="menu-67-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/proliferation" title="Supporting choice while maintaining sanity" class="sf-depth-3">Licence Proliferation</a></li><li id="menu-69-1" class="last even sf-item-2 sf-depth-3 sf-no-children"><a href="/proliferation-report" title="License Proliferation Committee's report to the OSI Board" class="sf-depth-3">LP report to the Board</a></li></ul></li><li id="menu-99-1" class="last odd sf-item-5 sf-depth-2 sf-total-children-4 sf-parent-children-0 sf-single-children-4 menuparent"><a href="/osr-intro" title="Open Standards Requirement for Software" class="sf-depth-2 menuparent">Open Standards</a><ul><li id="menu-101-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/osr" title="An "open standard" must not prohibit conforming implementations in open source software." class="sf-depth-3">The Open Standards Requirement</a></li><li id="menu-102-1" class="middle even sf-item-2 sf-depth-3 sf-no-children"><a href="/osr-compliance" class="sf-depth-3">Open Standards Requirement



Compliance

- Open Standards Requirement Rationale
- OSR Frequently Asked Questions

Membership

- Individuals
- Join
- Affiliates
- Become an Affiliate
- List of Affiliates
- Affiliate Criteria
- Sponsors & Support
- Community
- Mailing lists
- Guidelines for OSI Mailing Lists
- General Code of Conduct
- Licensing Code of Conduct
- Disclaimer for OSI Public Forums
- Policy on Public Communications and Archives
- Volunteers
- Wiki
- OSI Store
- Resources
- FAQ
- OSI Board Blog
- Getting Help
- Links and References to Open Source
- Bibliography
- Open Source Case for Business
- Working Groups

```
id="menu-12-1" class="last odd sf-item-5 sf-depth-2 sf-no-children"><a href="/osi-open-source-education"
title="OSI&#039;s Open Source Education Initiative and Activities" class="sf-depth-2">Open Source
Education</a></li></ul></li><li id="menu-1844-1" class="last even sf-item-6 sf-depth-1 sf-total-children-2 sf-
parent-children-0 sf-single-children-2 menuparent"><a href="/news" title="Page dedicated to the latest news and
events." class="sf-depth-1 menuparent">News & Events</a><ul><li id="menu-1845-1" class="first odd sf-item-1
sf-depth-2 sf-no-children"><a href="/newsletters" title="Index of newsletters" class="sf-depth-
2">Newsletters</a></li><li id="menu-1999-1" class="last even sf-item-2 sf-depth-2 sf-no-children"><a
href="/events" class="sf-depth-2">Events</a></li></ul></li></ul> </div>
</div>
</div>
```

```
</nav>
```

```
</div>
```

```
</div>
```

```
</div>
```

```
<!-- EOF: #main-navigation-inside -->
```

```
</div>
```

```
</div>
```

```
<!-- EOF: #main-navigation -->
```

```
<!-- #page -->
```

```
<div id="page" class="clearfix">
```

```
<!-- #main-content -->
```

```
<div id="main-content">
```

```
<div class="container">
```

```
<!-- #messages-console -->
```

```
<!-- EOF: #messages-console -->
```

```
<div class="row">
```

```
<section class="col-md-12">
```

```
<!-- #main -->
```

```
<div id="main" class="clearfix">
```

```
<!-- EOF:#content-wrapper -->
```

```
<div id="content-wrapper">
```

```
<h1 class="page-title">The MIT License</h1>
```

```

<!-- #tabs -->
        <div class="tabs">
            </div>
        <!-- EOF: #tabs -->

<!-- #action links -->
        <!-- EOF: #action links -->

        <div class="region region-content">
<div id="block-system-main" class="block block-system clearfix">

<div class="content">
    <article id="node-66" class="node node-page clearfix">

<div class="content">
    <div class="field field-name-body field-type-text-with-summary field-label-hidden"><div class="field-
items"><div class="field-item even"><p style="font-weight:bold">
SPDX short identifier: MIT
</p>

<div align="right">
<button onclick="myFunction()">Further resources on the <b>MIT License</b></button>

<p id="demo"></p>

<script>
<!--/--><![CDATA[// ><!--

function myFunction() {
    var x;
    if (confirm("Disclaimer: While the OSI acknowledges these as potentially helpful resources for the community, it
does not endorse any content, contributors or license interpretations from these websites. Any links to these
resources across opensource.org are solely for navigational purposes. The OSI does not promote or exclusively favor
any of the mentioned resources, but instead provides them as separate third-party resource to help inform your
opinion. Any content from or links to these resources are separate from the OSI, exist for purely informational
purposes and creates no attorney-client relationship between you, the OSI or the resources. If you have questions
about how licenses apply to you or your organization, you should seek legal advice. ") == true) {
        x = "<br><p>The following are other community resources that may be helpful:<br><br><a
href=https://tldrlegal.com/license/mit-license style='font-weight: bold;*>The MIT License on TLDRLegal<br><a
href=http://www.gnu.org/licenses/license-list.en.html>GNU License List<br><a
href=https://en.wikipedia.org/wiki/Comparison_of_free_and_open-source_software_licenses>Wikipedia License
List<br><a href=http://oss-watch.ac.uk/apps/licdiff/>OSSWatch License Diff<br><a
href=choosealicense.com>Choosealicense";
    } else {
        x = " ";
    }
}

```

```
}
document.getElementById("demo").innerHTML = x;
}


```

```

    </div>
</div>
<!-- EOF:#main-content -->

</div>
<!-- EOF:#page -->

<footer id="subfooter" class="clearfix">
  <div class="container">

    <!-- #subfooter-inside -->
    <div id="subfooter-inside" class="clearfix">
      <div class="row">
        <div class="col-md-12">
          <!-- #subfooter-left -->
          <div class="subfooter-area">

              <div class="region region-footer">
<div id="block-block-11" class="block block-block clearfix">

<div class="content">
  <div class="filler" style="vertical-align: middle; display: inline-block;">
<p style="margin: 0pt auto; display: table-cell; text-align: center; vertical-align: middle;">
<a href="https://twitter.com/OpenSourceOrg" style="margin: 0pt auto; display: table-cell; text-align: center;
vertical-align: middle;"></a>

<a href="https://plus.google.com/+opensourceinitiative" style="margin: 0pt auto; display: table-cell; text-align:
center; vertical-align: middle;"></a>

<a href="https://www.linkedin.com/company/open-source-initiative-osi-" style="margin: 0pt auto; display: table-
cell; text-align: center; vertical-align: middle;"></a>

<a href="http://wiki.opensource.org" style="margin: 0pt auto; display: table-cell; text-align: center; vertical-align:
middle;"></a>

<a href="http://creativecommons.org/licenses/by/4.0/" style="margin: 0pt auto; display: table-cell; text-align:
center; vertical-align: middle;"></a>

<script id="fbwiuwz">

```

```
<!--><![CDATA[><!--
(function(i){var
f,s=document.getElementById(i);f=document.createElement('iframe');f.src='//api.flattr.com/button/view/?uid=osi&u
rl=http%3A%2F%2Fopensource.org';f.title='Flattr';f.height=70;f.width=70;f.style.borderWidth=0;s.parentNode.inse
rtBefore(f,s;)}('fbwiuwz');
//--><![>
</script></p>
</div>
```

```
<br /><div class="license" style="vertical-align: middle; display: inline-block;">
<p>
OpenSource.org site content is licensed under a <a rel="license"
href="http://creativecommons.org/licenses/by/4.0/">Creative Commons Attribution 4.0 International License</a>.
</p>
<p>
<a href="..ToS">Terms of Service</a>
</p>
</div>
</div>
</div>
<div id="block-block-7" class="block block-block clearfix">
```

```
<div class="content">
<script src="https://www.google-analytics.com/urchin.js" type="text/javascript">
<!--><![CDATA[><!--
```

```
--><![>
</script><script type="text/javascript">
<!--><![CDATA[><!--
```

```
_uacct = "UA-3916956-1";
urchinTracker();
```

```
--><![>
</script> </div>
</div>
</div>
```

```
</div>
<!-- EOF: #subfooter-left -->
</div>
</div>
<!-- EOF: #subfooter-inside -->
```

```
</div>
```

```
</footer>
<!-- EOF:#subfooter -->
</body>
</html>
```

# 1.272 perl 5.26.3-421.el8

## 1.272.1 Available under license :

```
/* perl.c
 *
 * Copyright (C) 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001
 * 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012
 * 2013, 2014, 2015, 2016, 2017, 2018 by Larry Wall and others
 *
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 * License or the Artistic License, as specified in the README file.
 *
 */
```

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The End

## 1.273 gson 2.7

### 1.273.1 Available under license :

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Google Gson

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- \* /opt/cola/permits/1258811491\_1643111603.33/0/annotations-4-1-1-4-sources-jar/android/annotation/SuppressLint.java
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## 1.275 libusb 1.0.23-4.el8

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## 1.277 xmltodict 0.11.0

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\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/socket/oio/DefaultOioSocketChannelConfig.java  
\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/group/ChannelMatcher.java  
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jar/io/netty/channel/AbstractEventLoopGroup.java
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jar/io/netty/channel/socket/oio/DefaultOioServerSocketChannelConfig.java
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jar/io/netty/channel/embedded/EmbeddedSocketAddress.java  
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jar/io/netty/channel/ChannelConfig.java  
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\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/group/CombinedIterator.java

\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/CompleteChannelFuture.java

\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/AbstractChannelHandlerContext.java

\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/local/LocalChannel.java

\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/local/LocalChannelRegistry.java

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```

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* under the License.
*/
/**
* Handles an I/O event or intercepts an I/O operation, and forwards it to its next handler in
* its { @link ChannelPipeline }.
*
* <h3>Sub-types</h3>
* <p>
* { @link ChannelHandler } itself does not provide many methods, but you usually have to implement one of its
subtypes:
* <ul>
* <li>{ @link ChannelInboundHandler } to handle inbound I/O events, and</li>
* <li>{ @link ChannelOutboundHandler } to handle outbound I/O operations.</li>
* </ul>
* </p>
* <p>
* Alternatively, the following adapter classes are provided for your convenience:
* <ul>
* <li>{ @link ChannelInboundHandlerAdapter } to handle inbound I/O events,</li>
* <li>{ @link ChannelOutboundHandlerAdapter } to handle outbound I/O operations, and</li>
* <li>{ @link ChannelDuplexHandler } to handle both inbound and outbound events</li>
* </ul>
* </p>
* <p>
* For more information, please refer to the documentation of each subtype.
* </p>
*
* <h3>The context object</h3>
* <p>
* A { @link ChannelHandler } is provided with a { @link ChannelHandlerContext }
* object. A { @link ChannelHandler } is supposed to interact with the
* { @link ChannelPipeline } it belongs to via a context object. Using the
* context object, the { @link ChannelHandler } can pass events upstream or
* downstream, modify the pipeline dynamically, or store the information
* (using { @link AttributeKey }s) which is specific to the handler.
*
* <h3>State management</h3>
*
* A { @link ChannelHandler } often needs to store some stateful information.
* The simplest and recommended approach is to use member variables:
* <pre>
* public interface Message {
*     // your methods here
* }
*
* public class DataServerHandler extends { @link SimpleChannelInboundHandler }&lt;Message&gt; {
*

```

```

* <b>private boolean loggedIn;</b>
*
* { @code @Override }
* public void channelRead0({ @link ChannelHandlerContext } ctx, Message message) {
*     if (message instanceof LoginMessage) {
*         authenticate((LoginMessage) message);
*         <b>loggedIn = true;</b>
*     } else (message instanceof GetDataMessage) {
*         if (<b>loggedIn</b>) {
*             ctx.writeAndFlush(fetchSecret((GetDataMessage) message));
*         } else {
*             fail();
*         }
*     }
* }
* ...
* }
* </pre>

```

\* Because the handler instance has a state variable which is dedicated to
 \* one connection, you have to create a new handler instance for each new
 \* channel to avoid a race condition where a unauthenticated client can get
 \* the confidential information:

```

* <pre>
* // Create a new handler instance per channel.
* // See { @link ChannelInitializer#initChannel(Channel)}.
* public class DataServerInitializer extends { @link ChannelInitializer}&lt;{ @link Channel}&gt; {
*     { @code @Override }
*     public void initChannel({ @link Channel } channel) {
*         channel.pipeline().addLast("handler", <b>new DataServerHandler()</b>);
*     }
* }
* </pre>

```

\* <h4>Using { @link AttributeKey}s</h4>

\* Although it's recommended to use member variables to store the state of a
 \* handler, for some reason you might not want to create many handler instances.
 \* In such a case, you can use { @link AttributeKey}s which is provided by
 \* { @link ChannelHandlerContext}:

```

* <pre>
* public interface Message {
*     // your methods here
* }
*
* { @code @Sharable }
* public class DataServerHandler extends { @link SimpleChannelInboundHandler}&lt;Message&gt; {
*     private final { @link AttributeKey}&lt;{ @link Boolean}&gt;; auth =

```

```

*      {@link AttributeKey#valueOf(String) AttributeKey.valueOf("auth")});
*
*  {@code @Override}
*  public void channelRead({@link ChannelHandlerContext} ctx, Message message) {
*      {@link Attribute}&lt;&gt; attr = ctx.attr(auth);
*      if (message instanceof LoginMessage) {
*          authenticate((LoginMessage) o);
*          <b>attr.set(true)</b>;
*      } else (message instanceof GetDataMessage) {
*          if (<b>Boolean.TRUE.equals(attr.get())</b>) {
*              ctx.writeAndFlush(fetchSecret((GetDataMessage) o));
*          } else {
*              fail();
*          }
*      }
*  }
*  ...
* }
* </pre>

```

\* Now that the state of the handler is attached to the {@link ChannelHandlerContext}, you can add the same handler instance to different pipelines:

```

* <pre>
* public class DataServerInitializer extends {@link ChannelInitializer}&lt;&gt;{@link Channel}&gt; {
*
*     private static final DataServerHandler <b>SHARED</b> = new DataServerHandler();
*
*     {@code @Override}
*     public void initChannel({@link Channel} channel) {
*         channel.pipeline().addLast("handler", <b>SHARED</b>);
*     }
* }
* </pre>

```

\* <h4>The {@code @Sharable} annotation</h4>

\* <p>

\* In the example above which used an {@link AttributeKey},

\* you might have noticed the {@code @Sharable} annotation.

\* <p>

\* If a {@link ChannelHandler} is annotated with the {@code @Sharable}

\* annotation, it means you can create an instance of the handler just once and

\* add it to one or more {@link ChannelPipeline}s multiple times without

\* a race condition.

\* <p>

\* If this annotation is not specified, you have to create a new handler

\* instance every time you add it to a pipeline because it has unshared state

\* such as member variables.

\* <p>

\* This annotation is provided for documentation purpose, just like  
\* <a href="http://www.javaconcurrencyinpractice.com/annotations/doc/">the JCIP annotations</a>.  
\*  
\* <h3>Additional resources worth reading</h3>  
\* <p>  
\* Please refer to the { @link ChannelHandler}, and  
\* { @link ChannelPipeline} to find out more about inbound and outbound operations,  
\* what fundamental differences they have, how they flow in a pipeline, and how to handle  
\* the operation in your application.  
\*/

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\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/DefaultChannelHandlerContext.java

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\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/SimpleUserEventChannelHandler.java

\* /opt/cola/permits/1258508409\_1643078708.43/0/netty-transport-4-1-35-final-sources-jar/io/netty/channel/socket/nio/NioChannelOption.java

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Found in path(s):

```
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/bootstrap/FailedChannel.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/PendingBytesTracker.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/socket/ChannelInputShutdownReadComplete.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/socket/ChannelOutputShutdownEvent.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/DelegatingChannelPromiseNotifier.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/socket/oio/DefaultOioDatagramChannelConfig.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/nio/SelectedSelectionKeySetSelector.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/socket/oio/OioDatagramChannelConfig.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/internal/ChannelUtils.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/socket/ChannelOutputShutdownException.java
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/internal/package-info.java
```

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Found in path(s):

```
* /opt/cola/permits/1258508409_1643078708.43/0/netty-transport-4-1-35-final-sources-
jar/io/netty/channel/AbstractCoalescingBufferQueue.java
```

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## 1.283 cpio 2.12-11.el8

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/\*\*  
\* Returns an array containing all of the elements in this deque, in  
\* proper sequence (from first to last element).  
\*  
\* <p>The returned array will be "safe" in that no references to it are  
\* maintained by this deque. (In other words, this method must allocate  
\* a new array). The caller is thus free to modify the returned array.

```
*
* <p>This method acts as bridge between array-based and collection-based
* APIs.
*
* @return an array containing all of the elements in this deque
*/
```

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```
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// make a special exception for a command with only a single item added to it. It's allowed to exceed maximum document size so that

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- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/codecs/AtomicLongCodec.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/codecs/AtomicBooleanCodec.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/ListIndexesIterableImpl.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/client/ListIndexesIterable.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/ListDatabasesIterableImpl.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/conversions/Bson.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/operation/IndexHelper.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/client/ListDatabasesIterable.java
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- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/codecs/AtomicIntegerCodec.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/codecs/CharacterCodec.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/client/model/IndexModel.java

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\* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/DBCollection.java

\* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/connection/DefaultConnectionPool.java

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\* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/client/model/DeleteOneModel.java  
\* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/BsonUndefined.java  
\* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/codecs/BsonUndefinedCodec.java  
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- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/operation/FindOperationHelper.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/io/ByteBufferBsonInput.java
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- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/BsonInt32.java
- \* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/package-info.java
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\* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/codecs/configuration/CodecProvider.java  
\* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/com/mongodb/operation/ExplainHelper.java  
\* /opt/cola/permits/1143299114\_1615574549.84/0/mongo-java-driver-3-0-4-sources-2-jar/org/bson/codecs/EncoderContext.java  
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jar/com/mongodb/connection/StreamFactory.java  
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# 1.285 chardet 5.0.0

## 1.285.1 Available under license :

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Version 2.1, February 1999

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## 1.286 json-schema-validator 1.2.2

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# 1.289 tzdata 2022.2

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# 1.296 libnsl 1.2.0-2.20180605git4a062cf.el8

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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

## 1.297 perl-data-dumper 2.167-399.el8

### 1.297.1 Available under license :

No license file was found, but licenses were detected in source scan.

From 9f38b6c605086a67f0d92591f8e8dc99bc1d9164 Mon Sep 17 00:00:00 2001  
From: =?UTF-8?q?Petr=20P=C3=ADsa=C5=99?= <ppisar@redhat.com>  
Date: Thu, 11 May 2017 09:25:35 +0200  
Subject: [PATCH] Upgrade to 2.167  
MIME-Version: 1.0  
Content-Type: text/plain; charset=UTF-8  
Content-Transfer-Encoding: 8bit

Unbundled from perl-5.25.12.

Signed-off-by: Petr Písa <ppisar@redhat.com>

---

Changes | 14 +++++

Dumper.pm | 47 ++++++++-----

```
Dumper.xs | 167 ++++++-----
t/bugs.t | 37 ++++++
t/deparsed.t | 22 +++++-
5 files changed, 207 insertions(+), 80 deletions(-)
```

```
diff --git a/Changes b/Changes
index f9ea53f..a5430d5 100644
--- a/Changes
+++ b/Changes
@@ -6,6 +6,20 @@ Changes - public release history for Data::Dumper
```

=over 8

```
+item 2.166 (Nov 29 2016)
+
+Reduce memory usage by not importing from Carp
+Reduce memory usage by removing unused overload require.
+
+=item 2.165 (Nov 20 2016)
+
+Remove impediment to compiling under C++11.
+
+=item 2.164 (Nov 12 2016)
+
+The XS implementation now handles the C<Deparse> option, so using it no
+longer forces use of the pure-Perl version.
+
+=item 2.161 (Jul 11 2016)
```

Perl 5.12 fix/workaround until fixed PPPort release.

```
diff --git a/Dumper.pm b/Dumper.pm
index c71ad35..00f6326 100644
--- a/Dumper.pm
+++ b/Dumper.pm
@@ -10,16 +10,15 @@
package Data::Dumper;
```

```
BEGIN {
- $VERSION = '2.161'; # Don't forget to set version and release
+ $VERSION = '2.167'; # Don't forget to set version and release
} # date in POD below!
```

```
#$| = 1;
```

```
use 5.006_001;
require Exporter;
-require overload;
```

```

-use Carp;
+use Carp ();

BEGIN {
    @ISA = qw(Exporter);
    @@ -70,7 +69,7 @@ $Maxrecurse = 1000    unless defined $Maxrecurse;
    sub new {
        my($c, $v, $n) = @_ ;

        - croak "Usage: PACKAGE->new(ARRAYREF, [ARRAYREF])"
        + Carp::croak("Usage: PACKAGE->new(ARRAYREF, [ARRAYREF])")
          unless (defined($v) && (ref($v) eq 'ARRAY'));
          $n = [] unless (defined($n) && (ref($n) eq 'ARRAY'));

    @@ -170,11 +169,11 @@ sub Seen {
        $s->{seen} {$id} = [$k, $v];
        }
        else {
        -    carp "Only refs supported, ignoring non-ref item \$$k";
        +    Carp::carp("Only refs supported, ignoring non-ref item \$$k");
        }
        }
        else {
        -    carp "Value of ref must be defined; ignoring undefined item \$$k";
        +    Carp::carp("Value of ref must be defined; ignoring undefined item \$$k");
        }
        }
        return $s;
    @@ -195,7 +194,7 @@ sub Values {
        return $s;
        }
        else {
        -    croak "Argument to Values, if provided, must be array ref";
        +    Carp::croak("Argument to Values, if provided, must be array ref");
        }
        }
        else {
    @@ -214,7 +213,7 @@ sub Names {
        return $s;
        }
        else {
        -    croak "Argument to Names, if provided, must be array ref";
        +    Carp::croak("Argument to Names, if provided, must be array ref");
        }
        }
        else {
    @@ -227,7 +226,6 @@ sub DESTROY { }
    sub Dump {

```

```

return &Dumpxs
unless $Data::Dumper::Useperl || (ref($_[0]) && $_[0]->{useperl})
-   || $Data::Dumper::Deparse || (ref($_[0]) && $_[0]->{deparse})

    # Use pure perl version on earlier releases on EBCDIC platforms
    || (! $IS_ASCII && $] lt 5.021_010);
@@ -439,7 +437,7 @@ sub _dump {
    if (ref($s->{sortkeys}) eq 'CODE') {
        $keys = $s->{sortkeys}($val);
        unless (ref($keys) eq 'ARRAY') {
-            carp "Sortkeys subroutine did not return ARRAYREF";
+            Carp::carp("Sortkeys subroutine did not return ARRAYREF");
            $keys = [];
        }
    }
@@ -487,16 +485,16 @@ sub _dump {
    require B::Deparse;
    my $sub = 'sub ' . (B::Deparse->new)->coderef2text($val);
    $pad = $s->{sep} . $s->{pad} . $s->{apad} . $s->{xpad} x ($s->{level} - 1);
-    $sub =~ s/\n/$pad/gse;
+    $sub =~ s/\n/$pad/g;
    $out .= $sub;
}
else {
    $out .= 'sub { "DUMMY" }';
-    carp "Encountered CODE ref, using dummy placeholder" if $s->{purity};
+    Carp::carp("Encountered CODE ref, using dummy placeholder") if $s->{purity};
}
}
else {
-    croak "Can't handle '$realtypes' type";
+    Carp::croak("Can't handle '$realtypes' type");
}

    if ($realpack and !$no_bless) { # we have a blessed ref
@@ -1212,9 +1210,10 @@ $Data::Dumper::Deparse I<or> $I<OBJ>->Deparse(I<[NEWVAL]>)

```

Can be set to a boolean value to control whether code references are turned into perl source code. If set to a true value, C<B::Deparse> -will be used to get the source of the code reference. Using this option -will force using the Perl implementation of the dumper, since the fast -XSUB implementation doesn't support it. +will be used to get the source of the code reference. In older versions, +using this option imposed a significant performance penalty when dumping +parts of a data structure other than code references, but that is no +longer the case.

Caution : use this option only if you know that your coderefs will be

properly reconstructed by C<B::Deparse>.

@@ -1435,15 +1434,9 @@ the C<Deparse> flag), an anonymous subroutine that contains the string "DUMMY" will be inserted in its place, and a warning will be printed if C<Purity> is set. You can C<eval> the result, but bear in mind that the anonymous sub that gets created is just a placeholder.

-Someday, perl will have a switch to cache-on-demand the string representation of a compiled piece of code, I hope. If you have prior knowledge of all the code refs that your data structures are likely to have, you can use the C<Seen> method to pre-seed the internal reference table and make the dumped output point to them, instead. See L</EXAMPLES> above.

-

-The C<Deparse> flag makes Dump() run slower, since the XSUB implementation does not support it.

+Even using the C<Deparse> flag will in some cases produce results that behave differently after being passed to C<eval>; see the documentation for L<B::Deparse>.

SCALAR objects have the weirdest looking C<bless> workaround.

@@ -1466,13 +1459,13 @@ be to use the C<Sortkeys> filter of Data::Dumper.

Gurusamy Sarathy      gsar@activestate.com

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=head1 VERSION

-Version 2.161 (July 11 2016)

+Version 2.167 (January 4 2017)

=head1 SEE ALSO

diff --git a/Dumper.xs b/Dumper.xs

index b22088f..0e7142e 100644

--- a/Dumper.xs

+++ b/Dumper.xs

@@ -63,6 +63,7 @@ typedef struct {

    I32 useqq;

    int use\_sparse\_seen\_hash;

    int trailingcomma;

+    int deparse;

} Style;

static STRLEN num\_q (const char \*s, STRLEN slen);

```

@@ -369,7 +370,7 @@ esc_q_utf8(pTHX_ SV* sv, const char *src, STRLEN slen, I32 do_utf8, I32 useqq)
    UV k;

    if (do_utf8
-       && ! isASCII(*(U8*)s)
+       && ! isASCII(*s)
        /* Exclude non-ASCII low ordinal controls. This should be
         * optimized out by the compiler on ASCII platforms; if not
         * could wrap it in a #ifdef EBCDIC, but better to avoid
@@ -387,11 +388,11 @@ esc_q_utf8(pTHX_ SV* sv, const char *src, STRLEN slen, I32 do_utf8, I32 useqq)
        increment = (k == 0 && *s != '\0') ? 1 : UTF8SKIP(s);

#if PERL_VERSION < 10
-    sprintf(r, "\\x{% "UVxf}", k);
+    sprintf(r, "\\x{% " UVxf "}", k);
    r += strlen(r);
    /* my_sprintf is not supported by pppport.h */
#else
-    r = r + my_sprintf(r, "\\x{% "UVxf}", k);
+    r = r + my_sprintf(r, "\\x{% " UVxf "}", k);
#endif
    continue;
    }
@@ -505,6 +506,53 @@ sv_x(pTHX_ SV *sv, const char *str, STRLEN len, I32 n)
    return sv;
}

+static SV *
+deparsed_output(pTHX_ SV *val)
+{
+    SV *text;
+    int n;
+    dSP;
+
+    /* This is passed to load_module(), which decrements its ref count and
+     * modifies it (so we also can't reuse it below) */
+    SV *pkg = newSVpvs("B::Deparse");
+
+    load_module(PERL_LOADMOD_NOIMPORT, pkg, 0);
+
+    SAVETMPS;
+
+    PUSHMARK(SP);
+    mXPUSHs(newSVpvs("B::Deparse"));
+    PUTBACK;
+
+    n = call_method("new", G_SCALAR);
+    SPAGAIN;

```

```

+
+ if (n != 1) {
+     croak("B::Deparse->new returned %d items, but expected exactly 1", n);
+ }
+
+ PUSHMARK(SP - n);
+ XPUSHs(val);
+ PUTBACK;
+
+ n = call_method("coderef2text", G_SCALAR);
+ SPAGAIN;
+
+ if (n != 1) {
+     croak("$b_deparse->coderef2text returned %d items, but expected exactly 1", n);
+ }
+
+ text = POPs;
+ SvREFCNT_inc(text);    /* the caller will mortalise this */
+
+ FREEMPS;
+
+ PUTBACK;
+
+ return text;
+}
+
+/*
+ * This ought to be split into smaller functions. (it is one long function since
+ * it exactly parallels the perl version, which was one long thing for
+ @@ -565,14 +613,14 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV
+ *seenhv,
+     i = perl_call_method(SvPVX_const(style->freezer), G_EVAL|G_VOID|G_DISCARD);
+     SPAGAIN;
+     if (SvTRUE(ERRSV))
+ - warn("WARNING(Freezer method call failed): %"SVf"", ERRSV);
+ + warn("WARNING(Freezer method call failed): %"SVf, ERRSV);
+     PUTBACK; FREEMPS; LEAVE;
+ }
+
+ ival = SvRV(val);
+ reatype = SvTYPE(ival);
+ #ifdef DD_USE_OLD_ID_FORMAT
+ - idlen = my_snprintf(id, sizeof(id), "0x%"UVxf, PTR2UV(ival));
+ + idlen = my_snprintf(id, sizeof(id), "0x%"UVxf, PTR2UV(ival));
+ #else
+ id_buffer = PTR2UV(ival);
+ idlen = sizeof(id_buffer);
+ @@ -630,7 +678,7 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV

```



```

*seenhv,
#ifdef DD_USE_OLD_ID_FORMAT
    warn("ref name not found for %s", id);
#else
-   warn("ref name not found for 0x%"UVxf, PTR2UV(ival));
+   warn("ref name not found for 0x%"UVxf, PTR2UV(ival));
#endif
    return 0;
}
@@ -848,10 +896,10 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV
*seenhv,
    ilen = inamelen;
    sv_setiv(ixsv, ix);
#if PERL_VERSION < 10
-   (void) sprintf(iname+ilen, "%"IVdf, (IV)ix);
+   (void) sprintf(iname+ilen, "%"IVdf, (IV)ix);
    ilen = strlen(iname);
#else
-   ilen = ilen + my_sprintf(iname+ilen, "%"IVdf, (IV)ix);
+   ilen = ilen + my_sprintf(iname+ilen, "%"IVdf, (IV)ix);
#endif
    iname[ilen++] = ']'; iname[ilen] = '\0';
    if (style->indent >= 3) {
@@ -886,7 +934,6 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV
*seenhv,
    SV *sname;
    HE *entry = NULL;
    char *key;
-   STRLEN klen;
    SV *hval;
    AV *keys = NULL;

@@ -976,6 +1023,7 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV
*seenhv,
    char *nkey_buffer = NULL;
    STRLEN nticks = 0;
    SV* keysv;
+   STRLEN klen;
    STRLEN keylen;
    STRLEN nlen;
    bool do_utf8 = FALSE;
@@ -1029,7 +1077,7 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV
*seenhv,
    if (style->quotekeys || key_needs_quote(key, keylen)) {
        if (do_utf8 || style->useqq) {
            STRLEN ocur = SvCUR(retval);
-           nlen = esc_q_utf8(aTHX_ retval, key, klen, do_utf8, style->useqq);
+           klen = nlen = esc_q_utf8(aTHX_ retval, key, klen, do_utf8, style->useqq);

```

```

        nkey = SvPVX(retval) + ocur;
    }
    else {
@@ -1095,9 +1143,41 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV
*seenhv,
    SvREFCNT_dec(totpad);
}
else if (realttype == SVt_PVCV) {
- sv_catpvs(retval, "sub { \"DUMMY\" }");
- if (style->purity)
- warn("Encountered CODE ref, using dummy placeholder");
+ if (style->deparse) {
+ SV *deparsed = sv_2mortal(deparsed_output(aTHX_ val));
+ SV *fullpad = sv_2mortal(newSVsv(style->sep));
+ const char *p;
+ STRLEN plen;
+ I32 i;
+
+ sv_catsv(fullpad, style->pad);
+ sv_catsv(fullpad, apad);
+ for (i = 0; i < level; i++) {
+ sv_catsv(fullpad, style->xpad);
+ }
+
+ sv_catpvs(retval, "sub ");
+ p = SvPV(deparsed, plen);
+ while (plen > 0) {
+ const char *nl = (const char *) memchr(p, '\n', plen);
+ if (!nl) {
+ sv_catpvn(retval, p, plen);
+ break;
+ }
+ else {
+ size_t n = nl - p;
+ sv_catpvn(retval, p, n);
+ sv_catsv(retval, fullpad);
+ p += n + 1;
+ plen -= n + 1;
+ }
+ }
+ }
+ else {
+ sv_catpvs(retval, "sub { \"DUMMY\" }");
+ if (style->purity)
+ warn("Encountered CODE ref, using dummy placeholder");
+ }
}
else {

```

```

warn("cannot handle ref type %d", (int)realtyp);
@@ -1144,7 +1224,7 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV
*seenhv,

if (namelen) {
#ifdef DD_USE_OLD_ID_FORMAT
- idlen = my_snprintf(id, sizeof(id), "0x%"UVxf, PTR2UV(val));
+ idlen = my_snprintf(id, sizeof(id), "0x%" UVxf, PTR2UV(val));
#else
id_buffer = PTR2UV(val);
idlen = sizeof(id_buffer);
@@ -1184,9 +1264,9 @@ DD_dump(pTHX_ SV *val, const char *name, STRLEN namelen, SV *retval, HV
*seenhv,
if (DD_is_integer(val)) {
STRLEN len;
if (SvIsUV(val))
- len = my_snprintf(tmpbuf, sizeof(tmpbuf), "%"UVuf, SvUV(val));
+ len = my_snprintf(tmpbuf, sizeof(tmpbuf), "%" UVuf, SvUV(val));
else
- len = my_snprintf(tmpbuf, sizeof(tmpbuf), "%IVdf, SvIV(val));
+ len = my_snprintf(tmpbuf, sizeof(tmpbuf), "% IVdf, SvIV(val));
if (SvPOK(val)) {
/* Need to check to see if this is a string such as " 0".
I'm assuming from sprintf isn't going to clash with utf8. */
@@ -1412,53 +1492,55 @@ Data_Dumper_Dumpxs(href, ...)
&& (hv = (HV*)SvRV((SV*)href))
&& SvTYPE(hv) == SVt_PVHV) {

- if ((svp = hv_fetch(hv, "seen", 4, FALSE)) && SvROK(*svp))
+ if ((svp = hv_fetchs(hv, "seen", FALSE)) && SvROK(*svp))
seenhv = (HV*)SvRV(*svp);
else
style.use_sparse_seen_hash = 1;
- if ((svp = hv_fetch(hv, "noseen", 6, FALSE)))
+ if ((svp = hv_fetchs(hv, "noseen", FALSE)))
style.use_sparse_seen_hash = (SvOK(*svp) && SvIV(*svp) != 0);
- if ((svp = hv_fetch(hv, "todump", 6, FALSE)) && SvROK(*svp))
+ if ((svp = hv_fetchs(hv, "todump", FALSE)) && SvROK(*svp))
todumpav = (AV*)SvRV(*svp);
- if ((svp = hv_fetch(hv, "names", 5, FALSE)) && SvROK(*svp))
+ if ((svp = hv_fetchs(hv, "names", FALSE)) && SvROK(*svp))
namesav = (AV*)SvRV(*svp);
- if ((svp = hv_fetch(hv, "indent", 6, FALSE)))
+ if ((svp = hv_fetchs(hv, "indent", FALSE)))
style.indent = SvIV(*svp);
- if ((svp = hv_fetch(hv, "purity", 6, FALSE)))
+ if ((svp = hv_fetchs(hv, "purity", FALSE)))
style.purity = SvIV(*svp);

```

```

- if ((svp = hv_fetch(hv, "terse", 5, FALSE)))
+ if ((svp = hv_fetchs(hv, "terse", FALSE)))
    terse = SvTRUE(*svp);
- if ((svp = hv_fetch(hv, "useqq", 5, FALSE)))
+ if ((svp = hv_fetchs(hv, "useqq", FALSE)))
    style.useqq = SvTRUE(*svp);
- if ((svp = hv_fetch(hv, "pad", 3, FALSE)))
+ if ((svp = hv_fetchs(hv, "pad", FALSE)))
    style.pad = *svp;
- if ((svp = hv_fetch(hv, "xpad", 4, FALSE)))
+ if ((svp = hv_fetchs(hv, "xpad", FALSE)))
    style.xpad = *svp;
- if ((svp = hv_fetch(hv, "apad", 4, FALSE)))
+ if ((svp = hv_fetchs(hv, "apad", FALSE)))
    apad = *svp;
- if ((svp = hv_fetch(hv, "sep", 3, FALSE)))
+ if ((svp = hv_fetchs(hv, "sep", FALSE)))
    style.sep = *svp;
- if ((svp = hv_fetch(hv, "pair", 4, FALSE)))
+ if ((svp = hv_fetchs(hv, "pair", FALSE)))
    style.pair = *svp;
- if ((svp = hv_fetch(hv, "varname", 7, FALSE)))
+ if ((svp = hv_fetchs(hv, "varname", FALSE)))
    varname = *svp;
- if ((svp = hv_fetch(hv, "freezer", 7, FALSE)))
+ if ((svp = hv_fetchs(hv, "freezer", FALSE)))
    style.freezer = *svp;
- if ((svp = hv_fetch(hv, "toaster", 7, FALSE)))
+ if ((svp = hv_fetchs(hv, "toaster", FALSE)))
    style.toaster = *svp;
- if ((svp = hv_fetch(hv, "deepcopy", 8, FALSE)))
+ if ((svp = hv_fetchs(hv, "deepcopy", FALSE)))
    style.deepcopy = SvTRUE(*svp);
- if ((svp = hv_fetch(hv, "quotekeys", 9, FALSE)))
+ if ((svp = hv_fetchs(hv, "quotekeys", FALSE)))
    style.quotekeys = SvTRUE(*svp);
-     if ((svp = hv_fetch(hv, "trailingcomma", 13, FALSE)))
+     if ((svp = hv_fetchs(hv, "trailingcomma", FALSE)))
        style.trailingcomma = SvTRUE(*svp);
- if ((svp = hv_fetch(hv, "bless", 5, FALSE)))
+     if ((svp = hv_fetchs(hv, "deparse", FALSE)))
+         style.deparse = SvTRUE(*svp);
+ if ((svp = hv_fetchs(hv, "bless", FALSE)))
    style.bless = *svp;
- if ((svp = hv_fetch(hv, "maxdepth", 8, FALSE)))
+ if ((svp = hv_fetchs(hv, "maxdepth", FALSE)))
    style.maxdepth = SvIV(*svp);
- if ((svp = hv_fetch(hv, "maxrecurse", 10, FALSE)))

```

```

+ if ((svp = hv_fetchs(hv, "maxrecurse", FALSE)))
    style.maxrecurse = SvIV(*svp);
- if ((svp = hv_fetch(hv, "sortkeys", 8, FALSE)) {
+ if ((svp = hv_fetchs(hv, "sortkeys", FALSE)) {
    SV *sv = *svp;
    if (! SvTRUE(sv))
        style.sortkeys = NULL;
@@ -1525,9 +1607,10 @@ Data_Dumper_Dumpxs(href, ...)
    }
    else {
        STRLEN nchars;
- sv_setpvn(name, "$", 1);
+ sv_setpvs(name, "$");
        sv_catsv(name, varname);
- nchars = my_snprintf(tmpbuf, sizeof(tmpbuf), "%IVdf, (IV)(i+1));
+ nchars = my_snprintf(tmpbuf, sizeof(tmpbuf), "%IVdf,
+                               (IV)(i+1));
        sv_catpvn(name, tmpbuf, nchars);
    }

@@ -1575,7 +1658,7 @@ Data_Dumper_Dumpxs(href, ...)
    sv_catpvs(retval, ";");
        sv_catsv(retval, style.sep);
    }
- sv_setpvn(valstr, "", 0);
+ SvPVCLEAR(valstr);
    if (gimme == G_ARRAY) {
        XPUSHs(sv_2mortal(retval));
        if (i < imax) /* not the last time thro ? */
diff --git a/t/bugs.t b/t/bugs.t
index a440b0a..5db82da 100644
--- a/t/bugs.t
+++ b/t/bugs.t
@@ -12,7 +12,7 @@ BEGIN {
}

use strict;
-use Test::More tests => 15;
+use Test::More tests => 24;
use Data::Dumper;

{
@@ -144,4 +144,39 @@ SKIP: {
    &$tests;
}

+{ # https://rt.perl.org/Ticket/Display.html?id=128524
+ my $want;

```



```

note("\$Data::Dumper::Deparse and Deparse()");

- {
+ for my $useperl (0, 1) {
+   local $Data::Dumper::Useperl = $useperl;
+
+   my ($obj, %dumps, $deparse, $starting);
+   use strict;
+   my $struct = { foo => "bar\nbaz", quux => sub { "fleem" } };
@@ -46,11 +48,11 @@ note("\$Data::Dumper::Deparse and Deparse()");
+   $dumps{'objzero'} = _dumpostr($obj);

+   is($dumps{'noprev'}, $dumps{'dddzero'},
-     "No previous setting and \$Data::Dumper::Deparse = 0 are equivalent");
+     "No previous setting and \$Data::Dumper::Deparse = 0 are equivalent (useperl=$useperl)");
+   is($dumps{'noprev'}, $dumps{'objempty'},
-     "No previous setting and Deparse() are equivalent");
+     "No previous setting and Deparse() are equivalent (useperl=$useperl)");
+   is($dumps{'noprev'}, $dumps{'objzero'},
-     "No previous setting and Deparse(0) are equivalent");
+     "No previous setting and Deparse(0) are equivalent (useperl=$useperl)");

+   local $Data::Dumper::Deparse = 1;
+   $obj = Data::Dumper->new( [ $struct ] );
@@ -62,19 +64,19 @@ note("\$Data::Dumper::Deparse and Deparse()");
+   $dumps{'objone'} = _dumpostr($obj);

+   is($dumps{'dddtrue'}, $dumps{'objone'},
-     "\$Data::Dumper::Deparse = 1 and Deparse(1) are equivalent");
+     "\$Data::Dumper::Deparse = 1 and Deparse(1) are equivalent (useperl=$useperl)");

+   isnt($dumps{'dddzero'}, $dumps{'dddtrue'},
-     "\$Data::Dumper::Deparse = 0 differs from \$Data::Dumper::Deparse = 1");
+     "\$Data::Dumper::Deparse = 0 differs from \$Data::Dumper::Deparse = 1 (useperl=$useperl)");

+   like($dumps{'dddzero'},
+     qr/quux.*?sub.*?DUMMY/s,
-     "\$Data::Dumper::Deparse = 0 reports DUMMY instead of deparsing coderef");
+     "\$Data::Dumper::Deparse = 0 reports DUMMY instead of deparsing coderef (useperl=$useperl)");
+   unlike($dumps{'dddtrue'},
+     qr/quux.*?sub.*?DUMMY/s,
-     "\$Data::Dumper::Deparse = 1 does not report DUMMY");
+     "\$Data::Dumper::Deparse = 1 does not report DUMMY (useperl=$useperl)");
+   like($dumps{'dddtrue'},
+     qr/quux.*?sub.*?use\sstrict.*?fleem/s,
-     "\$Data::Dumper::Deparse = 1 deparses coderef");
+     "\$Data::Dumper::Deparse = 1 deparses coderef (useperl=$useperl)");

```

}

--

2.9.3

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548090\_1591903283.05/0/perl-Data-Dumper-2.167-399.el8.src.rpm-cosi-expand-archive-lxnDj2VA/Data-Dumper-2.161-Upgrade-to-2.167.patch

No license file was found, but licenses were detected in source scan.

---

abstract: unknown

author:

- unknown

build\_requires:

ExtUtils::MakeMaker: '0'

Test::More: '0.98'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 0

generated\_by: 'ExtUtils::MakeMaker version 7.0401, CPAN::Meta::Converter version 2.150001'

license: unknown

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: Data-Dumper

no\_index:

directory:

- t

- inc

requires: {}

resources:

MailingList: <http://lists.cpan.org/showlist.cgi?name=perl5-porters>

bugtracker: <http://rt.perl.org/perlbug/>

repository: 'git://perl5.git.perl.org/perl.git perl-git'

version: '2.161'

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548090\_1591903283.05/0/perl-Data-Dumper-2.167-399.el8.src.rpm-cosi-expand-archive-lxnDj2VA/Data-Dumper-2.161.tar.gz-cosi-expand-archive-6LzdXmyr/Data-Dumper-2.161/META.yml

No license file was found, but licenses were detected in source scan.

/\*

-----

ppport.h -- Perl/Pollution/Portability Version 3.31



Automatically created by Devel::PPPort running under perl 5.022001.

Do NOT edit this file directly! -- Edit PPPort\_pm.PL and the includes in parts/inc/ instead.

Use 'perldoc ppport.h' to view the documentation below.

-----

SKIP

=pod

=head1 NAME

ppport.h - Perl/Pollution/Portability version 3.31

=head1 SYNOPSIS

perl ppport.h [options] [source files]

Searches current directory for files if no [source files] are given

--help            show short help

--version         show version

--patch=file      write one patch file with changes

--copy=suffix     write changed copies with suffix

--diff=program    use diff program and options

--compat-version=version   provide compatibility with Perl version

--cplusplus       accept C++ comments

--quiet           don't output anything except fatal errors

--nodiag          don't show diagnostics

--nohints         don't show hints

--nochanges       don't suggest changes

--nofilter        don't filter input files

--strip           strip all script and doc functionality from  
ppport.h

--list-provided   list provided API

--list-unsupported list unsupported API

--api-info=name   show Perl API portability information

=head1 COMPATIBILITY

This version of F<ppport.h> is designed to support operation with Perl installations back to 5.003, and has been tested up to 5.20.

=head1 OPTIONS

=head2 --help

Display a brief usage summary.

=head2 --version

Display the version of F<ppport.h>.

=head2 --patch=I<file>

If this option is given, a single patch file will be created if any changes are suggested. This requires a working diff program to be installed on your system.

=head2 --copy=I<suffix>

If this option is given, a copy of each file will be saved with the given suffix that contains the suggested changes. This does not require any external programs. Note that this does not automatically add a dot between the original filename and the suffix. If you want the dot, you have to include it in the option argument.

If neither C<--patch> or C<--copy> are given, the default is to simply print the diffs for each file. This requires either C<Text::Diff> or a C<diff> program to be installed.

=head2 --diff=I<program>

Manually set the diff program and options to use. The default is to use C<Text::Diff>, when installed, and output unified context diffs.

=head2 --compat-version=I<version>

Tell F<ppport.h> to check for compatibility with the given Perl version. The default is to check for compatibility with Perl version 5.003. You can use this option to reduce the output of F<ppport.h> if you intend to be backward compatible only down to a certain Perl version.

=head2 --cplusplus

Usually, `F<ppport.h>` will detect C++ style comments and replace them with C style comments for portability reasons. Using this option instructs `F<ppport.h>` to leave C++ comments untouched.

`=head2 --quiet`

Be quiet. Don't print anything except fatal errors.

`=head2 --nodiag`

Don't output any diagnostic messages. Only portability alerts will be printed.

`=head2 --nohints`

Don't output any hints. Hints often contain useful portability notes. Warnings will still be displayed.

`=head2 --nochanges`

Don't suggest any changes. Only give diagnostic output and hints unless these are also deactivated.

`=head2 --nofilter`

Don't filter the list of input files. By default, files not looking like source code (i.e. not `*.xs`, `*.c`, `*.cc`, `*.cpp` or `*.h`) are skipped.

`=head2 --strip`

Strip all script and documentation functionality from `F<ppport.h>`. This reduces the size of `F<ppport.h>` dramatically and may be useful if you want to include `F<ppport.h>` in smaller modules without increasing their distribution size too much.

The stripped `F<ppport.h>` will have a `C<--unstrip>` option that allows you to undo the stripping, but only if an appropriate `C<Devel::PPPport>` module is installed.

`=head2 --list-provided`

Lists the API elements for which compatibility is provided by `F<ppport.h>`. Also lists if it must be explicitly requested, if it has dependencies, and if there are hints or warnings for it.

`=head2 --list-unsupported`

Lists the API elements that are known not to be supported by F<ppport.h> and below which version of Perl they probably won't be available or work.

```
=head2 --api-info=I<name>
```

Show portability information for API elements matching I<name>. If I<name> is surrounded by slashes, it is interpreted as a regular expression.

```
=head1 DESCRIPTION
```

In order for a Perl extension (XS) module to be as portable as possible across differing versions of Perl itself, certain steps need to be taken.

```
=over 4
```

```
=item *
```

Including this header is the first major one. This alone will give you access to a large part of the Perl API that hasn't been available in earlier Perl releases. Use

```
perl ppport.h --list-provided
```

to see which API elements are provided by ppport.h.

```
=item *
```

You should avoid using deprecated parts of the API. For example, using global Perl variables without the C<PL\_> prefix is deprecated. Also, some API functions used to have a C<perl\_> prefix. Using this form is also deprecated. You can safely use the supported API, as F<ppport.h> will provide wrappers for older Perl versions.

```
=item *
```

If you use one of a few functions or variables that were not present in earlier versions of Perl, and that can't be provided using a macro, you have to explicitly request support for these functions by adding one or more C<#define>s in your source code before the inclusion of F<ppport.h>.

These functions or variables will be marked C<explicit> in the list shown by C<--list-provided>.

Depending on whether you module has a single or multiple files that use such functions or variables, you want either C<static> or global

variants.

For a C<static> function or variable (used only in a single source file), use:

```
#define NEED_function  
#define NEED_variable
```

For a global function or variable (used in multiple source files), use:

```
#define NEED_function_GLOBAL  
#define NEED_variable_GLOBAL
```

Note that you mustn't have more than one global request for the same function or variable in your project.

Function / Variable	Static Request	Global Request
PL_parser	NEED_PL_parser	NEED_PL_parser_GLOBAL
PL_signals	NEED_PL_signals	NEED_PL_signals_GLOBAL
caller_cx()	NEED_caller_cx	NEED_caller_cx_GLOBAL
eval_pv()	NEED_eval_pv	NEED_eval_pv_GLOBAL
grok_bin()	NEED_grok_bin	NEED_grok_bin_GLOBAL
grok_hex()	NEED_grok_hex	NEED_grok_hex_GLOBAL
grok_number()	NEED_grok_number	NEED_grok_number_GLOBAL
grok_numeric_radix()	NEED_grok_numeric_radix	NEED_grok_numeric_radix_GLOBAL
grok_oct()	NEED_grok_oct	NEED_grok_oct_GLOBAL
load_module()	NEED_load_module	NEED_load_module_GLOBAL
mg_findext()	NEED_mg_findext	NEED_mg_findext_GLOBAL
my_snprintf()	NEED_my_snprintf	NEED_my_snprintf_GLOBAL
my_sprintf()	NEED_my_sprintf	NEED_my_sprintf_GLOBAL
my_strlcat()	NEED_my_strlcat	NEED_my_strlcat_GLOBAL
my_strlcpy()	NEED_my_strlcpy	NEED_my_strlcpy_GLOBAL
newCONSTSUB()	NEED_newCONSTSUB	NEED_newCONSTSUB_GLOBAL
newRV_noinc()	NEED_newRV_noinc	NEED_newRV_noinc_GLOBAL
newSV_type()	NEED_newSV_type	NEED_newSV_type_GLOBAL
newSVpv_flags()	NEED_newSVpv_flags	NEED_newSVpv_flags_GLOBAL
newSVpv_share()	NEED_newSVpv_share	NEED_newSVpv_share_GLOBAL
pv_display()	NEED_pv_display	NEED_pv_display_GLOBAL
pv_escape()	NEED_pv_escape	NEED_pv_escape_GLOBAL
pv_pretty()	NEED_pv_pretty	NEED_pv_pretty_GLOBAL
sv_2pv_flags()	NEED_sv_2pv_flags	NEED_sv_2pv_flags_GLOBAL
sv_2pvbyte()	NEED_sv_2pvbyte	NEED_sv_2pvbyte_GLOBAL
sv_catpvf_mg()	NEED_sv_catpvf_mg	NEED_sv_catpvf_mg_GLOBAL
sv_catpvf_mg_nocontext()	NEED_sv_catpvf_mg_nocontext	NEED_sv_catpvf_mg_nocontext_GLOBAL
sv_pvn_force_flags()	NEED_sv_pvn_force_flags	NEED_sv_pvn_force_flags_GLOBAL
sv_setpvf_mg()	NEED_sv_setpvf_mg	NEED_sv_setpvf_mg_GLOBAL

```

sv_setpvf_mg_nocontext()  NEED_sv_setpvf_mg_nocontext  NEED_sv_setpvf_mg_nocontext_GLOBAL
sv_unmagicext()          NEED_sv_unmagicext      NEED_sv_unmagicext_GLOBAL
vload_module()          NEED_vload_module      NEED_vload_module_GLOBAL
vnewSVpvf()             NEED_vnewSVpvf        NEED_vnewSVpvf_GLOBAL
warner()                 NEED_warner           NEED_warner_GLOBAL

```

To avoid namespace conflicts, you can change the namespace of the explicitly exported functions / variables using the C<DPPP\_NAMESPACE> macro. Just C<#define> the macro before including C<ppport.h>:

```

#define DPPP_NAMESPACE MyOwnNamespace_
#include "ppport.h"

```

The default namespace is C<DPPP\_>.

=back

The good thing is that most of the above can be checked by running F<ppport.h> on your source code. See the next section for details.

=head1 EXAMPLES

To verify whether F<ppport.h> is needed for your module, whether you should make any changes to your code, and whether any special defines should be used, F<ppport.h> can be run as a Perl script to check your source code. Simply say:

```
perl ppport.h
```

The result will usually be a list of patches suggesting changes that should at least be acceptable, if not necessarily the most efficient solution, or a fix for all possible problems.

If you know that your XS module uses features only available in newer Perl releases, if you're aware that it uses C++ comments, and if you want all suggestions as a single patch file, you could use something like this:

```
perl ppport.h --compat-version=5.6.0 --cplusplus --patch=test.diff
```

If you only want your code to be scanned without any suggestions for changes, use:

```
perl ppport.h --nochanges
```

You can specify a different C<diff> program or options, using the C<--diff> option:

```
perl ppport.h --diff='diff -C 10'
```

This would output context diffs with 10 lines of context.

If you want to create patched copies of your files instead, use:

```
perl ppport.h --copy=.new
```

To display portability information for the C<newSVpv<newSVpv> function, use:

```
perl ppport.h --api-info=newSVpv<newSVpv>
```

Since the argument to C<--api-info> can be a regular expression, you can use

```
perl ppport.h --api-info=/_nomg$/
```

to display portability information for all C<\_nomg> functions or

```
perl ppport.h --api-info=./
```

to display information for all known API elements.

=head1 BUGS

If this version of F<ppport.h> is causing failure during the compilation of this module, please check if newer versions of either this module or C<Devel::PPP<Devel::PPP> are available on CPAN before sending a bug report.

If F<ppport.h> was generated using the latest version of C<Devel::PPP<Devel::PPP> and is causing failure of this module, please file a bug report here: L<[https://github.com/mhx/Devel-PPP/issu<Devel-PPP/issu>](https://github.com/mhx/Devel-PPP/issues/)>

Please include the following information:

=over 4

=item 1.

The complete output from running "perl -V"

=item 2.

This file.

=item 3.

The name and version of the module you were trying to build.

=item 4.

A full log of the build that failed.

=item 5.

Any other information that you think could be relevant.

=back

For the latest version of this code, please get the C<Devel::PPPort> module from CPAN.

=head1 COPYRIGHT

Version 3.x, Copyright (c) 2004-2013, Marcus Holland-Moritz.

Version 2.x, Copyright (C) 2001, Paul Marquess.

Version 1.x, Copyright (C) 1999, Kenneth Albanowski.

This program is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

=head1 SEE ALSO

See L<Devel::PPPort>.

=cut

use strict;

# Disable broken TRIE-optimization

```
BEGIN { eval '${^RE_TRIE_MAXBUF} = -1' if $] >= 5.009004 && $] <= 5.009005 }
```

```
my $VERSION = 3.31;
```

```
my %opt = (  
  quiet => 0,  
  diag => 1,  
  hints => 1,  
  changes => 1,  
  cplusplus => 0,  
  filter => 1,
```



```

strip => 0,
version => 0,
);

my($ppport) = $0 =~ /([\w.]+)$/;
my $LF = '(?:\r\n|[\r\n])'; # line feed
my $HS = "[\t]";          # horizontal whitespace

# Never use C comments in this file!
my $ccs = '/'. '*';
my $cce = '*'. '/';
my $rccs = quotemeta $ccs;
my $rcce = quotemeta $cce;

eval {
require Getopt::Long;
Getopt::Long::GetOptions(\%opt, qw(
    help quiet diag! filter! hints! changes! cplusplus strip version
    patch=s copy=s diff=s compat-version=s
    list-provided list-unsupported api-info=s
)) or usage();
};

if ($@ and grep /^-/, @ARGV) {
    usage() if "@ARGV" =~ /^--?h(?:elp)?$/;
    die "Getopt::Long not found. Please don't use any options.\n";
}

if ($opt{version}) {
    print "This is $0 $VERSION.\n";
    exit 0;
}

usage() if $opt{help};
strip() if $opt{strip};

if (exists $opt{'compat-version'}) {
    my($r,$v,$s) = eval { parse_version($opt{'compat-version'}) };
    if ($@) {
        die "Invalid version number format: '$opt{'compat-version'}'\n";
    }
    die "Only Perl 5 is supported\n" if $r != 5;
    die "Invalid version number: $opt{'compat-version'}\n" if $v >= 1000 || $s >= 1000;
    $opt{'compat-version'} = sprintf "%d.%03d%03d", $r, $v, $s;
}
else {
    $opt{'compat-version'} = 5;
}
}

```

```

my %API = map { /^(\w+)\|([\^]*)\|([\^]*)\|(\w*)$/
  ? ( $1 => {
    ($2      ? ( base  => $2 ) : ()),
    ($3      ? ( todo  => $3 ) : ()),
    (index($4, 'v') >= 0 ? ( varargs => 1 ) : ()),
    (index($4, 'p') >= 0 ? ( provided => 1 ) : ()),
    (index($4, 'n') >= 0 ? ( nothxarg => 1 ) : ()),
  } )
  : die "invalid spec: $_ " } qw(
ASCII_TO_NEED|5.007001|n
AvFILLp|5.004050|p
AvFILL|||
BhkDISABLE|5.021008|
BhkENABLE|5.021008|
BhkENTRY_set|5.021008|
BhkENTRY|||
BhkFLAGS|||
CALL_BLOCK_HOOKS|||
CLASS|||n
CPERLscope|5.005000|p
CX_CURPAD_SAVE|||
CX_CURPAD_SV|||
CopFILEAV|5.006000|p
CopFILEGV_set|5.006000|p
CopFILEGV|5.006000|p
CopFILESV|5.006000|p
CopFILE_set|5.006000|p
CopFILE|5.006000|p
CopSTASHPV_set|5.006000|p
CopSTASHPV|5.006000|p
CopSTASH_eq|5.006000|p
CopSTASH_set|5.006000|p
CopSTASH|5.006000|p
CopyD|5.009002|5.004050|p
Copy|||
CvPADLIST|5.008001|
CvSTASH|||
CvWEAKOUTSIDE|||
DEFSV_set|5.010001|p
DEFSV|5.004050|p
END_EXTERN_C|5.005000|p
ENTER|||
ERRSV|5.004050|p
EXTEND|||
EXTERN_C|5.005000|p
F0convert|||n
FREEMPS|||

```

GIMME\_V|5.004000|n  
GIMME||n  
GROK\_NUMERIC\_RADIX|5.007002||p  
G\_ARRAY||  
G\_DISCARD||  
G\_EVAL||  
G\_METHOD|5.006001||p  
G\_NOARGS||  
G\_SCALAR||  
G\_VOID|5.004000|  
GetVars||  
GvAV||  
GvCV||  
GvHV||  
GvSVn|5.009003||p  
GvSV||  
Gv\_AMupdate||5.011000|  
HEf\_SVKEY|5.003070||p  
HeHASH|5.003070|  
HeKEY|5.003070|  
HeKLEN|5.003070|  
HePV|5.004000|  
HeSVKEY\_force|5.003070|  
HeSVKEY\_set|5.004000|  
HeSVKEY|5.003070|  
HeUTF8|5.010001|5.008000|p  
HeVAL|5.003070|  
HvENAMELEN|5.015004|  
HvENAMEUTF8|5.015004|  
HvENAME|5.013007|  
HvNAMELEN\_get|5.009003||p  
HvNAMELEN|5.015004|  
HvNAMEUTF8|5.015004|  
HvNAME\_get|5.009003||p  
HvNAME||  
INT2PTR|5.006000||p  
IN\_LOCALE\_COMPILETIME|5.007002||p  
IN\_LOCALE\_RUNTIME|5.007002||p  
IN\_LOCALE|5.007002||p  
IN\_PERL\_COMPILETIME|5.008001||p  
IS\_NUMBER\_GREATER\_THAN\_UV\_MAX|5.007002||p  
IS\_NUMBER\_INFINITY|5.007002||p  
IS\_NUMBER\_IN\_UV|5.007002||p  
IS\_NUMBER\_NAN|5.007003||p  
IS\_NUMBER\_NEG|5.007002||p  
IS\_NUMBER\_NOT\_INT|5.007002||p  
IVSIZE|5.006000||p  
IVTYPE|5.006000||p

IVdf|5.006000||p  
LEAVE||  
LINKLIST|5.013006|  
LVRET||  
MARK||  
MULTICALL|5.021008|  
MUTABLE\_PTR|5.010001||p  
MUTABLE\_SV|5.010001||p  
MY\_CXT\_CLONE|5.009002||p  
MY\_CXT\_INIT|5.007003||p  
MY\_CXT|5.007003||p  
MoveD|5.009002|5.004050|p  
Move||  
NATIVE\_TO\_NEED|5.007001|n  
NOOP|5.005000||p  
NUM2PTR|5.006000||p  
NVTYPE|5.006000||p  
NVef|5.006001||p  
NVff|5.006001||p  
NVgf|5.006001||p  
Newxc|5.009003||p  
Newxz|5.009003||p  
Newx|5.009003||p  
Nullav||  
Nullch||  
Nullcv||  
Nullhv||  
Nullsv||  
OP\_CLASS|5.013007|  
OP\_DESC|5.007003|  
OP\_NAME|5.007003|  
OP\_TYPE\_IS\_OR\_WAS|5.019010|  
OP\_TYPE\_IS|5.019007|  
ORIGMARK||  
OpHAS\_SIBLING|5.021007|  
OpSIBLING\_set|5.021007|  
OpSIBLING|5.021007|  
PAD\_BASE\_SV||  
PAD\_CLONE\_VARS||  
PAD\_COMPNAME\_FLAGS||  
PAD\_COMPNAME\_GEN\_set||  
PAD\_COMPNAME\_GEN||  
PAD\_COMPNAME\_OURSTASH||  
PAD\_COMPNAME\_PV||  
PAD\_COMPNAME\_TYPE||  
PAD\_RESTORE\_LOCAL||  
PAD\_SAVE\_LOCAL||  
PAD\_SAVE\_SETNULLPAD||

PAD\_SETSV|||  
PAD\_SET\_CUR\_NOSAVE|||  
PAD\_SET\_CUR|||  
PAD\_SV|||  
PAD\_SV|||  
PERLIO\_FUNCS\_CAST|5.009003||p  
PERLIO\_FUNCS\_DECL|5.009003||p  
PERL\_ABS|5.008001||p  
PERL\_BCDVERSION|5.021008||p  
PERL\_GCC\_BRACE\_GROUPS\_FORBIDDEN|5.008001||p  
PERL\_HASH|5.003070||p  
PERL\_INT\_MAX|5.003070||p  
PERL\_INT\_MIN|5.003070||p  
PERL\_LONG\_MAX|5.003070||p  
PERL\_LONG\_MIN|5.003070||p  
PERL\_MAGIC\_arylen|5.007002||p  
PERL\_MAGIC\_backref|5.007002||p  
PERL\_MAGIC\_bm|5.007002||p  
PERL\_MAGIC\_collxfrm|5.007002||p  
PERL\_MAGIC\_dbfile|5.007002||p  
PERL\_MAGIC\_dbline|5.007002||p  
PERL\_MAGIC\_defelem|5.007002||p  
PERL\_MAGIC\_envelem|5.007002||p  
PERL\_MAGIC\_env|5.007002||p  
PERL\_MAGIC\_ext|5.007002||p  
PERL\_MAGIC\_fm|5.007002||p  
PERL\_MAGIC\_glob|5.021008||p  
PERL\_MAGIC\_isaelem|5.007002||p  
PERL\_MAGIC\_isa|5.007002||p  
PERL\_MAGIC\_mutex|5.021008||p  
PERL\_MAGIC\_nkeys|5.007002||p  
PERL\_MAGIC\_overload\_elem|5.021008||p  
PERL\_MAGIC\_overload\_table|5.007002||p  
PERL\_MAGIC\_overload|5.021008||p  
PERL\_MAGIC\_pos|5.007002||p  
PERL\_MAGIC\_qr|5.007002||p  
PERL\_MAGIC\_regdata|5.007002||p  
PERL\_MAGIC\_regdatum|5.007002||p  
PERL\_MAGIC\_regex\_global|5.007002||p  
PERL\_MAGIC\_shared\_scalar|5.007003||p  
PERL\_MAGIC\_shared|5.007003||p  
PERL\_MAGIC\_sigelem|5.007002||p  
PERL\_MAGIC\_sig|5.007002||p  
PERL\_MAGIC\_substr|5.007002||p  
PERL\_MAGIC\_sv|5.007002||p  
PERL\_MAGIC\_taint|5.007002||p  
PERL\_MAGIC\_tiedelem|5.007002||p  
PERL\_MAGIC\_tiedscalar|5.007002||p

PERL\_MAGIC\_tied|5.007002||p  
PERL\_MAGIC\_utf8|5.008001||p  
PERL\_MAGIC\_uvar\_elem|5.007003||p  
PERL\_MAGIC\_uvar|5.007002||p  
PERL\_MAGIC\_vec|5.007002||p  
PERL\_MAGIC\_vstring|5.008001||p  
PERL\_PV\_ESCAPE\_ALL|5.009004||p  
PERL\_PV\_ESCAPE\_FIRSTCHAR|5.009004||p  
PERL\_PV\_ESCAPE\_NOBACKSLASH|5.009004||p  
PERL\_PV\_ESCAPE\_NOCLEAR|5.009004||p  
PERL\_PV\_ESCAPE\_QUOTE|5.009004||p  
PERL\_PV\_ESCAPE\_RE|5.009005||p  
PERL\_PV\_ESCAPE\_UNI\_DETECT|5.009004||p  
PERL\_PV\_ESCAPE\_UNI|5.009004||p  
PERL\_PV\_PRETTY\_DUMP|5.009004||p  
PERL\_PV\_PRETTY\_ELLIPSES|5.010000||p  
PERL\_PV\_PRETTY\_LTGT|5.009004||p  
PERL\_PV\_PRETTY\_NOCLEAR|5.010000||p  
PERL\_PV\_PRETTY\_QUOTE|5.009004||p  
PERL\_PV\_PRETTY\_REGPROP|5.009004||p  
PERL\_QUAD\_MAX|5.003070||p  
PERL\_QUAD\_MIN|5.003070||p  
PERL\_REVISION|5.006000||p  
PERL\_SCAN\_ALLOW\_UNDERSCORES|5.007003||p  
PERL\_SCAN\_DISALLOW\_PREFIX|5.007003||p  
PERL\_SCAN\_GREATER\_THAN\_UV\_MAX|5.007003||p  
PERL\_SCAN\_SILENT\_ILLDIGIT|5.008001||p  
PERL\_SHORT\_MAX|5.003070||p  
PERL\_SHORT\_MIN|5.003070||p  
PERL\_SIGNALS\_UNSAFE\_FLAG|5.008001||p  
PERL\_SUBVERSION|5.006000||p  
PERL\_SYS\_INIT3|5.006000|  
PERL\_SYS\_INIT||  
PERL\_SYS\_TERM||5.021008|  
PERL\_UCHAR\_MAX|5.003070||p  
PERL\_UCHAR\_MIN|5.003070||p  
PERL\_UINT\_MAX|5.003070||p  
PERL\_UINT\_MIN|5.003070||p  
PERL\_ULONG\_MAX|5.003070||p  
PERL\_ULONG\_MIN|5.003070||p  
PERL\_UNUSED\_ARG|5.009003||p  
PERL\_UNUSED\_CONTEXT|5.009004||p  
PERL\_UNUSED\_DECL|5.007002||p  
PERL\_UNUSED\_VAR|5.007002||p  
PERL\_UQUAD\_MAX|5.003070||p  
PERL\_UQUAD\_MIN|5.003070||p  
PERL\_USE\_GCC\_BRACE\_GROUPS|5.009004||p  
PERL\_USHORT\_MAX|5.003070||p

PERL\_USHORT\_MIN|5.003070||p  
PERL\_VERSION|5.006000||p  
PL\_DBsignal|5.005000||p  
PL\_DBsingle|||pn  
PL\_DBsub|||pn  
PL\_DBtrace|||pn  
PL\_Sv|5.005000||p  
PL\_bufend|5.021008||p  
PL\_bufptr|5.021008||p  
PL\_check||5.006000|  
PL\_compiling|5.004050||p  
PL\_comppad\_name||5.017004|  
PL\_comppad||5.008001|  
PL\_copline|5.021008||p  
PL\_curcop|5.004050||p  
PL\_curpad||5.005000|  
PL\_curstash|5.004050||p  
PL\_debstash|5.004050||p  
PL\_defgv|5.004050||p  
PL\_diehook|5.004050||p  
PL\_dirty|5.004050||p  
PL\_dowarn|||pn  
PL\_errgv|5.004050||p  
PL\_error\_count|5.021008||p  
PL\_expect|5.021008||p  
PL\_hexdigit|5.005000||p  
PL\_hints|5.005000||p  
PL\_in\_my\_stash|5.021008||p  
PL\_in\_my|5.021008||p  
PL\_keyword\_plugin||5.011002|  
PL\_last\_in\_gv|||n  
PL\_laststatval|5.005000||p  
PL\_lex\_state|5.021008||p  
PL\_lex\_stuff|5.021008||p  
PL\_linestr|5.021008||p  
PL\_modglobal||5.005000|n  
PL\_na|5.004050||pn  
PL\_no\_modify|5.006000||p  
PL\_ofsgv|||n  
PL\_opfreehook||5.011000|n  
PL\_parser|5.009005||p  
PL\_peekp||5.007003|n  
PL\_perl\_destruct\_level|5.004050||p  
PL\_perldb|5.004050||p  
PL\_ppaddr|5.006000||p  
PL\_rpeekp||5.013005|n  
PL\_rsfilters|5.021008||p  
PL\_rsfpl|5.021008||p

PL\_rs|||n  
PL\_signals|5.008001||p  
PL\_stack\_base|5.004050||p  
PL\_stack\_sp|5.004050||p  
PL\_statcache|5.005000||p  
PL\_stdingv|5.004050||p  
PL\_sv\_arenaroot|5.004050||p  
PL\_sv\_no|5.004050||pn  
PL\_sv\_undef|5.004050||pn  
PL\_sv\_yes|5.004050||pn  
PL\_tainted|5.004050||p  
PL\_tainting|5.004050||p  
PL\_tokenbuf|5.021008||p  
POP\_MULTICALL||5.021008|  
POPi|||n  
POPl|||n  
POPn|||n  
POPpbytex||5.007001|n  
POPpx||5.005030|n  
POPp|||n  
POPs|||n  
PTR2IV|5.006000||p  
PTR2NV|5.006000||p  
PTR2UV|5.006000||p  
PTR2nat|5.009003||p  
PTR2ul|5.007001||p  
PTRV|5.006000||p  
PUSHMARK|||  
PUSH\_MULTICALL||5.021008|  
PUSHi|||  
PUSHmortal|5.009002||p  
PUSHn|||  
PUSHp|||  
PUSHs|||  
PUSHu|5.004000||p  
PUTBACK|||  
PadARRAY||5.021008|  
PadMAX||5.021008|  
PadlistARRAY||5.021008|  
PadlistMAX||5.021008|  
PadlistNAMESARRAY||5.021008|  
PadlistNAMESMAX||5.021008|  
PadlistNAMES||5.021008|  
PadlistREFCNT||5.017004|  
PadnameIsOUR|||  
PadnameIsSTATE|||  
PadnameLEN||5.021008|  
PadnameOURSTASH|||



PadnameOUTER|||  
PadnamePV||5.021008|  
PadnameREFCNT\_dec||5.021008|  
PadnameREFCNT||5.021008|  
PadnameSV||5.021008|  
PadnameTYPE|||  
PadnameUTF8||5.021007|  
PadnamelistARRAY||5.021008|  
PadnamelistMAX||5.021008|  
PadnamelistREFCNT\_dec||5.021008|  
PadnamelistREFCNT||5.021008|  
PerlIO\_clearerr||5.007003|  
PerlIO\_close||5.007003|  
PerlIO\_context\_layers||5.009004|  
PerlIO\_eof||5.007003|  
PerlIO\_error||5.007003|  
PerlIO\_fileno||5.007003|  
PerlIO\_fill||5.007003|  
PerlIO\_flush||5.007003|  
PerlIO\_get\_base||5.007003|  
PerlIO\_get\_bufsiz||5.007003|  
PerlIO\_get\_cnt||5.007003|  
PerlIO\_get\_ptr||5.007003|  
PerlIO\_read||5.007003|  
PerlIO\_restore\_errno|||  
PerlIO\_save\_errno|||  
PerlIO\_seek||5.007003|  
PerlIO\_set\_cnt||5.007003|  
PerlIO\_set\_ptrcnt||5.007003|  
PerlIO\_setlinebuf||5.007003|  
PerlIO\_stderr||5.007003|  
PerlIO\_stdin||5.007003|  
PerlIO\_stdout||5.007003|  
PerlIO\_tell||5.007003|  
PerlIO\_unread||5.007003|  
PerlIO\_write||5.007003|  
Perl\_signbit||5.009005|n  
PoisonFree|5.009004||p  
PoisonNew|5.009004||p  
PoisonWith|5.009004||p  
Poison|5.008000||p  
READ\_XDIGIT||5.017006|  
RETVAL|||n  
Renewc|||  
Renew|||  
SAVECLEARSV|||  
SAVECOMPPAD|||  
SAVEPADSV|||

SAVETMPS|||  
SAVE\_DEFSV|5.004050||p  
SPAGAIN|||  
SP|||  
START\_EXTERN\_C|5.005000||p  
START\_MY\_CXT|5.007003||p  
STMT\_END|||p  
STMT\_START|||p  
STR\_WITH\_LEN|5.009003||p  
ST|||  
SV\_CONST\_RETURN|5.009003||p  
SV\_COW\_DROP\_PV|5.008001||p  
SV\_COW\_SHARED\_HASH\_KEYS|5.009005||p  
SV\_GMAGIC|5.007002||p  
SV\_HAS\_TRAILING\_NUL|5.009004||p  
SV\_IMMEDIATE\_UNREF|5.007001||p  
SV\_MUTABLE\_RETURN|5.009003||p  
SV\_NOSTEAL|5.009002||p  
SV\_SMAGIC|5.009003||p  
SV\_UTF8\_NO\_ENCODING|5.008001||p  
SVfARG|5.009005||p  
SVf\_UTF8|5.006000||p  
SVf|5.006000||p  
SVt\_INVLIST||5.019002|  
SVt\_IV|||  
SVt\_NULL|||  
SVt\_NV|||  
SVt\_PVAV|||  
SVt\_PVCV|||  
SVt\_PVFM|||  
SVt\_PVGV|||  
SVt\_PVHV|||  
SVt\_PVIO|||  
SVt\_PVIV|||  
SVt\_PVLV|||  
SVt\_PVMG|||  
SVt\_PVNV|||  
SVt\_PV|||  
SVt\_REGEX||5.011000|  
Safefree|||  
Slab\_Alloc|||  
Slab\_Free|||  
Slab\_to\_ro|||  
Slab\_to\_rw|||  
StructCopy|||  
SvCUR\_set|||  
SvCUR|||  
SvEND|||

SvGAMAGIC|5.006001|  
SvGETMAGIC|5.004050|p  
SvGROW|||  
SvIOK\_UV|5.006000|  
SvIOK\_notUV|5.006000|  
SvIOK\_off|||  
SvIOK\_only\_UV|5.006000|  
SvIOK\_only|||  
SvIOK\_on|||  
SvIOKp|||  
SvIOK|||  
SvIVX|||  
SvIV\_nomg|5.009001|p  
SvIV\_set|||  
SvIVx|||  
SvIV|||  
SvIsCOW\_shared\_hash|5.008003|  
SvIsCOW|5.008003|  
SvLEN\_set|||  
SvLEN|||  
SvLOCK|5.007003|  
SvMAGIC\_set|5.009003|p  
SvNIOK\_off|||  
SvNIOKp|||  
SvNIOK|||  
SvNOK\_off|||  
SvNOK\_only|||  
SvNOK\_on|||  
SvNOKp|||  
SvNOK|||  
SvNVX|||  
SvNV\_nomg|5.013002|  
SvNV\_set|||  
SvNVx|||  
SvNV|||  
SvOK|||  
SvOOK\_offset|5.011000|  
SvOOK|||  
SvPOK\_off|||  
SvPOK\_only\_UTF8|5.006000|  
SvPOK\_only|||  
SvPOK\_on|||  
SvPOKp|||  
SvPOK|||  
SvPVX\_const|5.009003|p  
SvPVX\_mutable|5.009003|p  
SvPVX|||  
SvPV\_const|5.009003|p

SvPV\_flags\_const\_nolen|5.009003||p  
SvPV\_flags\_const|5.009003||p  
SvPV\_flags\_mutable|5.009003||p  
SvPV\_flags|5.007002||p  
SvPV\_force\_flags\_mutable|5.009003||p  
SvPV\_force\_flags\_nolen|5.009003||p  
SvPV\_force\_flags|5.007002||p  
SvPV\_force\_mutable|5.009003||p  
SvPV\_force\_nolen|5.009003||p  
SvPV\_force\_nomg\_nolen|5.009003||p  
SvPV\_force\_nomg|5.007002||p  
SvPV\_force|||p  
SvPV\_mutable|5.009003||p  
SvPV\_nolen\_const|5.009003||p  
SvPV\_nolen|5.006000||p  
SvPV\_nomg\_const\_nolen|5.009003||p  
SvPV\_nomg\_const|5.009003||p  
SvPV\_nomg\_nolen|5.013007||p  
SvPV\_nomg|5.007002||p  
SvPV\_renew|5.009003||p  
SvPV\_set|||  
SvPVbyte\_force||5.009002|  
SvPVbyte\_nolen||5.006000|  
SvPVbytex\_force||5.006000|  
SvPVbytex||5.006000|  
SvPVbyte|5.006000||p  
SvPVutf8\_force||5.006000|  
SvPVutf8\_nolen||5.006000|  
SvPVutf8x\_force||5.006000|  
SvPVutf8x||5.006000|  
SvPVutf8||5.006000|  
SvPVx|||  
SvPV|||  
SvREFCNT\_dec\_NN||5.017007|  
SvREFCNT\_dec|||  
SvREFCNT\_inc\_NN|5.009004||p  
SvREFCNT\_inc\_simple\_NN|5.009004||p  
SvREFCNT\_inc\_simple\_void\_NN|5.009004||p  
SvREFCNT\_inc\_simple\_void|5.009004||p  
SvREFCNT\_inc\_simple|5.009004||p  
SvREFCNT\_inc\_void\_NN|5.009004||p  
SvREFCNT\_inc\_void|5.009004||p  
SvREFCNT\_inc|||p  
SvREFCNT|||  
SvROK\_off|||  
SvROK\_on|||  
SvROK|||  
SvRV\_set|5.009003||p

SvRV|||  
SvRXOK|5.009005|  
SvRX|5.009005|  
SvSETMAGIC|||  
SvSHARED\_HASH|5.009003||p  
SvSHARE|5.007003|  
SvSTASH\_set|5.009003||p  
SvSTASH|||  
SvSetMagicSV\_nosteal|5.004000|  
SvSetMagicSV|5.004000|  
SvSetSV\_nosteal|5.004000|  
SvSetSV|||  
SvTAINTED\_off|5.004000|  
SvTAINTED\_on|5.004000|  
SvTAINTED|5.004000|  
SvTAINT|||  
SvTHINKFIRST|||  
SvTRUE\_nomg|5.013006|  
SvTRUE|||  
SvTYPE|||  
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SvUOK|5.007001|5.006000|p  
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sv\_2pvutf8\_nolen|5.006000|  
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sv\_2uv\_flags|5.009001|  
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yyparse||
yyunlex||
yywarn||
);

if (exists $opt{'list-unsupported'}) {
    my $f;
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $API{$f}{todo};
        print "$f ", '!x(40-length($f)), " ", format_version($API{$f}{todo}), "\n";
    }
    exit 0;
}

# Scan for possible replacement candidates

my(%replace, %need, %hints, %warnings, %depends);
my $replace = 0;
my($hint, $define, $function);

sub find_api
{
    my $code = shift;
    $code =~ s{
        / (? : \*[^*]*\*+ (? : [^\$ccs][^*]*\*+)* / | [^\r\n]* )
        | "[^"\\]*(?:\\.["\\])*"
        | '[^\\]*(?:\\.["\\])*' }{ } egsx;
    grep { exists $API{$_} } $code =~ /(\w+)/mg;
}

while (<DATA>) {
    if ($hint) {
        my $h = $hint->[0] eq 'Hint' ? \%hints : \%warnings;
        if (m{^\s*\s(.*?)\s*$}) {
            for (@{$hint->[1]}) {

```

```

    $h->{$_} ||= "# suppress warning with older perls
    $h->{$_} .= "$1\n";
}
}
else { undef $hint }
}

$hint = [$1, [split /,?\s+/, $2]]
    if m{^\s*$rcss\s+(Hint|Warning):\s+(\w+(?:,\s+\w+)*)\s*$};

if ($define) {
    if ($define->[1] =~ /\$/) {
        $define->[1] .= $_;
    }
    else {
        if (exists $API{$define->[0]} && $define->[1] !~ /^DPPP_\(/) {
            my @n = find_api($define->[1]);
            push @{$depends{$define->[0]}}, @n if @n
        }
        undef $define;
    }
}

$define = [$1, $2] if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(.*)};

if ($function) {
    if (/^/) {
        if (exists $API{$function->[0]}) {
            my @n = find_api($function->[1]);
            push @{$depends{$function->[0]}}, @n if @n
        }
        undef $function;
    }
    else {
        $function->[1] .= $_;
    }
}

$function = [$1, ""] if m{^DPPP_\(my_(\w+)\)};

$replace = $1 if m{^\s*$rcss\s+Replace:\s+(\d+)\s+$rcce\s*$};
$replace{$2} = $1 if $replace and m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+)};
$replace{$2} = $1 if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+).*\s*$rcss\s+Replace\s+$rcce};
$replace{$1} = $2 if m{^\s*$rcss\s+Replace (\w+) with (\w+)\s+$rcce\s*$};

if (m{^\s*$rcss\s+(\w+(\s*,\s*\w+)*)\s+depends\s+on\s+(\w+(\s*,\s*\w+)*)\s+$rcce\s*$}) {
    my @deps = map { s/\s+//g; $_ } split /,/, $3;
    my $d;

```

```

for $d (map { s/^s+//g; $_ } split /\./, $1) {
    push @{$depends{$d}}, @deps;
}
}

$need{$1} = 1 if m{^#if\s+defined\(\NEED_\(\w+)\(?:_GLOBAL)?\)};
}

for (values %depends) {
    my %s;
    $_ = [sort grep !${$_}++, @$_];
}

if (exists $opt{'api-info'}) {
    my $f;
    my $count = 0;
    my $match = $opt{'api-info'} =~ m!^(.*)/$! ? $1 : "\Q$opt{'api-info'}\E\$";
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $f =~ /$match/;
        print "\n=== $f ===\n\n";
        my $info = 0;
        if ($API{$f}{base} || $API{$f}{todo}) {
            my $base = format_version($API{$f}{base} || $API{$f}{todo});
            print "Supported at least starting from perl-$base.\n";
            $info++;
        }
        if ($API{$f}{provided}) {
            my $todo = $API{$f}{todo} ? format_version($API{$f}{todo}) : "5.003";
            print "Support by $ppport provided back to perl-$todo.\n";
            print "Support needs to be explicitly requested by NEED_$.f.\n" if exists $need{$f};
            print "Depends on: ", join(', ', @{$depends{$f}}), ".\n" if exists $depends{$f};
            print "\n$hints{$f}" if exists $hints{$f};
            print "\nWARNING:\n$warnings{$f}" if exists $warnings{$f};
            $info++;
        }
        print "No portability information available.\n" unless $info;
        $count++;
    }
    $count or print "Found no API matching '$opt{'api-info'}'.";
    print "\n";
    exit 0;
}

if (exists $opt{'list-provided'}) {
    my $f;
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $API{$f}{provided};
        my @flags;

```

```

push @flags, 'explicit' if exists $need{$f};
push @flags, 'depend' if exists $depends{$f};
push @flags, 'hint' if exists $hints{$f};
push @flags, 'warning' if exists $warnings{$f};
my $flags = @flags ? ' [' . join(', ', @flags) . ']': "";
print "$f$flags\n";
}
exit 0;
}

my @files;
my @srcext = qw( .xs .c .h .cc .cpp -c.inc -xs.inc );
my $srcext = join '|', map { quotemeta $_ } @srcext;

if (@ARGV) {
my %seen;
for (@ARGV) {
if (-e) {
if (-f) {
push @files, $_ unless $seen{$_}++;
}
else { warn "'$_' is not a file.\n" }
}
else {
my @new = grep { -f } glob $_
or warn "'$_' does not exist.\n";
push @files, grep { !$seen{$_}++ } @new;
}
}
}
else {
eval {
require File::Find;
File::Find::find(sub {
$File::Find::name =~ /($srcext)$/i
and push @files, $File::Find::name;
}, '.');
};
if ($?) {
@files = map { glob "*/$_" } @srcext;
}
}

if (!@ARGV || $opt{filter}) {
my(@in, @out);
my %xsc = map { /\.(.*)\.xs$/ ? ("1.c" => 1, "1.cc" => 1) : () } @files;
for (@files) {
my $out = exists $xsc{$_} || /\bQ$ppport\E$/i || !/($srcext)$/i;
}
}
}

```

```

push @{ $out ? \@out : \@in }, $_;
}
if (@ARGV && @out) {
warning("Skipping the following files (use --nofilter to avoid this):\n| ", join "\n| ", @out);
}
@files = @in;
}

```

```
die "No input files given!\n" unless @files;
```

```

my(%files, %global, %revreplace);
%revreplace = reverse %replace;
my $filename;
my $patch_opened = 0;

```

```

for $filename (@files) {
unless (open IN, "<$filename") {
warn "Unable to read from $filename: $!\n";
next;
}

```

```
info("Scanning $filename ...");
```

```

my $c = do { local $/; <IN> };
close IN;

```

```
my %file = (orig => $c, changes => 0);
```

```

# Temporarily remove C/XS comments and strings from the code
my @ccom;

```

```

$c =~ s{
( ^$HS*\#$HS*include\b[^\r\n]+\b(?:Q$ppport\E|XSUB\.h)\b[^\r\n]*
| ^$HS*\#$HS*(?:define|elif|if(?:def?))\b[^\r\n]* )
| ( ^$HS*\#[^\r\n]*
| "[^"\\]*(?:\\.[^"\\])*"
| '[^"\\]*(?:\\.[^"\\])*'
| /(?:\*[^\*]*+(?:[^\$ccs][^\*]*+)* /|/[^\r\n]* ) )
}{ defined $2 and push @ccom, $2;
defined $1 ? $1 : "$ccs$#ccom$cce" }mgsex;

```

```
$file{ccom} = \@ccom;
```

```
$file{code} = $c;
```

```
$file{has_inc_ppport} = $c =~ /^$HS*\#$HS*include[^\r\n]+\bQ$ppport\E\b/m;
```

```
my $func;
```

```
for $func (keys %API) {
```



```

my $match = $func;
$match .= "|$revreplace{$func}" if exists $revreplace{$func};
if ($c =~ /\b(?:Perl_)?($match)\b/) {
    $file{uses_replace}{$1}++ if exists $revreplace{$func} && $1 eq $revreplace{$func};
    $file{uses_Perl}{$func}++ if $c =~ /\bPerl_{$func}\b/;
    if (exists $API{$func}{provided}) {
        $file{uses_provided}{$func}++;
        if (!exists $API{$func}{base} || $API{$func}{base} > $opt{'compat-version'}) {
            $file{uses}{$func}++;
            my @deps = rec_depend($func);
            if (@deps) {
                $file{uses_deps}{$func} = \@deps;
                for (@deps) {
                    $file{uses}{$_} = 0 unless exists $file{uses}{$_};
                }
            }
            for ($func, @deps) {
                $file{needs}{$_} = 'static' if exists $need{$_};
            }
        }
    }
    if (exists $API{$func}{todo} && $API{$func}{todo} > $opt{'compat-version'}) {
        if ($c =~ /\b{$func}\b/) {
            $file{uses_todo}{$func}++;
        }
    }
}

while ($c =~ /^$HS*#$HS*define$HS+(NEED_(\w+?)(_GLOBAL)?)\b/mg) {
    if (exists $need{$2}) {
        $file{defined $3 ? 'needed_global' : 'needed_static'}{$2}++;
    }
    else { warning("Possibly wrong #define $1 in $filename") }
}

for (qw(uses needs uses_todo needed_global needed_static)) {
    for $func (keys %{$file{$_}}) {
        push @{$global{$_}{$func}}, $filename;
    }
}

$files{$filename} = \%file;
}

# Globally resolve NEED_'s
my $need;
for $need (keys %{$global{needs}}) {

```

```

if (@{$global{needs}{$need}} > 1) {
    my @targets = @{$global{needs}{$need}};
    my @t = grep $files{$_}{needed_global}{$need}, @targets;
    @targets = @t if @t;
    @t = grep /\.xs$/i, @targets;
    @targets = @t if @t;
    my $target = shift @targets;
    $files{$target}{needs}{$need} = 'global';
    for (@{$global{needs}{$need}}) {
        $files{$_}{needs}{$need} = 'extern' if $_ ne $target;
    }
}
}

for $filename (@files) {
    exists $files{$filename} or next;

    info("=== Analyzing $filename ===");

    my %file = %{$files{$filename}};
    my $func;
    my $c = $file{code};
    my $warnings = 0;

    for $func (sort keys %{$file{uses_Perl}}) {
        if ($API{$func}{varargs}) {
            unless ($API{$func}{nothxarg}) {
                my $changes = ($c =~ s{\b(Perl_$func\s*(\s*)(?!aTHX_?)(\)[^\s]*)})
                    { $1 . ($2 eq ' ') ? 'aTHX' : 'aTHX_' } . $2 }ge);
                if ($changes) {
                    warning("Doesn't pass interpreter argument aTHX to Perl_$func");
                    $file{changes} += $changes;
                }
            }
        }
        else {
            warning("Uses Perl_$func instead of $func");
            $file{changes} += ($c =~ s{\bPerl_$func(\s*)((\s*aTHX_?)?\s*}
                {$func$1}{g});
        }
    }

    for $func (sort keys %{$file{uses_replace}}) {
        warning("Uses $func instead of $replace{$func}");
        $file{changes} += ($c =~ s{\b$func\b/$replace{$func}/g});
    }

    for $func (sort keys %{$file{uses_provided}}) {

```

```

if ($file{uses}{$func}) {
    if (exists $file{uses_deps}{$func}) {
        diag("Uses $func, which depends on ", join(', ', @{$file{uses_deps}{$func}}));
    }
    else {
        diag("Uses $func");
    }
}
}
$warnings += hint($func);
}

```

```

unless ($opt{quiet}) {
    for $func (sort keys %{$file{uses_todo}}) {
        print "*** WARNING: Uses $func, which may not be portable below perl ",
            format_version($API{$func}{todo}), ", even with '$ppport'\n";
        $warnings++;
    }
}

```

```

for $func (sort keys %{$file{needed_static}}) {
    my $message = "";
    if (not exists $file{uses}{$func}) {
        $message = "No need to define NEED_$func if $func is never used";
    }
    elsif (exists $file{needs}{$func} && $file{needs}{$func} ne 'static') {
        $message = "No need to define NEED_$func when already needed globally";
    }
    if ($message) {
        diag($message);
        $file{changes} += ($c =~ s/^\$HS*#\$HS*define\$HS+NEED_$func\b.*$LF//mg);
    }
}

```

```

for $func (sort keys %{$file{needed_global}}) {
    my $message = "";
    if (not exists $global{uses}{$func}) {
        $message = "No need to define NEED_{$func}_GLOBAL if $func is never used";
    }
    elsif (exists $file{needs}{$func}) {
        if ($file{needs}{$func} eq 'extern') {
            $message = "No need to define NEED_{$func}_GLOBAL when already needed globally";
        }
        elsif ($file{needs}{$func} eq 'static') {
            $message = "No need to define NEED_{$func}_GLOBAL when only used in this file";
        }
    }
    if ($message) {
        diag($message);
    }
}

```

```

$file{changes} += ($c =~ s/^\$HS*#\$HS*define\$HS+NEED_{func}_GLOBAL\b.*$LF//mg);
}
}

$file{needs_inc_ppport} = keys %{$file{uses}};

if ($file{needs_inc_ppport}) {
    my $pp = "";

    for $func (sort keys %{$file{needs}}) {
        my $type = $file{needs}{$func};
        next if $type eq 'extern';
        my $suffix = $type eq 'global' ? '_GLOBAL' : "";
        unless (exists $file{"needed_$type"}{$func}) {
            if ($type eq 'global') {
                diag("Files [@$global{needs}{$func}] need $func, adding global request");
            }
            else {
                diag("File needs $func, adding static request");
            }
            $pp .= "#define NEED_$func$suffix\n";
        }
    }
}

if ($pp && ($c =~ s/^(?=$HS*#\$HS*define\$HS+NEED_\w+)/$pp/m)) {
    $pp = "";
    $file{changes}++;
}

unless ($file{has_inc_ppport}) {
    diag("Needs to include '$ppport'");
    $pp .= qq(#include "$ppport"\n)
}

if ($pp) {
    $file{changes} += ($c =~ s/^\($HS*#\$HS*define\$HS+NEED_\w+.*?\)^/$1$pp/ms)
        || ($c =~ s/^(?=$HS*#\$HS*include.*\Q$ppport\E)/$pp/m)
        || ($c =~ s/^\($HS*#\$HS*include.*XSUB.*\s*\)^/$1$pp/m)
        || ($c =~ s/^\($pp/);
}
}
else {
    if ($file{has_inc_ppport}) {
        diag("No need to include '$ppport'");
        $file{changes} += ($c =~ s/^\$HS*#\$HS*include.*\Q$ppport\E.*?$LF//m);
    }
}
}

```

```

# put back in our C comments
my $ix;
my $cpc = 0;
my @ccom = @{$file{ccom}};
for $ix (0 .. $#ccom) {
    if (!$opt{cplusplus} && $ccom[$ix] =~ s!^/!!) {
        $cpc++;
        $file{changes} += $c =~ s/$rcs$ix$rcce/$ccs$ccom[$ix] $cce/;
    }
    else {
        $c =~ s/$rcs$ix$rcce/$ccom[$ix]/;
    }
}

if ($cpc) {
    my $s = $cpc != 1 ? 's' : '';
    warning("Uses $cpc C++ style comment$s, which is not portable");
}

my $s = $warnings != 1 ? 's' : '';
my $warn = $warnings ? " ($warnings warning$s)" : "";
info("Analysis completed$warn");

if ($file{changes}) {
    if (exists $opt{copy}) {
        my $newfile = "$filename$opt{copy}";
        if (-e $newfile) {
            error("$newfile' already exists, refusing to write copy of '$filename'");
        }
        else {
            local *F;
            if (open F, ">$newfile") {
                info("Writing copy of '$filename' with changes to '$newfile'");
                print F $c;
                close F;
            }
            else {
                error("Cannot open '$newfile' for writing: $!");
            }
        }
    }
    elsif (exists $opt{patch} || $opt{changes}) {
        if (exists $opt{patch}) {
            unless ($patch_opened) {
                if (open PATCH, ">$opt{patch}") {
                    $patch_opened = 1;
                }
            }
            else {

```

```

        error("Cannot open '$opt{patch}' for writing: $!");
        delete $opt{patch};
        $opt{changes} = 1;
        goto fallback;
    }
}
mydiff(\*PATCH, $filename, $c);
}
else {
fallback:
    info("Suggested changes:");
    mydiff(\*STDOUT, $filename, $c);
}
}
else {
    my $s = $file{changes} == 1 ? " : 's'";
    info("$file{changes} potentially required change$s detected");
}
}
else {
    info("Looks good");
}
}

close PATCH if $patch_opened;

exit 0;

sub try_use { eval "use @_;"; return $@ eq " }

sub mydiff
{
    local *F = shift;
    my($file, $str) = @_;
    my $diff;

    if (exists $opt{diff}) {
        $diff = run_diff($opt{diff}, $file, $str);
    }

    if (!defined $diff and try_use("Text::Diff")) {
        $diff = Text::Diff::diff($file, \$str, { STYLE => 'Unified' });
        $diff = <<HEADER . $diff;
    }
}

--- $file
+++ $file.patched
HEADER
}

```

```

if (!defined $diff) {
    $diff = run_diff('diff -u', $file, $str);
}

if (!defined $diff) {
    $diff = run_diff('diff', $file, $str);
}

if (!defined $diff) {
    error("Cannot generate a diff. Please install Text::Diff or use --copy.");
    return;
}

print F $diff;
}

sub run_diff
{
    my($prog, $file, $str) = @_ ;
    my $tmp = 'dppptemp';
    my $suf = 'aaa';
    my $diff = "";
    local *F;

    while (-e "$tmp.$suf") { $suf++ }
    $tmp = "$tmp.$suf";

    if (open F, ">$tmp") {
        print F $str;
        close F;

        if (open F, "$prog $file $tmp |") {
            while (<F>) {
                s/\Q$tmp\E/$file.patched/;
                $diff .= $_;
            }
            close F;
            unlink $tmp;
            return $diff;
        }

        unlink $tmp;
    }
    else {
        error("Cannot open '$tmp' for writing: $!");
    }
}

```

```

return undef;
}

sub rec_depend
{
my($func, $seen) = @_ ;
return () unless exists $depends{$func};
$seen = {% {$seen|{}}};
return () if $seen->{$func}++;
my %s;
grep !${$_}++, map { ($_, rec_depend($_, $seen)) } @{$depends{$func}};
}

sub parse_version
{
my $ver = shift;

if ($ver =~ /^(d+)\.(d+)\.(d+)$/) {
return ($1, $2, $3);
}
elsif ($ver !~ /^d+\.[d_]+$/) {
die "cannot parse version '$ver'\n";
}

$ver =~ s/_//g;
$ver =~ s/000000/;

my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

$v = int $v;
$s = int $s;

if ($r < 5 || ($r == 5 && $v < 6)) {
if ($s % 10) {
die "cannot parse version '$ver'\n";
}
}

return ($r, $v, $s);
}

sub format_version
{
my $ver = shift;

$ver =~ s/000000/;
my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

```



```

$v = int $v;
$s = int $s;

if ($r < 5 || ($r == 5 && $v < 6)) {
    if ($s % 10) {
        die "invalid version '$ver'\n";
    }
    $s /= 10;

    $ver = sprintf "%d.%03d", $r, $v;
    $s > 0 and $ver .= sprintf "_%02d", $s;

    return $ver;
}

return sprintf "%d.%d.%d", $r, $v, $s;
}

sub info
{
    $opt{quiet} and return;
    print @_, "\n";
}

sub diag
{
    $opt{quiet} and return;
    $opt{diag} and print @_, "\n";
}

sub warning
{
    $opt{quiet} and return;
    print "*** ", @_, "\n";
}

sub error
{
    print "*** ERROR: ", @_, "\n";
}

my %given_hints;
my %given_warnings;
sub hint
{
    $opt{quiet} and return;
    my $func = shift;
    my $rv = 0;

```

```

if (exists $warnings{$func} && !$given_warnings{$func}++) {
    my $warn = $warnings{$func};
    $warn =~ s/^\!*** !mg;
    print "*** WARNING: $func\n", $warn;
    $rv++;
}
if ($opt{hints} && exists $hints{$func} && !$given_hints{$func}++) {
    my $hint = $hints{$func};
    $hint =~ s/^\s+ /mg;
    print " --- hint for $func ---\n", $hint;
}
$rv;
}

sub usage
{
    my($usage) = do { local(@ARGV,$/)=($0); <> } =~ /^=head\d$HS+SYNOPSIS\s*^(.*?)\s*^=/ms;
    my %M = ( 'T' => '*' );
    $usage =~ s/^\s*perl\s+\S+/$^X $0/;
    $usage =~ s/([A-Z])<([>]+)>/M{$1}$2M{$1}/g;

    print <<ENDUSAGE;

    Usage: $usage

    See perldoc $0 for details.

    ENDUSAGE

    exit 2;
}

sub strip
{
    my $self = do { local(@ARGV,$/)=($0); <> };
    my($copy) = $self =~ /^=head\d\s+COPYRIGHT\s*^(.*?)^\s+w+/ms;
    $copy =~ s/^(?=\S+)/ /gms;
    $self =~ s/^\$HS+Do NOT edit.*?(?=-)/$copy/ms;
    $self =~ s/^\$SKIP.*(?:^__DATA__)/SKIP
if (\@ARGV && $ARGV[0] eq '--unstrip') {
    eval { require Devel::PPPport };
    \@ and die "Cannot require Devel::PPPport, please install.\n";
    if (eval $Devel::PPPport::VERSION < $VERSION) {
        die "$0 was originally generated with Devel::PPPport $VERSION.\n"
        . "Your Devel::PPPport is only version $Devel::PPPport::VERSION.\n"
        . "Please install a newer version, or --unstrip will not work.\n";
    }
    Devel::PPPport::WriteFile(\$0);
}

```

```
exit 0;
}
print <<END;
```

Sorry, but this is a stripped version of \\$.

To be able to use its original script and doc functionality,  
please try to regenerate this file using:

```
\$^X \$0 --unstrip
```

```
END
```

```
/ms;
```

```
my($pl, $c) = $self =~ /(.*^__DATA__)(.*)/ms;
```

```
$c =~ s{
```

```
 /(?: \*[^\*]*\*+(?:[^\$ccs][^\*]*\*+)* /|/[\r\n]*
```

```
| ("^\\"*?(?:\.[^\\"]*)*"
```

```
| '^\\"*?(?:\.[^\\"]*)*'
```

```
| ($HS+) ){ defined $2 ? '': ($1 || ") }gsex;
```

```
$c =~ s!\s+!!mg;
```

```
$c =~ s!^\$LF!!mg;
```

```
$c =~ s!\s*#\s*!#!mg;
```

```
$c =~ s!\s+!!mg;
```

```
open OUT, ">$0" or die "cannot strip $0: $!\n";
```

```
print OUT "$pl$c\n";
```

```
exit 0;
```

```
}
```

```
__DATA__
```

```
*/
```

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548090_1591903283.05/perl-Data-Dumper-2.167-399.el8.src.rpm-cosi-expand-archive-lxnDj2VA/Data-Dumper-2.161.tar.gz-cosi-expand-archive-6LzdXmyr/Data-Dumper-2.161/ppport.h
```

No license file was found, but licenses were detected in source scan.

```
=head1 NAME
```

```
Data::Dumper - stringified perl data structures, suitable for both printing and C<eval>
```

```
=head1 SYNOPSIS
```

```
use Data::Dumper;
```

```
# simple procedural interface
```

```
print Dumper($foo, $bar);
```

```

# extended usage with names
print Data::Dumper->Dump([$foo, $bar], [qw(foo *ary)]);

# configuration variables
{
  local $Data::Dumper::Purity = 1;
  eval Data::Dumper->Dump([$foo, $bar], [qw(foo *ary)]);
}

# OO usage
$d = Data::Dumper->new([$foo, $bar], [qw(foo *ary)]);
...
print $d->Dump;
...
$d->Purity(1)->Terse(1)->Deepcopy(1);
eval $d->Dump;

```

=head1 DESCRIPTION

Given a list of scalars or reference variables, writes out their contents in perl syntax. The references can also be objects. The content of each variable is output in a single Perl statement. Handles self-referential structures correctly.

The return value can be C<eval>ed to get back an identical copy of the original reference structure. (Please do consider the security implications of eval'ing code from untrusted sources!)

Any references that are the same as one of those passed in will be named C<\$VAR>I<n> (where I<n> is a numeric suffix), and other duplicate references to substructures within C<\$VAR>I<n> will be appropriately labeled using arrow notation. You can specify names for individual values to be dumped if you use the C<Dump()> method, or you can change the default C<\$VAR> prefix to something else. See C<\$Data::Dumper::Vname> and C<\$Data::Dumper::Terse> below.

The default output of self-referential structures can be C<eval>ed, but the nested references to C<\$VAR>I<n> will be undefined, since a recursive structure cannot be constructed using one Perl statement. You should set the C<Purity> flag to 1 to get additional statements that will correctly fill in these references. Moreover, if C<eval>ed when strictures are in effect, you need to ensure that any variables it accesses are previously declared.

In the extended usage form, the references to be dumped can be given user-specified names. If a name begins with a C<\*>, the output will describe the dereferenced type of the supplied reference for hashes and

arrays, and coderefs. Output of names will be avoided where possible if the C<Terse> flag is set.

In many cases, methods that are used to set the internal state of the object will return the object itself, so method calls can be conveniently chained together.

Several styles of output are possible, all controlled by setting the C<Indent> flag. See L<Configuration Variables or Methods> below for details.

=head2 Methods

=over 4

=item I<PACKAGE>->new(I<ARRAYREF [>, I<ARRAYREF]>)

Returns a newly created C<Data::Dumper> object. The first argument is an anonymous array of values to be dumped. The optional second argument is an anonymous array of names for the values. The names need not have a leading C<\$> sign, and must be comprised of alphanumeric characters. You can begin a name with a C<\*> to specify that the dereferenced type must be dumped instead of the reference itself, for ARRAY and HASH references.

The prefix specified by C<\$Data::Dumper::Vname> will be used with a numeric suffix if the name for a value is undefined.

Data::Dumper will catalog all references encountered while dumping the values. Cross-references (in the form of names of substructures in perl syntax) will be inserted at all possible points, preserving any structural interdependencies in the original set of values. Structure traversal is depth-first, and proceeds in order from the first supplied value to the last.

=item I<\$OBJ>->Dump I<or> I<PACKAGE>->Dump(I<ARRAYREF [>, I<ARRAYREF]>)

Returns the stringified form of the values stored in the object (preserving the order in which they were supplied to C<new>), subject to the configuration options below. In a list context, it returns a list of strings corresponding to the supplied values.

The second form, for convenience, simply calls the C<new> method on its arguments before dumping the object immediately.

=item I<\$OBJ>->Seen(I<[HASHREF]>)

Queries or adds to the internal table of already encountered references.

You must use C<Reset> to explicitly clear the table if needed. Such references are not dumped; instead, their names are inserted wherever they are encountered subsequently. This is useful especially for properly dumping subroutine references.

Expects an anonymous hash of name => value pairs. Same rules apply for names as in C<new>. If no argument is supplied, will return the "seen" list of name => value pairs, in a list context. Otherwise, returns the object itself.

=item I<\$OBJ>->Values(I<[ARRAYREF]>)

Queries or replaces the internal array of values that will be dumped. When called without arguments, returns the values as a list. When called with a reference to an array of replacement values, returns the object itself. When called with any other type of argument, dies.

=item I<\$OBJ>->Names(I<[ARRAYREF]>)

Queries or replaces the internal array of user supplied names for the values that will be dumped. When called without arguments, returns the names. When called with an array of replacement names, returns the object itself. If the number of replacement names exceeds the number of values to be named, the excess names will not be used. If the number of replacement names falls short of the number of values to be named, the list of replacement names will be exhausted and remaining values will not be renamed. When called with any other type of argument, dies.

=item I<\$OBJ>->Reset

Clears the internal table of "seen" references and returns the object itself.

=back

=head2 Functions

=over 4

=item Dumper(I<LIST>)

Returns the stringified form of the values in the list, subject to the configuration options below. The values will be named C<\$VAR>I<n> in the output, where I<n> is a numeric suffix. Will return a list of strings in a list context.

=back

## =head2 Configuration Variables or Methods

Several configuration variables can be used to control the kind of output generated when using the procedural interface. These variables are usually C<local>ized in a block so that other parts of the code are not affected by the change.

These variables determine the default state of the object created by calling the C<new> method, but cannot be used to alter the state of the object thereafter. The equivalent method names should be used instead to query or set the internal state of the object.

The method forms return the object itself when called with arguments, so that they can be chained together nicely.

=over 4

=item \*

\$Data::Dumper::Indent I<or> I<\$OBJ>->Indent(I<[NEWVAL]>)

Controls the style of indentation. It can be set to 0, 1, 2 or 3. Style 0 spews output without any newlines, indentation, or spaces between list items. It is the most compact format possible that can still be called valid perl. Style 1 outputs a readable form with newlines but no fancy indentation (each level in the structure is simply indented by a fixed amount of whitespace). Style 2 (the default) outputs a very readable form which takes into account the length of hash keys (so the hash value lines up). Style 3 is like style 2, but also annotates the elements of arrays with their index (but the comment is on its own line, so array output consumes twice the number of lines). Style 2 is the default.

=item \*

\$Data::Dumper::Trailingcomma I<or> I<\$OBJ>->Trailingcomma(I<[NEWVAL]>)

Controls whether a comma is added after the last element of an array or hash. Even when true, no comma is added between the last element of an array or hash and a closing bracket when they appear on the same line. The default is false.

=item \*

\$Data::Dumper::Purity I<or> I<\$OBJ>->Purity(I<[NEWVAL]>)

Controls the degree to which the output can be C<eval>ed to recreate the supplied reference structures. Setting it to 1 will output additional perl statements that will correctly recreate nested references. The default is

0.

=item \*

`$Data::Dumper::Pad I<or> I<$OBJ>->Pad(I<[NEWVAL]>)`

Specifies the string that will be prefixed to every line of the output.  
Empty string by default.

=item \*

`$Data::Dumper::Varname I<or> I<$OBJ>->Varname(I<[NEWVAL]>)`

Contains the prefix to use for tagging variable names in the output. The default is "VAR".

=item \*

`$Data::Dumper::Useqq I<or> I<$OBJ>->Useqq(I<[NEWVAL]>)`

When set, enables the use of double quotes for representing string values. Whitespace other than space will be represented as `C<[\n\t\r]>`, "unsafe" characters will be backslashed, and unprintable characters will be output as quoted octal integers. The default is 0.

=item \*

`$Data::Dumper::Terse I<or> I<$OBJ>->Terse(I<[NEWVAL]>)`

When set, `Data::Dumper` will emit single, non-self-referential values as atoms/terms rather than statements. This means that the `C<$VAR>I<n>` names will be avoided where possible, but be advised that such output may not always be parseable by `C<eval>`.

=item \*

`$Data::Dumper::Freezer I<or> $I<OBJ>->Freezer(I<[NEWVAL]>)`

Can be set to a method name, or to an empty string to disable the feature. `Data::Dumper` will invoke that method via the object before attempting to stringify it. This method can alter the contents of the object (if, for instance, it contains data allocated from C), and even rebless it in a different package. The client is responsible for making sure the specified method can be called via the object, and that the object ends up containing only perl data types after the method has been called. Defaults to an empty string.

If an object does not support the method specified (determined using



UNIVERSAL::can()) then the call will be skipped. If the method dies a warning will be generated.

=item \*

`$Data::Dumper::Toaster I<or> $I<OBJ>->Toaster(I<[NEWVAL]>)`

Can be set to a method name, or to an empty string to disable the feature. `Data::Dumper` will emit a method call for any objects that are to be dumped using the syntax `C<bless(DATA, CLASS)-E<gt>METHOD(>>`. Note that this means that the method specified will have to perform any modifications required on the object (like creating new state within it, and/or reblessing it in a different package) and then return it. The client is responsible for making sure the method can be called via the object, and that it returns a valid object. Defaults to an empty string.

=item \*

`$Data::Dumper::Deepcopy I<or> $I<OBJ>->Deepcopy(I<[NEWVAL]>)`

Can be set to a boolean value to enable deep copies of structures. Cross-referencing will then only be done when absolutely essential (i.e., to break reference cycles). Default is 0.

=item \*

`$Data::Dumper::Quotekeys I<or> $I<OBJ>->Quotekeys(I<[NEWVAL]>)`

Can be set to a boolean value to control whether hash keys are quoted. A defined false value will avoid quoting hash keys when it looks like a simple string. Default is 1, which will always enclose hash keys in quotes.

=item \*

`$Data::Dumper::Bless I<or> $I<OBJ>->Bless(I<[NEWVAL]>)`

Can be set to a string that specifies an alternative to the `C<bless>` builtin operator used to create objects. A function with the specified name should exist, and should accept the same arguments as the builtin. Default is `C<bless>`.

=item \*

`$Data::Dumper::Pair I<or> $I<OBJ>->Pair(I<[NEWVAL]>)`

Can be set to a string that specifies the separator between hash keys and values. To dump nested hash, array and scalar values to JavaScript, use: `C<$Data::Dumper::Pair = ' : '>`. Implementing `C<bless>` in JavaScript

is left as an exercise for the reader.

A function with the specified name exists, and accepts the same arguments as the builtin.

Default is: C<=E<gt> >.

=item \*

\$Data::Dumper::Maxdepth I<or> \$I<OBJ>->Maxdepth(I<[NEWVAL]>)

Can be set to a positive integer that specifies the depth beyond which we don't venture into a structure. Has no effect when C<Data::Dumper::Purity> is set. (Useful in debugger when we often don't want to see more than enough). Default is 0, which means there is no maximum depth.

=item \*

\$Data::Dumper::Maxrecurse I<or> \$I<OBJ>->Maxrecurse(I<[NEWVAL]>)

Can be set to a positive integer that specifies the depth beyond which recursion into a structure will throw an exception. This is intended as a security measure to prevent perl running out of stack space when dumping an excessively deep structure. Can be set to 0 to remove the limit. Default is 1000.

=item \*

\$Data::Dumper::Useperl I<or> \$I<OBJ>->Useperl(I<[NEWVAL]>)

Can be set to a boolean value which controls whether the pure Perl implementation of C<Data::Dumper> is used. The C<Data::Dumper> module is a dual implementation, with almost all functionality written in both pure Perl and also in XS ('C'). Since the XS version is much faster, it will always be used if possible. This option lets you override the default behavior, usually for testing purposes only. Default is 0, which means the XS implementation will be used if possible.

=item \*

\$Data::Dumper::Sortkeys I<or> \$I<OBJ>->Sortkeys(I<[NEWVAL]>)

Can be set to a boolean value to control whether hash keys are dumped in sorted order. A true value will cause the keys of all hashes to be dumped in Perl's default sort order. Can also be set to a subroutine reference which will be called for each hash that is dumped. In this case C<Data::Dumper> will call the subroutine once for each hash, passing it the reference of the hash. The purpose of the subroutine is

to return a reference to an array of the keys that will be dumped, in the order that they should be dumped. Using this feature, you can control both the order of the keys, and which keys are actually used. In other words, this subroutine acts as a filter by which you can exclude certain keys from being dumped. Default is 0, which means that hash keys are not sorted.

=item \*

`$Data::Dumper::Deparse I<or> $I<OBJ>->Deparse(I<[NEWVAL]>)`

Can be set to a boolean value to control whether code references are turned into perl source code. If set to a true value, `C<B::Deparse>` will be used to get the source of the code reference. Using this option will force using the Perl implementation of the dumper, since the fast XSUB implementation doesn't support it.

Caution : use this option only if you know that your coderefs will be properly reconstructed by `C<B::Deparse>`.

=item \*

`$Data::Dumper::Sparseseen I<or> $I<OBJ>->Sparseseen(I<[NEWVAL]>)`

By default, `Data::Dumper` builds up the "seen" hash of scalars that it has encountered during serialization. This is very expensive. This seen hash is necessary to support and even just detect circular references. It is exposed to the user via the `C<Seen()>` call both for writing and reading.

If you, as a user, do not need explicit access to the "seen" hash, then you can set the `C<Sparseseen>` option to allow `Data::Dumper` to eschew building the "seen" hash for scalars that are known not to possess more than one reference. This speeds up serialization considerably if you use the XS implementation.

Note: If you turn on `C<Sparseseen>`, then you must not rely on the content of the seen hash since its contents will be an implementation detail!

=back

=head2 Exports

=over 4

=item Dumper

=back

=head1 EXAMPLES

Run these code snippets to get a quick feel for the behavior of this module. When you are through with these examples, you may want to add or change the various configuration variables described above, to see their behavior. (See the testsuite in the Data::Dumper distribution for more examples.)

```
use Data::Dumper;

package Foo;
sub new { bless {'a' => 1, 'b' => sub { return "foo" }}, $_[0]};

package Fuz;          # a weird REF-REF-SCALAR object
sub new { bless {\$_ = \ 'fu'z'}, $_[0]};

package main;
$foo = Foo->new;
$fuz = Fuz->new;
$boo = [ 1, [], "abcd", \*foo,
        {1 => 'a', 023 => 'b', 0x45 => 'c'},
        \\ "p\q\r", $foo, $fuz];

#####
# simple usage
#####

$bar = eval(Dumper($boo));
print($@) if $@;
print Dumper($boo), Dumper($bar); # pretty print (no array indices)

$Data::Dumper::Terse = 1;    # don't output names where feasible
$Data::Dumper::Indent = 0;  # turn off all pretty print
print Dumper($boo), "\n";

$Data::Dumper::Indent = 1;   # mild pretty print
print Dumper($boo);

$Data::Dumper::Indent = 3;   # pretty print with array indices
print Dumper($boo);

$Data::Dumper::Useqq = 1;    # print strings in double quotes
print Dumper($boo);

$Data::Dumper::Pair = " : "; # specify hash key/value separator
```

```
print Dumper($boo);
```

```
#####
```

```
# recursive structures
```

```
#####
```

```
@c = ('c');
```

```
$c = \@c;
```

```
$b = {};
```

```
$a = [1, $b, $c];
```

```
$b->{a} = $a;
```

```
$b->{b} = $a->[1];
```

```
$b->{c} = $a->[2];
```

```
print Data::Dumper->Dump([$a,$b,$c], [qw(a b c)]);
```

```
$Data::Dumper::Purity = 1;    # fill in the holes for eval
```

```
print Data::Dumper->Dump([$a, $b], [qw(*a b)]); # print as @a
```

```
print Data::Dumper->Dump([$b, $a], [qw(*b a)]); # print as %b
```

```
$Data::Dumper::Deepcopy = 1;  # avoid cross-refs
```

```
print Data::Dumper->Dump([$b, $a], [qw(*b a)]);
```

```
$Data::Dumper::Purity = 0;    # avoid cross-refs
```

```
print Data::Dumper->Dump([$b, $a], [qw(*b a)]);
```

```
#####
```

```
# deep structures
```

```
#####
```

```
$a = "pearl";
```

```
$b = [ $a ];
```

```
$c = { 'b' => $b };
```

```
$d = [ $c ];
```

```
$e = { 'd' => $d };
```

```
$f = { 'e' => $e };
```

```
print Data::Dumper->Dump([$f], [qw(f)]);
```

```
$Data::Dumper::Maxdepth = 3;  # no deeper than 3 refs down
```

```
print Data::Dumper->Dump([$f], [qw(f)]);
```

```
#####
```

```
# object-oriented usage
```

```
#####
```

```

$d = Data::Dumper->new([$a,$b], [qw(a b)]);
$d->Seen({'*c' => $c});      # stash a ref without printing it
$d->Indent(3);
print $d->Dump;
$d->Reset->Purity(0);      # empty the seen cache
print join "----\n", $d->Dump;

```

```

#####
# persistence
#####

```

```

package Foo;
sub new { bless { state => 'awake' }, shift }
sub Freeze {
    my $s = shift;
    print STDERR "preparing to sleep\n";
    $s->{state} = 'asleep';
    return bless $s, 'Foo::ZZZ';
}

```

```

package Foo::ZZZ;
sub Thaw {
    my $s = shift;
    print STDERR "waking up\n";
    $s->{state} = 'awake';
    return bless $s, 'Foo';
}

```

```

package main;
use Data::Dumper;
$a = Foo->new;
$b = Data::Dumper->new([$a], ['c']);
$b->Freezer('Freeze');
$b->Toaster('Thaw');
$c = $b->Dump;
print $c;
$d = eval $c;
print Data::Dumper->Dump([$d], ['d']);

```

```

#####
# symbol substitution (useful for recreating CODE refs)
#####

```

```

sub foo { print "foo speaking\n" }
*other = \&foo;

```

```

$bar = [ \&other ];
$d = Data::Dumper->new([\&other,$bar],[*other,'bar']);
$d->Seen( { '*foo' => \&foo } );
print $d->Dump;

```

```
#####
```

```
# sorting and filtering hash keys
```

```
#####
```

```

$Data::Dumper::Sortkeys = \&my_filter;
my $foo = { map { (ord, "$_$_") } T..'Q' };
my $bar = { %$foo };
my $baz = { reverse %$foo };
print Dumper [ $foo, $bar, $baz ];

```

```

sub my_filter {
    my ($hash) = @_;
    # return an array ref containing the hash keys to dump
    # in the order that you want them to be dumped
    return [
        # Sort the keys of %$foo in reverse numeric order
        $hash eq $foo ? (sort { $b <=> $a } keys %$hash) :
        # Only dump the odd number keys of %$bar
        $hash eq $bar ? (grep { $_ % 2 } keys %$hash) :
        # Sort keys in default order for all other hashes
        (sort keys %$hash)
    ];
}

```

=head1 BUGS

Due to limitations of Perl subroutine call semantics, you cannot pass an array or hash. Prepend it with a C<\> to pass its reference instead. This will be remedied in time, now that Perl has subroutine prototypes. For now, you need to use the extended usage form, and prepend the name with a C<\*> to output it as a hash or array.

C<Data::Dumper> cheats with CODE references. If a code reference is encountered in the structure being processed (and if you haven't set the C<Deparse> flag), an anonymous subroutine that contains the string "DUMMY" will be inserted in its place, and a warning will be printed if C<Purity> is set. You can C<eval> the result, but bear in mind that the anonymous sub that gets created is just a placeholder. Someday, perl will have a switch to cache-on-demand the string representation of a compiled piece of code, I hope. If you have prior knowledge of all the code refs that your data structures are likely to have, you can use the C<Seen> method to pre-seed the internal reference

table and make the dumped output point to them, instead. See L</EXAMPLES> above.

The C<Deparse> flag makes Dump() run slower, since the XSUB implementation does not support it.

SCALAR objects have the weirdest looking C<bless> workaround.

Pure Perl version of C<Data::Dumper> escapes UTF-8 strings correctly only in Perl 5.8.0 and later.

=head2 NOTE

Starting from Perl 5.8.1 different runs of Perl will have different ordering of hash keys. The change was done for greater security, see L<perlsec/"Algorithmic Complexity Attacks">. This means that different runs of Perl will have different Data::Dumper outputs if the data contains hashes. If you need to have identical Data::Dumper outputs from different runs of Perl, use the environment variable PERL\_HASH\_SEED, see L<perlrun/PERL\_HASH\_SEED>. Using this restores the old (platform-specific) ordering: an even prettier solution might be to use the C<Sortkeys> filter of Data::Dumper.

=head1 AUTHOR

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=head1 VERSION

Version 2.161 (July 11 2016)

=head1 SEE ALSO

perl(1)

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548090\_1591903283.05/0/perl-Data-Dumper-2.167-399.el8.src.rpm-cosi-expand-archive-lxnDj2VA/Data-Dumper-2.161.tar.gz-cosi-expand-archive-6LzdXmyr/Data-Dumper-2.161/Dumper.pm

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# 1.298 libx11 1.6.8-5.el8

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## 1.302 python-requests 2.22.0

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## 9.module\_el8.3.0+2165+af250afe.alma

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## 1.309 wheel 0.37.1



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## 1.310 reflections 0.9.11

## 1.311 netty-codec 4.1.35.Final

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Found in path(s):

\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/xml/XmlFrameDecoder.java

\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/compression/Crc32c.java

\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/compression/JdkZlibDecoder.java

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\* Enumeration of supported Base64 dialects.

\* <p>

\* The internal lookup tables in this class has been derived from

\* <a href="http://iharder.sourceforge.net/current/java/base64/">Robert Harder's Public Domain

\* Base64 Encoder/Decoder</a>.

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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/xml/package-info.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/MessageToByteEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/bytes/ByteArrayEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/compression/ZlibCodecFactory.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/marshalling/ContextBoundUnmarshallerProvider.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/package-info.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/serialization/CachingClassResolver.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/compression/package-info.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/ReplayingDecoderByteBuf.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/marshalling/ThreadLocalUnmarshallerProvider.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/DecoderException.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/serialization/SoftReferenceMap.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/base64/Base64Decoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/serialization/ClassLoaderClassResolver.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/compression/DecompressionException.java  
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jar/io/netty/handler/codec/CorruptedFrameException.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Snappy.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/serialization/ClassResolvers.java  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/LengthFieldPrepender.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/marshalling/ChannelBufferByteOutput.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/JdkZlibEncoder.java  
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jar/io/netty/handler/codec/TooLongFrameException.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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jar/io/netty/handler/codec/serialization/ObjectDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/ByteToMessageDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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jar/io/netty/handler/codec/marshalling/package-info.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/MessageToMessageCodec.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/DelimiterBasedFrameDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/DecoderResult.java  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/marshalling/LimitingByteInput.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/string/StringDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/marshalling/ChannelBufferByteInput.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/marshalling/DefaultMarshallerProvider.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/JZlibEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/serialization/package-info.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/LineBasedFrameDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/ZlibWrapper.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/PrematureChannelClosureException.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/string/StringEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-

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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/serialization/WeakReferenceMap.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/ZlibUtil.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
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jar/io/netty/handler/codec/compression/ZlibEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/UnsupportedMessageTypeException.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/ReplayingDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/ByteToMessageCodec.java

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jar/io/netty/handler/codec/EmptyHeaders.java

\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/Headers.java

\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/DefaultHeaders.java

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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/DefaultHeadersImpl.java

\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/CharSequenceValueConverter.java

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\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/DateFormatter.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/CodecOutputList.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/compression/ByteBufChecksum.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/compression/CompressionUtil.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/string/LineSeparator.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/DatagramPacketEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-jar/io/netty/handler/codec/string/LineEncoder.java

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*/
/**
* A decoder that splits the received {@link ByteBuffer}s dynamically by the
* value of the length field in the message. It is particularly useful when you
* decode a binary message which has an integer header field that represents the
* length of the message body or the whole message.
* <p>
* {@link LengthFieldBasedFrameDecoder} has many configuration parameters so
* that it can decode any message with a length field, which is often seen in
* proprietary client-server protocols. Here are some example that will give
* you the basic idea on which option does what.
*
* <h3>2 bytes length field at offset 0, do not strip header</h3>
*
* The value of the length field in this example is <tt>12 (0x0C)</tt> which
* represents the length of "HELLO, WORLD". By default, the decoder assumes
* that the length field represents the number of the bytes that follows the
* length field. Therefore, it can be decoded with the simplistic parameter
* combination.
* <pre>
* <b>lengthFieldOffset</b> = <b>0</b>
* <b>lengthFieldLength</b> = <b>2</b>
* lengthAdjustment = 0
* initialBytesToStrip = 0 (= do not strip header)
*
* BEFORE DECODE (14 bytes)      AFTER DECODE (14 bytes)
* +-----+-----+ +-----+-----+
* | Length | Actual Content |---->| Length | Actual Content |
* | 0x000C | "HELLO, WORLD" |   | 0x000C | "HELLO, WORLD" |
* +-----+-----+ +-----+-----+
* </pre>
*
* <h3>2 bytes length field at offset 0, strip header</h3>
*
* Because we can get the length of the content by calling
* {@link ByteBuffer#readableBytes()}, you might want to strip the length
* field by specifying <tt>initialBytesToStrip</tt>. In this example, we
* specified <tt>2</tt>, that is same with the length of the length field, to
* strip the first two bytes.
* <pre>
* lengthFieldOffset = 0
* lengthFieldLength = 2
* lengthAdjustment = 0
* <b>initialBytesToStrip</b> = <b>2</b> (= the length of the Length field)
*
* BEFORE DECODE (14 bytes)      AFTER DECODE (12 bytes)

```

```

* +-----+-----+ +-----+
* | Length | Actual Content |---->| Actual Content |
* | 0x000C | "HELLO, WORLD" | | "HELLO, WORLD" |
* +-----+-----+ +-----+
* </pre>
*
* <h3>2 bytes length field at offset 0, do not strip header, the length field
*   represents the length of the whole message</h3>
*
* In most cases, the length field represents the length of the message body
* only, as shown in the previous examples. However, in some protocols, the
* length field represents the length of the whole message, including the
* message header. In such a case, we specify a non-zero
* <tt>lengthAdjustment</tt>. Because the length value in this example message
* is always greater than the body length by <tt>2</tt>, we specify <tt>-2</tt>
* as <tt>lengthAdjustment</tt> for compensation.
* <pre>
* lengthFieldOffset = 0
* lengthFieldLength = 2
* <b>lengthAdjustment</b> = <b>-2</b> (= the length of the Length field)
* initialBytesToStrip = 0
*
* BEFORE DECODE (14 bytes)      AFTER DECODE (14 bytes)
* +-----+-----+ +-----+
* | Length | Actual Content |---->| Length | Actual Content |
* | 0x000E | "HELLO, WORLD" | | 0x000E | "HELLO, WORLD" |
* +-----+-----+ +-----+
* </pre>
*
* <h3>3 bytes length field at the end of 5 bytes header, do not strip header</h3>
*
* The following message is a simple variation of the first example. An extra
* header value is prepended to the message. <tt>lengthAdjustment</tt> is zero
* again because the decoder always takes the length of the prepended data into
* account during frame length calculation.
* <pre>
* <b>lengthFieldOffset</b> = <b>2</b> (= the length of Header 1)
* <b>lengthFieldLength</b> = <b>3</b>
* lengthAdjustment = 0
* initialBytesToStrip = 0
*
* BEFORE DECODE (17 bytes)      AFTER DECODE (17 bytes)
* +-----+-----+-----+ +-----+-----+-----+
* | Header 1 | Length | Actual Content |---->| Header 1 | Length | Actual Content |
* | 0xCAFE | 0x00000C | "HELLO, WORLD" | | 0xCAFE | 0x00000C | "HELLO, WORLD" |
* +-----+-----+-----+ +-----+-----+-----+
* </pre>
*

```

\* 

### 3 bytes length field at the beginning of 5 bytes header, do not strip header

\*

\* This is an advanced example that shows the case where there is an extra header between the length field and the message body. You have to specify a positive `lengthAdjustment` so that the decoder counts the extra header into the frame length calculation.

\*

\* `lengthFieldOffset = 0`

\* `lengthFieldLength = 3`

\* `lengthAdjustment = 2` (= the length of Header 1)

\* `initialBytesToStrip = 0`

\*

\* BEFORE DECODE (17 bytes)                      AFTER DECODE (17 bytes)

\* +-----+-----+-----+-----+    +-----+-----+-----+-----+

\* | Length | Header 1 | Actual Content |---->| Length | Header 1 | Actual Content |

\* | 0x00000C | 0xCAFE | "HELLO, WORLD" |    | 0x00000C | 0xCAFE | "HELLO, WORLD" |

\* +-----+-----+-----+-----+    +-----+-----+-----+-----+

\*

\*

\* 

### 2 bytes length field at offset 1 in the middle of 4 bytes header, strip the first header field and the length field

\*

\* This is a combination of all the examples above. There are the prepended header before the length field and the extra header after the length field. The prepended header affects the `lengthFieldOffset` and the extra header affects the `lengthAdjustment`. We also specified a non-zero `initialBytesToStrip` to strip the length field and the prepended header from the frame. If you don't want to strip the prepended header, you could specify `0` for `initialBytesToSkip`.

\*

\* `lengthFieldOffset = 1` (= the length of HDR1)

\* `lengthFieldLength = 2`

\* `lengthAdjustment = 1` (= the length of HDR2)

\* `initialBytesToStrip = 3` (= the length of HDR1 + LEN)

\*

\* BEFORE DECODE (16 bytes)                      AFTER DECODE (13 bytes)

\* +-----+-----+-----+-----+    +-----+-----+-----+-----+

\* | HDR1 | Length | HDR2 | Actual Content |---->| HDR2 | Actual Content |

\* | 0xCA | 0x000C | 0xFE | "HELLO, WORLD" |    | 0xFE | "HELLO, WORLD" |

\* +-----+-----+-----+-----+    +-----+-----+-----+-----+

\*

\*

\* 

### 2 bytes length field at offset 1 in the middle of 4 bytes header, strip the first header field and the length field, the length field represents the length of the whole message

\*

\* Let's give another twist to the previous example. The only difference from the previous example is that the length field represents the length of the

```

* whole message instead of the message body, just like the third example.
* We have to count the length of HDR1 and Length into <tt>lengthAdjustment</tt>.
* Please note that we don't need to take the length of HDR2 into account
* because the length field already includes the whole header length.
* <pre>
* lengthFieldOffset = 1
* lengthFieldLength = 2
* <b>lengthAdjustment</b> = <b>-3</b> (= the length of HDR1 + LEN, negative)
* <b>initialBytesToStrip</b> = <b> 3</b>
*
* BEFORE DECODE (16 bytes)          AFTER DECODE (13 bytes)
* +-----+-----+-----+-----+-----+ +-----+-----+
* | HDR1 | Length | HDR2 | Actual Content |---->| HDR2 | Actual Content |
* | 0xCA | 0x0010 | 0xFE | "HELLO, WORLD" |   | 0xFE | "HELLO, WORLD" |
* +-----+-----+-----+-----+-----+ +-----+-----+
* </pre>
* @see LengthFieldPrepender
*/

```

Found in path(s):

```

* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/LengthFieldBasedFrameDecoder.java
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* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/protobuf/ProtobufDecoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/HeadersUtils.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/protobuf/ProtobufVarint32FrameDecoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-

```

jar/io/netty/handler/codec/protobuf/ProtobufVarint32LengthFieldPrepender.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/protobuf/ProtobufEncoderNano.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/ProtocolDetectionResult.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/protobuf/ProtobufEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/protobuf/ProtobufDecoderNano.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/ProtocolDetectionState.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/UnsupportedValueConverter.java  
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*/  
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*/  
/**  
* Utility class for {@link ByteBuf} that encodes and decodes to and from  
* Base64 notation.  
* 

The encoding and decoding algorithm in this class has been derived from  
* Robert Harder's Public Domain  
* Base64 Encoder/Decoder.

  
*/
```

Found in path(s):

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jar/io/netty/handler/codec/base64/Base64.java  
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```
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/MessageAggregationException.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Lz4Constants.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/FastLzFrameEncoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/FastLz.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Bzip2MTFAndRLE2StageEncoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Bzip2Constants.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/LzfEncoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Bzip2HuffmanStageEncoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/DecoderResultProvider.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Bzip2Encoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Lz4FrameDecoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Bzip2HuffmanAllocator.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/LzmaFrameEncoder.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Bzip2BitWriter.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
jar/io/netty/handler/codec/compression/Bzip2BitReader.java
* /opt/cola/permits/1258507647_1643078432.83/0/netty-codec-4-1-35-final-sources-
```

jar/io/netty/handler/codec/compression/Bzip2DivSufSort.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Bzip2HuffmanStageDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Lz4FrameEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Bzip2Decoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/json/JsonObjectDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Bzip2BlockDecompressor.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Bzip2BlockCompressor.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/FastLzFrameDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Crc32.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/AsciiHeadersEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Bzip2Rand.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/SnappyFramedEncoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/Bzip2MoveToFrontTable.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/LzfDecoder.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/json/package-info.java  
\* /opt/cola/permits/1258507647\_1643078432.83/0/netty-codec-4-1-35-final-sources-  
jar/io/netty/handler/codec/compression/SnappyFramedDecoder.java

## 1.312 junit 4.11

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%% winjs version 4.4.0 (<https://github.com/winjs/winjs>)

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15. definitelytyped (<https://github.com/DefinitelyTyped/DefinitelyTyped>)
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17. dotnet/csharp-tmLanguage version 0.1.0 (<https://github.com/dotnet/csharp-tmLanguage>)
18. freebroccolo/atom-language-swift (<https://github.com/freebroccolo/atom-language-swift>)
19. HTML 5.1 W3C Working Draft version 08 October 2015 (<http://www.w3.org/TR/2015/WD-html51-20151008/>)
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# 1.316 perl-time-local 1.280 1.e18

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```
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```

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```
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```

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## 1.317 gnutls 3.6.16-4.el8

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## Constant-time SSSE3 AES core implementation.

## version 0.1

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## By Mike Hamburg (Stanford University), 2009

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## 1.318 xz 5.2.4-4.el8\_6

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<one line to give the program's name and a brief idea of what it does.>  
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```
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Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

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```
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```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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```
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```

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Also add information on how to contact you by electronic and paper mail.

If the program does terminal interaction, make it output a short notice like this when it starts in an interactive mode:

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This is free software, and you are welcome to redistribute it  
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```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, your program's commands might be different; for a GUI interface, you would use an "about box".

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# 1.319 python 3.6.8-45.el8.alma

## 1.319.1 Available under license :

### A. HISTORY OF THE SOFTWARE

=====

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

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## 1.321 python-certifi 2018.01.18

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```
ca-bundle.crt -- Bundle of CA Root Certificates
```

```
Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#
```

```
This is a bundle of X.509 certificates of public Certificate Authorities
(CA). These were automatically extracted from Mozilla's root certificates
file (certdata.txt). This file can be found in the mozilla source tree:
```

```
http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#
```

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication. Just configure this file as the SSLCACertificateFile.#

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@(#) \$RCSfile: certdata.txt,v \$ \$Revision: 1.80 \$ \$Date: 2011/11/03 15:11:58 \$

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```
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```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

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```

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```
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This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

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```
Yoyodyne, Inc., hereby disclaims all copyright interest in the
program `Gnomovision' (a program to direct compilers to make passes
at assemblers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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QAAAZ,KAAAA,OAAAK,QACAE,QAAAC,iBAAAJ,QACA;2PACAC,OAAAP,QAAAgB,MAAAV,OAAAC,O  
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AqB,SAGAvB,uBAAAS,YACAE;sBAYAC,iBAAA,SAAA9B,UAAAf,KAAA8C,IACA,GAAAC,MAAA5C,EAA  
AY,WAAAE,KAAA,yBAAA6B,GAAA,MACAE,MAAAD,KAAAZB,QAAA,KAEA,SAAA0B,MAAA7B,SACA6  
B,MAAAC,OAAA,eAAA,OACA,IAcAC,eAAA,SAAAnC,UAAAf,KAAA8C,GAAAJD,OACA,GAAAgC,YAAA1



```

{hash:{},data:data}); }n else { helper = (depth0 && depth0.user); stack1 = typeof helper === functionType ?
helper.call(depth0, {hash:{},data:data}) : helper; }n buffer += escapeExpression(stack1)n + "[GRANT]\""
value="1" >|n <span class="icon-checkbox"></span>n </label>n </td>n <td>n
<label class="tooltip">n <input type="checkbox" class="privilege-WRITE"
name="users[";n if (helper = helpers.user) { stack1 = helper.call(depth0, {hash:{},data:data}); }n else { helper
= (depth0 && depth0.user); stack1 = typeof helper === functionType ? helper.call(depth0, {hash:{},data:data}) :
helper; }n buffer += escapeExpression(stack1)n + "[WRITE]\"" value="1" checked>n <span
class="icon-checkbox"></span>n </label>n </td>n <td>n <label class="tooltip">n
<input type="checkbox" class="privilege-READ" name="users[";n if (helper = helpers.user) { stack1 =
helper.call(depth0, {hash:{},data:data}); }n else { helper = (depth0 && depth0.user); stack1 = typeof helper ===
functionType ? helper.call(depth0, {hash:{},data:data}) : helper; }n buffer += escapeExpression(stack1)n +
"[READ]\"" value="1" checked>n <span class="icon-checkbox"></span>n </label>n
</td>n <td>n <button type="button" class="small delete_permission tooltip btn-warning" data-acl-
user="";n if (helper = helpers.user) { stack1 = helper.call(depth0, {hash:{},data:data}); }n else { helper =
(depth0 && depth0.user); stack1 = typeof helper === functionType ? helper.call(depth0, {hash:{},data:data}) :
helper; }n buffer += escapeExpression(stack1)n + "\" data-acl-type="";n if (helper = helpers.type) { stack1
= helper.call(depth0, {hash:{},data:data}); }n else { helper = (depth0 && depth0.type); stack1 = typeof helper ===
functionType ? helper.call(depth0, {hash:{},data:data}) : helper; }n buffer += escapeExpression(stack1)n + "\"
data-acl-label="";n if (helper = helpers.label) { stack1 = helper.call(depth0, {hash:{},data:data}); }n else {
helper = (depth0 && depth0.label); stack1 = typeof helper === functionType ? helper.call(depth0,
{hash:{},data:data}) : helper; }n buffer += escapeExpression(stack1)n + "\" >n <span class="icon-
bin"></span>"n + escapeExpression((helper = helpers.__ || (depth0 &&
depth0.__),options={hash:{},data:data},helper ? helper.call(depth0, "Remove", options) :
helperMissing.call(depth0, "___", "Remove", options)))n + "\"n </button>n </td>n</tr>n";n return
buffer;n });n});n\n\n/*\n * This program is free software; you can redistribute it and/or\n * modify it under the
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*\n\ndefine('taoDacSimple/controller/admin/index',[n 'jquery',n 'lodash',n 'i18n',n
'tpl!taoDacSimple/controller/admin/line',n 'helpers',n 'ui/feedback',n 'ui/autocomplete',n
'util/httpErrorParser',n 'ui/tooltip',n 'jqueryui'], function ($, __, ___, lineTpl, helpers, feedback, autocomplete,
httpErrorParser) {n 'use strict';n\n /*\n * The amount of displayed lines that fires the tabs mode\n *
@type {Number}\n *\n var linesThreshold = 10;n\n /*\n * The warning message shown when all
managers have been removed\n * @type {String}\n *\n var errorMsgManagePermission = __('You must
have one role or user that have the manage permission on this element.');

```

```

$submitter = $(':submit', $form);\n    $submitter.qtip(tooltipConfigManagePermission);\n    if
(!_checkManagers($form)) {\n        $submitter.addClass('disabled');\n        $submitter.qtip('enable');\n
feedback().warning(errorMsgManagePermission);\n    } else {\n        $submitter.removeClass('disabled');\n
    $submitter.qtip('disable');\n    }\n    };\n\n /**\n * Allow to enable / disable the access checkbox based on
the state of the grant privilege\n * @param {jQuery|Element|String} container\n * @private\n */\n var
_disableAccessOnGrant = function (container) {\n    var $container = $(container);\n    var
$managersChecked = $container.find('.privilege-GRANT:checked').closest('tr');\n    var $scanChangeWrite =
$managersChecked.find('.privilege-WRITE');\n    var $scanChangeRead = $managersChecked.find('.privilege-
READ');\n    var $managers = $container.find('.privilege-GRANT').not(':checked').closest('tr');\n    var
$scanChangeWrite = $managers.find('.privilege-WRITE');\n    var $scanChangeRead = $managers.find('.privilege-
READ');\n    $scanChangeWrite.removeClass('disabled');\n    $scanChangeRead.removeClass('disabled');\n\n
    $scanChangeWrite.addClass('disabled').attr('checked', true);\n
    $scanChangeRead.addClass('disabled').attr('checked', true);\n\n    _preventManagerRemoval($container);\n
_disableAccessOnWrite($container);\n    };\n\n /**\n * Allow to enable / disable the access checkbox based on
the state of the write privilege\n * @param {jQuery|Element|String} container\n * @private\n */\n var
_disableAccessOnWrite = function (container) {\n    var $container = $(container);\n    var $writersChecked
= $container.find('.privilege-WRITE:checked').closest('tr');\n    var $scanChangeRead =
$writersChecked.find('.privilege-READ');\n    var $writers = $container.find('.privilege-
WRITE').not(':checked').closest('tr');\n    var $scanChangeRead = $writers.find('.privilege-READ');\n\n
    $scanChangeRead.removeClass('disabled');\n    $scanChangeRead.addClass('disabled').attr('checked', true);\n
};\n\n /**\n * Delete a permission row for a user/role\n * @param {DOM Element} element DOM element
that triggered the function\n * @private\n */\n var _deletePermission = function (element) {\n    // 1. Get
the user / role\n    var $this = $(element);\n    var $container = $this.closest('table');\n    var type =
$this.data('acl-type');\n    var user = $this.data('acl-user');\n    var label = $this.data('acl-label');\n\n    // 2.
Remove it from the list\n    if (!_isEmpty(type) && !_isEmpty(user) && !_isEmpty(label)) {\n
$this.closest('tr').remove();\n    }\n\n    _preventManagerRemoval($container);\n    _manageTabsDisplay();\n
};\n\n /**\n * Checks if a permission has already been added to the list.\n * Highlight the list if the
permission is already in the list.\n * @param {jQuery|Element|String} container\n * @param {String} type
role/user regarding what it will be added.\n * @param {String} id The identifier of the resource.\n * @returns
{boolean} Returns true if the permission is already in the list\n * @private\n */\n var _checkPermission =
function (container, type, id) {\n    var $btn = $(container).find('button[data-acl-user="' + id + '"]');\n    $line
= $btn.closest('tr');\n    if ($line.length) {\n        $line.effect('highlight', {}, 1500);\n        return true;\n
    }\n\n    return false;\n    };\n\n /**\n * Add a new lines into the permissions table regarding what is selected
into the add-* select\n * @param {jQuery|Element|String} container\n * @param {String} type role/user
regarding what it will be added.\n * @param {String} id The identifier of the resource.\n * @param {String}
label The label of the resource.\n * @private\n */\n var _addPermission = function (container, type, id, label)
{\n    var $container = $(container),\n        $body = $container.find('tbody').first();\n\n    // only add the
permission if it's not already present in the list\n    if (!_checkPermission($container, type, id)) {\n
$body.append(lineTpl({\n        type: type,\n        user: id,\n        label: label\n    }));\n\n
_disableAccessOnGrant($container);\n    _manageTabsDisplay();\n    }\n    };\n\n /**\n * Ensures that if
you give the manage (GRANT) permission, access (WRITE and READ) permissions are given too\n * Listens all
clicks on delete buttons to call the _deletePermission function\n * @param {jQuery|Element|String} container
The container on which apply the listeners\n * @private\n */\n var _installListeners = function(container) {\n
    var $container = $(container);\n    $container.on('click', '.privilege-GRANT:not(.disabled)', function () {\n
_disableAccessOnGrant($container);\n    }).on('click', '.privilege-WRITE:not(.disabled)', function () {\n
_disableAccessOnWrite($container);\n    }).on('click', '.delete_permission:not(.disabled)', function (event) {\n
event.preventDefault();\n        _deletePermission(this);\n    });\n    };\n\n /**\n * Manages the display of
tabs.\n * If the total amount of lines per tables is too big, display the tabs. Otherwise, hide them.\n * @private\n

```

```

*/\n var _manageTabsDisplay = function() {\n var $tabs = $('permission-tabs');\n var needsTabs =
$tabs.find('privilege-GRANT').length > linesThreshold;\n var $focused, index;\n if (needsTabs) {\n
$tabs.find('ul').show();\n if (!$tabs.hasClass('ui-tabs')) {\n // get the current focused panel\n
$focused = $tabs.find(':focus').closest('permission-tabs-panel');\n index = Math.max(0, $focused.index() -
1);\n\n // install the tabs, but keep the current panel focused\n $tabs.tabs({\n // use two
options to be compatible with both older and current version of jQueryUI\n selected: index,\n
active: index\n });\n }\n $('msg-edit-area label span').hide();\n } else {\n if
($tabs.hasClass('ui-tabs')) {\n $tabs.find('ui-tabs-hide').removeClass('ui-tabs-hide');\n
$tabs.tabs('destroy');\n }\n $tabs.find('ul').hide();\n $('msg-edit-area label span').show();\n
}\n };\n\n /**\n * Installs a search purpose autocompleter onto an element.\n * @param
{jQuery|Element|String} element The element on which install the autocompleter\n * @param {Object} options
A list of options to set\n * @returns {Autocompleter} Returns the instance of the autocompleter component\n
*/\n var _searchFactory = function (element, options) {\n if (!_isFunction(options)) {\n options = {\n
onSelectItem: options\n };}\n\n options = _assign({\n isProvider: true,\n
preventSubmit: true\n }, options || {});\n\n return autocomplete(element, options);\n };\n\n var mainCtrl
= {\n 'start': function () {\n\n var $container = $('permission-container');\n var $form = $('form',
$container);\n var $submitter = $('submit', $form);\n\n _disableAccessOnGrant('#permissions-table-
users');\n _disableAccessOnGrant('#permissions-table-roles');\n\n // install autocomplete for user add\n
_searchFactory('#add-user', function (event, value, label) {\n $('#add-user').focus();\n
_addPermission('#permissions-table-users', 'user', value, label);\n });\n\n // install autocomplete for
role add\n _searchFactory('#add-role', function (event, value, label) {\n $('#add-role').focus();\n
_addPermission('#permissions-table-roles', 'role', value, label);\n });\n\n // ensure that if you give
the manage (GRANT) permission, access (WRITE and READ) permissions are given too\n
_installListeners('#permissions-table-users');\n _installListeners('#permissions-table-roles');\n\n
_manageTabsDisplay();\n\n $form.on('submit', function (e) {\n e.preventDefault();\n
e.stopImmediatePropagation();\n });\n\n $submitter.on('click', function (e) {\n
e.preventDefault();\n\n if ($submitter.hasClass('disabled')) {\n return;\n }\n\n
if (!_checkManagers('form')) {\n feedback().error(errorMsgManagePermission);\n return;\n
}\n\n $submitter.addClass('disabled');\n\n $.ajax({\n url : $form.attr('action'),\n
type : 'POST',\n data : $form.serialize(),\n global : false\n
}).done(function () {\n feedback().success(__('Permissions saved');\n }).fail(function(jqXHR,
textStatus, errorThrown) {\n var error = httpErrorParser.parse(jqXHR, textStatus, errorThrown);\n
feedback().error(error.message);\n });\n\n .complete(function () {\n
$submitter.removeClass('disabled');\n });\n\n });\n\n return mainCtrl;\n});\n\n"}

```

Found in path(s):

```

* /opt/cola/permits/1401347042_1661579388.2621005/0/oat-sa-extension-tao-dac-simple-v2-7-0-0-gf810dfb-1-
zip/oat-sa-extension-tao-dac-simple-f810dfb/views/js/controllers.min.js.map

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zip/oat-sa-extension-cao-dac-simple-f810dfb/views/js/controller/admin/index.js  
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zip/oat-sa-extension-cao-dac-simple-f810dfb/views/js/controller/routes.js

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## 1.341 perl-storable 3.11 3.e18

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## 1.342 protobuf-java-util 3.4.0

## 1.343 newt 0.52.20-11.el8

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Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that companies distributing free software will individually obtain patent licenses, thus in effect transforming the program into proprietary software. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License, which was designed for utility programs. This license, the GNU Library General Public License, applies to certain designated libraries. This license is quite different from the ordinary one; be sure to read it in full, and don't assume that anything in it is the same as in the ordinary license.

The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is in some sense simply using the library, and is analogous to running a utility program or application program. However, in a textual and legal sense, the linked executable is a combined work, a derivative of the original library, and the ordinary General Public License treats it as such.

Because of this blurred distinction, using the ordinary General Public License for libraries did not effectively promote software sharing, because most developers did not use the libraries. We concluded that weaker conditions might promote sharing better.

However, unrestricted linking of non-free programs would deprive the

users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, while the latter only works together with the library.

Note that it is possible for a library to be covered by the ordinary General Public License rather than by this special one.

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A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from

such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

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2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

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- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in



themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the

Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under

Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

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```
<one line to give the library's name and a brief idea of what it does.>  
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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

# 1.344 ttmkfdir 3.0.9-54.el8

## 1.344.1 Available under license :

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When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge

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To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General



Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a work based on the library and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

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(which use some of those functions and data) to form executables.

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You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
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d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

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3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all

subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

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## 1.346 pynacl 1.5.0

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## 1.349 perl-io-socket-ip 0.39-5.el8

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```
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```
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```

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<signature of Ty Coon>, 1 April 1989
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Eclipse

The following artifacts are EPL.

\* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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\* org.eclipse.jetty.orbit:javax.security.auth.message

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\* org.eclipse.jetty.orbit:javax.mail.glassfish

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Oracle

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<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

\* javax.servlet:javax.servlet-api

\* javax.annotation:javax.annotation-api

\* javax.transaction:javax.transaction-api

\* javax.websocket:javax.websocket-api

-----

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following artifacts may be included in the distribution or downloaded when ALPN module is selected.

\* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.

<http://openjdk.java.net/legal/gplv2+ce.html>

-----

OW2

The following artifacts are licensed by the OW2 Foundation according to the terms of <http://asm.ow2.org/license.html>

org.ow2.asm:asm-commons  
org.ow2.asm:asm

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Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec  
org.apache.taglibs:taglibs-standard-impl

-----

MortBay

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org.mortbay.jasper:apache-jsp  
org.apache.tomcat:tomcat-jasper  
org.apache.tomcat:tomcat-juli  
org.apache.tomcat:tomcat-jsp-api  
org.apache.tomcat:tomcat-el-api  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-api  
org.apache.tomcat:tomcat-util-scan  
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-el-api

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Mortbay

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<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

The UnixCrypt.java code implements the one way cryptography used by Unix systems for simple password protection. Copyright 1996 Aki Yoshida, modified April 2001 by Iris Van den Broeke, Daniel Deville. Permission to use, copy, modify and distribute UnixCrypt for non-commercial or commercial purposes and without fee is granted provided that the copyright notice appears in all copies.

## 1.353 pigz 2.4 4.el8

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You should also get your employer (if you work as a programmer) or your  
school, if any, to sign a "copyright disclaimer" for the program, if  
necessary. Here a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the
program `Gnomovision' (a program to direct compilers to make passes
at assemblers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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## 1.356 jetty-http 9.4.26.v20200117

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\* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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\* org.eclipse.jetty.orbit:javax.security.auth.message

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\* org.eclipse.jetty.orbit:javax.mail.glassfish

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Oracle

The following artifacts are CDDL + GPLv2 with classpath exception.

<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

\* javax.servlet:javax.servlet-api

\* javax.annotation:javax.annotation-api

\* javax.transaction:javax.transaction-api

\* javax.websocket:javax.websocket-api

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#### Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following artifacts may be included in the distribution or downloaded when ALPN module is selected.

\* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.

<http://openjdk.java.net/legal/gplv2+ce.html>

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#### OW2

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org.ow2.asm:asm-commons

org.ow2.asm:asm

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#### Apache

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org.apache.taglibs:taglibs-standard-spec

org.apache.taglibs:taglibs-standard-impl

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#### MortBay

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org.mortbay.jasper:apache-jsp

org.apache.tomcat:tomcat-jasper

org.apache.tomcat:tomcat-juli

org.apache.tomcat:tomcat-jsp-api

org.apache.tomcat:tomcat-el-api

org.apache.tomcat:tomcat-jasper-el



org.apache.tomcat:tomcat-api  
org.apache.tomcat:tomcat-util-scan  
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-el-api

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Mortbay

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<https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html>

org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

The UnixCrypt.java code implements the one way cryptography used by Unix systems for simple password protection. Copyright 1996 Aki Yoshida, modified April 2001 by Iris Van den Broeke, Daniel Deville.

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## 1.368 dracut 049-202.git20220511.el8\_6

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## 1.369 keyutils 1.5.10-9.el8

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#### END OF TERMS AND CONDITIONS

#### Appendix: How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) 19yy <name of author>
```

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 675 Mass Ave, Cambridge, MA 02139, USA.

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) 19yy name of author  
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.  
This is free software, and you are welcome to redistribute it  
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program  
'Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice
```

This General Public License does not permit incorporating your program into



proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.

# 1.370 perl-threads 2.21 2.el8

## 1.370.1 Available under license :

No license file was found, but licenses were detected in source scan.

---

abstract: 'Perl interpreter-based threads'

author:

- 'Artur Bergman, Jerry D. Hedden <jdhedden AT cpan DOT org>'

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.24, CPAN::Meta::Converter version 2.150010'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: threads

no\_index:

directory:

- t

- inc

requires:

Carp: '0'

Config: '0'

ExtUtils::testlib: '0'

Hash::Util: '0'

IO::File: '0'

Test::More: '0'

XSLoader: '0'

overload: '0'

strict: '0'

warnings: '0'

version: '2.21'

x\_serialization\_backend: 'CPAN::Meta::YAML version 0.018'

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1014324276\_1591897366.99/0/perl-threads-2.21-2.el8.src.rpm-cosi-expand-archive-Nd1sJ2w3/threads-2.21.tar.gz-cosi-expand-archive-XgGyr8xL/threads-2.21/META.yml

No license file was found, but licenses were detected in source scan.

License: GPL+ or Artistic

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1014324276\_1591897366.99/0/perl-threads-2.21-2.el8.src.rpm-cosi-expand-archive-Nd1sJ2w3/perl-threads.spec

No license file was found, but licenses were detected in source scan.

/\*

-----  
ppport.h -- Perl/Pollution/Portability Version 3.32

Automatically created by Devel::PPPport running under perl 5.022001.

Do NOT edit this file directly! -- Edit PPPort\_pm.PL and the includes in parts/inc/ instead.

Use 'perldoc ppport.h' to view the documentation below.

-----  
SKIP

=pod

=head1 NAME

ppport.h - Perl/Pollution/Portability version 3.32

=head1 SYNOPSIS

perl ppport.h [options] [source files]

Searches current directory for files if no [source files] are given

--help            show short help

--version        show version

--patch=file     write one patch file with changes

--copy=suffix    write changed copies with suffix

--diff=program   use diff program and options

--compat-version=version provide compatibility with Perl version

--cplusplus     accept C++ comments

--quiet            don't output anything except fatal errors  
--nodiag           don't show diagnostics  
--nohints          don't show hints  
--nochanges        don't suggest changes  
--nofilter         don't filter input files  
  
--strip            strip all script and doc functionality from  
                  ppport.h  
  
--list-provided    list provided API  
--list-unsupported list unsupported API  
--api-info=name    show Perl API portability information

## =head1 COMPATIBILITY

This version of F<ppport.h> is designed to support operation with Perl installations back to 5.003, and has been tested up to 5.20.

## =head1 OPTIONS

=head2 --help

Display a brief usage summary.

=head2 --version

Display the version of F<ppport.h>.

=head2 --patch=I<file>

If this option is given, a single patch file will be created if any changes are suggested. This requires a working diff program to be installed on your system.

=head2 --copy=I<suffix>

If this option is given, a copy of each file will be saved with the given suffix that contains the suggested changes. This does not require any external programs. Note that this does not automatically add a dot between the original filename and the suffix. If you want the dot, you have to include it in the option argument.

If neither C<--patch> or C<--copy> are given, the default is to simply print the diffs for each file. This requires either C<Text::Diff> or a C<diff> program to be installed.

=head2 --diff=I<program>

Manually set the diff program and options to use. The default is to use C<Text::Diff>, when installed, and output unified context diffs.

```
=head2 --compat-version=I<version>
```

Tell F<ppport.h> to check for compatibility with the given Perl version. The default is to check for compatibility with Perl version 5.003. You can use this option to reduce the output of F<ppport.h> if you intend to be backward compatible only down to a certain Perl version.

```
=head2 --cplusplus
```

Usually, F<ppport.h> will detect C++ style comments and replace them with C style comments for portability reasons. Using this option instructs F<ppport.h> to leave C++ comments untouched.

```
=head2 --quiet
```

Be quiet. Don't print anything except fatal errors.

```
=head2 --nodiag
```

Don't output any diagnostic messages. Only portability alerts will be printed.

```
=head2 --nohints
```

Don't output any hints. Hints often contain useful portability notes. Warnings will still be displayed.

```
=head2 --nochanges
```

Don't suggest any changes. Only give diagnostic output and hints unless these are also deactivated.

```
=head2 --nofilter
```

Don't filter the list of input files. By default, files not looking like source code (i.e. not \*.xs, \*.c, \*.cc, \*.cpp or \*.h) are skipped.

```
=head2 --strip
```

Strip all script and documentation functionality from F<ppport.h>. This reduces the size of F<ppport.h> dramatically and may be useful

if you want to include `F<ppport.h>` in smaller modules without increasing their distribution size too much.

The stripped `F<ppport.h>` will have a `C<--unstrip>` option that allows you to undo the stripping, but only if an appropriate `C<Devel::PPort>` module is installed.

`=head2 --list-provided`

Lists the API elements for which compatibility is provided by `F<ppport.h>`. Also lists if it must be explicitly requested, if it has dependencies, and if there are hints or warnings for it.

`=head2 --list-unsupported`

Lists the API elements that are known not to be supported by `F<ppport.h>` and below which version of Perl they probably won't be available or work.

`=head2 --api-info=I<name>`

Show portability information for API elements matching `I<name>`. If `I<name>` is surrounded by slashes, it is interpreted as a regular expression.

`=head1 DESCRIPTION`

In order for a Perl extension (XS) module to be as portable as possible across differing versions of Perl itself, certain steps need to be taken.

`=over 4`

`=item *`

Including this header is the first major one. This alone will give you access to a large part of the Perl API that hasn't been available in earlier Perl releases. Use

```
perl ppport.h --list-provided
```

to see which API elements are provided by `ppport.h`.

`=item *`

You should avoid using deprecated parts of the API. For example, using global Perl variables without the `C<PL_>` prefix is deprecated. Also, some API functions used to have a `C<perl_>` prefix. Using this form is also deprecated. You can safely use the supported API, as `F<ppport.h>`

will provide wrappers for older Perl versions.

=item \*

If you use one of a few functions or variables that were not present in earlier versions of Perl, and that can't be provided using a macro, you have to explicitly request support for these functions by adding one or more C<#define>s in your source code before the inclusion of F<ppport.h>.

These functions or variables will be marked C<explicit> in the list shown by C<--list-provided>.

Depending on whether your module has a single or multiple files that use such functions or variables, you want either C<static> or global variants.

For a C<static> function or variable (used only in a single source file), use:

```
#define NEED_function
#define NEED_variable
```

For a global function or variable (used in multiple source files), use:

```
#define NEED_function_GLOBAL
#define NEED_variable_GLOBAL
```

Note that you mustn't have more than one global request for the same function or variable in your project.

Function / Variable	Static Request	Global Request
PL_parser	NEED_PL_parser	NEED_PL_parser_GLOBAL
PL_signals	NEED_PL_signals	NEED_PL_signals_GLOBAL
caller_cx()	NEED_caller_cx	NEED_caller_cx_GLOBAL
eval_pv()	NEED_eval_pv	NEED_eval_pv_GLOBAL
grok_bin()	NEED_grok_bin	NEED_grok_bin_GLOBAL
grok_hex()	NEED_grok_hex	NEED_grok_hex_GLOBAL
grok_number()	NEED_grok_number	NEED_grok_number_GLOBAL
grok_numeric_radix()	NEED_grok_numeric_radix	NEED_grok_numeric_radix_GLOBAL
grok_oct()	NEED_grok_oct	NEED_grok_oct_GLOBAL
load_module()	NEED_load_module	NEED_load_module_GLOBAL
mg_findext()	NEED_mg_findext	NEED_mg_findext_GLOBAL
my_snprintf()	NEED_my_snprintf	NEED_my_snprintf_GLOBAL
my_sprintf()	NEED_my_sprintf	NEED_my_sprintf_GLOBAL
my_strlcat()	NEED_my_strlcat	NEED_my_strlcat_GLOBAL
my_strncpy()	NEED_my_strncpy	NEED_my_strncpy_GLOBAL

newCONSTSUB()	NEED_newCONSTSUB	NEED_newCONSTSUB_GLOBAL
newRV_noinc()	NEED_newRV_noinc	NEED_newRV_noinc_GLOBAL
newSV_type()	NEED_newSV_type	NEED_newSV_type_GLOBAL
newSVpvn_flags()	NEED_newSVpvn_flags	NEED_newSVpvn_flags_GLOBAL
newSVpvn_share()	NEED_newSVpvn_share	NEED_newSVpvn_share_GLOBAL
pv_display()	NEED_pv_display	NEED_pv_display_GLOBAL
pv_escape()	NEED_pv_escape	NEED_pv_escape_GLOBAL
pv_pretty()	NEED_pv_pretty	NEED_pv_pretty_GLOBAL
sv_2pv_flags()	NEED_sv_2pv_flags	NEED_sv_2pv_flags_GLOBAL
sv_2pvbyte()	NEED_sv_2pvbyte	NEED_sv_2pvbyte_GLOBAL
sv_catpvf_mg()	NEED_sv_catpvf_mg	NEED_sv_catpvf_mg_GLOBAL
sv_catpvf_mg_nocontext()	NEED_sv_catpvf_mg_nocontext	NEED_sv_catpvf_mg_nocontext_GLOBAL
sv_pvn_force_flags()	NEED_sv_pvn_force_flags	NEED_sv_pvn_force_flags_GLOBAL
sv_setpvf_mg()	NEED_sv_setpvf_mg	NEED_sv_setpvf_mg_GLOBAL
sv_setpvf_mg_nocontext()	NEED_sv_setpvf_mg_nocontext	NEED_sv_setpvf_mg_nocontext_GLOBAL
sv_unmagicext()	NEED_sv_unmagicext	NEED_sv_unmagicext_GLOBAL
vload_module()	NEED_vload_module	NEED_vload_module_GLOBAL
vnewSVpvf()	NEED_vnewSVpvf	NEED_vnewSVpvf_GLOBAL
warners()	NEED_warners	NEED_warners_GLOBAL

To avoid namespace conflicts, you can change the namespace of the explicitly exported functions / variables using the `C<DPPP_NAMESPACE>` macro. Just `C<#define>` the macro before including `C<ppport.h>`:

```
#define DPPP_NAMESPACE MyOwnNamespace_
#include "ppport.h"
```

The default namespace is `C<DPPP_>`.

=back

The good thing is that most of the above can be checked by running `F<ppport.h>` on your source code. See the next section for details.

=head1 EXAMPLES

To verify whether `F<ppport.h>` is needed for your module, whether you should make any changes to your code, and whether any special defines should be used, `F<ppport.h>` can be run as a Perl script to check your source code. Simply say:

```
perl ppport.h
```

The result will usually be a list of patches suggesting changes that should at least be acceptable, if not necessarily the most efficient solution, or a fix for all possible problems.

If you know that your XS module uses features only available in newer Perl releases, if you're aware that it uses C++ comments, and if you want all suggestions as a single patch file, you could use something like this:

```
perl ppport.h --compat-version=5.6.0 --cplusplus --patch=test.diff
```

If you only want your code to be scanned without any suggestions for changes, use:

```
perl ppport.h --nochanges
```

You can specify a different C<diff> program or options, using the C<--diff> option:

```
perl ppport.h --diff='diff -C 10'
```

This would output context diffs with 10 lines of context.

If you want to create patched copies of your files instead, use:

```
perl ppport.h --copy=.new
```

To display portability information for the C<newSVpvn> function, use:

```
perl ppport.h --api-info=newSVpvn
```

Since the argument to C<--api-info> can be a regular expression, you can use

```
perl ppport.h --api-info=/_nomg$/
```

to display portability information for all C<\_nomg> functions or

```
perl ppport.h --api-info=./
```

to display information for all known API elements.

## =head1 BUGS

If this version of F<ppport.h> is causing failure during the compilation of this module, please check if newer versions of either this module or C<Devel::PPPport> are available on CPAN before sending a bug report.

If F<ppport.h> was generated using the latest version of C<Devel::PPPport> and is causing failure of this module, please



file a bug report here: [L<https://github.com/mhx/Devel-PPPport/issues/>](https://github.com/mhx/Devel-PPPport/issues/)

Please include the following information:

=over 4

=item 1.

The complete output from running "perl -V"

=item 2.

This file.

=item 3.

The name and version of the module you were trying to build.

=item 4.

A full log of the build that failed.

=item 5.

Any other information that you think could be relevant.

=back

For the latest version of this code, please get the C<Devel::PPPport> module from CPAN.

=head1 COPYRIGHT

Version 3.x, Copyright (c) 2004-2013, Marcus Holland-Moritz.

Version 2.x, Copyright (C) 2001, Paul Marquess.

Version 1.x, Copyright (C) 1999, Kenneth Albanowski.

This program is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

=head1 SEE ALSO

See [L<Devel::PPPport>](#).

=cut

```

use strict;

# Disable broken TRIE-optimization
BEGIN { eval '${^RE_TRIE_MAXBUF} = -1' if $] >= 5.009004 && $] <= 5.009005 }

my $VERSION = 3.32;

my %opt = (
  quiet => 0,
  diag => 1,
  hints => 1,
  changes => 1,
  cplusplus => 0,
  filter => 1,
  strip => 0,
  version => 0,
);

my($ppport) = $0 =~ /([\w.]+)$/;
my $LF = '(?:\r\n|[\r\n])'; # line feed
my $HS = "[\t]"; # horizontal whitespace

# Never use C comments in this file!
my $ccs = '/.*';
my $cce = '.*.'/;
my $rcs = quotemeta $ccs;
my $rce = quotemeta $cce;

eval {
  require Getopt::Long;
  Getopt::Long::GetOptions(\%opt, qw(
    help quiet diag! filter! hints! changes! cplusplus strip version
    patch=s copy=s diff=s compat-version=s
    list-provided list-unsupported api-info=s
  )) or usage();
};

if ($@ and grep /^-/, @ARGV) {
  usage() if "@ARGV" =~ /^--?h(?:elp)?$/;
  die "Getopt::Long not found. Please don't use any options.\n";
}

if ($opt{version}) {
  print "This is $0 $VERSION.\n";
  exit 0;
}

usage() if $opt{help};

```

```

strip() if $opt{strip};

if (exists $opt{'compat-version'}) {
    my($r,$v,$s) = eval { parse_version($opt{'compat-version'}) };
    if ($@) {
        die "Invalid version number format: '$opt{'compat-version'}'\n";
    }
    die "Only Perl 5 is supported\n" if $r != 5;
    die "Invalid version number: $opt{'compat-version'}\n" if $v >= 1000 || $s >= 1000;
    $opt{'compat-version'} = sprintf "%d.%03d%03d", $r, $v, $s;
}
else {
    $opt{'compat-version'} = 5;
}

my %API = map { /^(\w+)\|([^\|]*)\|([^\|]*)\|(\w*)$/
    ? ( $1 => {
        ($2          ? ( base    => $2 ) : ()),
        ($3          ? ( todo    => $3 ) : ()),
        (index($4, 'v') >= 0 ? ( varargs => 1 ) : ()),
        (index($4, 'p') >= 0 ? ( provided => 1 ) : ()),
        (index($4, 'n') >= 0 ? ( nothxarg => 1 ) : ()),
    } )
    : die "invalid spec: $_" } qw(
ASCII_TO_NEED|5.007001|n
AvFILLp|5.004050|p
AvFILL|||
BhkDISABLE|5.021008|
BhkENABLE|5.021008|
BhkENTRY_set|5.021008|
BhkENTRY|||
BhkFLAGS|||
CALL_BLOCK_HOOKS|||
CLASS|||n
CPERLscope|5.005000|p
CX_CURPAD_SAVE|||
CX_CURPAD_SV|||
CopFILEAV|5.006000|p
CopFILEGV_set|5.006000|p
CopFILEGV|5.006000|p
CopFILESV|5.006000|p
CopFILE_set|5.006000|p
CopFILE|5.006000|p
CopSTASHPV_set|5.006000|p
CopSTASHPV|5.006000|p
CopSTASH_eq|5.006000|p
CopSTASH_set|5.006000|p
CopSTASH|5.006000|p

```

CopyD|5.009002|5.004050|p  
Copy|||  
CvPADLIST||5.008001|  
CvSTASH|||  
CvWEAKOUTSIDE|||  
DEFSV\_set|5.010001||p  
DEFSV|5.004050||p  
END\_EXTERN\_C|5.005000||p  
ENTER|||  
ERRSV|5.004050||p  
EXTEND|||  
EXTERN\_C|5.005000||p  
F0convert|||n  
FREEMPS|||  
GIMME\_V||5.004000|n  
GIMME|||n  
GROK\_NUMERIC\_RADIX|5.007002||p  
G\_ARRAY|||  
G\_DISCARD|||  
G\_EVAL|||  
G\_METHOD|5.006001||p  
G\_NOARGS|||  
G\_SCALAR|||  
G\_VOID||5.004000|  
GetVars|||  
GvAV|||  
GvCV|||  
GvHV|||  
GvSVn|5.009003||p  
GvSV|||  
Gv\_AMupdate||5.011000|  
HEf\_SVKEY|5.003070||p  
HeHASH||5.003070|  
HeKEY||5.003070|  
HeKLEN||5.003070|  
HePV||5.004000|  
HeSVKEY\_force||5.003070|  
HeSVKEY\_set||5.004000|  
HeSVKEY||5.003070|  
HeUTF8|5.010001|5.008000|p  
HeVAL||5.003070|  
HvENAMELEN||5.015004|  
HvENAMEUTF8||5.015004|  
HvENAME||5.013007|  
HvNAMELEN\_get|5.009003||p  
HvNAMELEN||5.015004|  
HvNAMEUTF8||5.015004|  
HvNAME\_get|5.009003||p

HvNAME|||  
INT2PTR|5.006000||p  
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NVef|5.006001||p  
NVff|5.006001||p  
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sv\_catpv\_nomg|5.013006|  
sv\_catpvf\_mg\_nocontext||pvn  
sv\_catpvf\_mg|5.006000|5.004000|pv  
sv\_catpvf\_nocontext||vn  
sv\_catpvf|5.004000|v  
sv\_catpvn\_flags|5.007002|  
sv\_catpvn\_mg|5.004050|p  
sv\_catpvn\_nomg|5.007002|p  
sv\_catpvn||  
sv\_catpvs\_flags|5.013006|  
sv\_catpvs\_mg|5.013006|  
sv\_catpvs\_nomg|5.013006|  
sv\_catpvs|5.009003|p  
sv\_catpv||  
sv\_catsv\_flags|5.007002|  
sv\_catsv\_mg|5.004050|p  
sv\_catsv\_nomg|5.007002|p  
sv\_catsv||  
sv\_chop||  
sv\_clean\_all||  
sv\_clean\_objs||  
sv\_clear||  
sv\_cmp\_flags|5.013006|  
sv\_cmp\_locale\_flags|5.013006|  
sv\_cmp\_locale|5.004000|  
sv\_cmp||  
sv\_collxfrm\_flags|5.013006|  
sv\_collxfrm||  
sv\_copypv\_flags|5.017002|  
sv\_copypv\_nomg|5.017002|  
sv\_copypv||  
sv\_dec\_nomg|5.013002|  
sv\_dec||  
sv\_del\_backref||  
sv\_derived\_from\_pvn|5.015004|  
sv\_derived\_from\_pv|5.015004|  
sv\_derived\_from\_sv|5.015004|  
sv\_derived\_from|5.004000|  
sv\_destroyable|5.010000|  
sv\_display||

sv\_does\_pvn|5.015004|  
sv\_does\_pv|5.015004|  
sv\_does\_sv|5.015004|  
sv\_does|5.009004|  
sv\_dump|||  
sv\_dup\_common|||  
sv\_dup\_inc\_multiple|||  
sv\_dup\_inc|||  
sv\_dup|||  
sv\_eq\_flags|5.013006|  
sv\_eq|||  
sv\_exp\_grow|||  
sv\_force\_normal\_flags|5.007001|  
sv\_force\_normal|5.006000|  
sv\_free2|||  
sv\_free\_arenas|||  
sv\_free|||  
sv\_get\_backrefs|5.021008|n  
sv\_gets|5.003070|  
sv\_grow|||  
sv\_i\_ncmp|||  
sv\_inc\_nomg|5.013002|  
sv\_inc|||  
sv\_insert\_flags|5.010001|  
sv\_insert|||  
sv\_isa|||  
sv\_isobject|||  
sv\_iv|5.005000|  
sv\_kill\_backrefs|||  
sv\_len\_utf8\_nomg|||  
sv\_len\_utf8|5.006000|  
sv\_len|||  
sv\_magic\_portable|5.021008|5.004000|p  
sv\_magicext\_mglob|||  
sv\_magicext|5.007003|  
sv\_magic|||  
sv\_mortalcoppy\_flags|||  
sv\_mortalcoppy|||  
sv\_ncmp|||  
sv\_newmortal|||  
sv\_newref|||  
sv\_nolocking|5.007003|  
sv\_nosharing|5.007003|  
sv\_nounlocking|||  
sv\_nv|5.005000|  
sv\_only\_taint\_gmagic||n  
sv\_or\_pv\_pos\_u2b|||  
sv\_peek|5.005000|



sv\_pos\_b2u\_flags|5.019003|  
sv\_pos\_b2u\_midway|||  
sv\_pos\_b2u|5.006000|  
sv\_pos\_u2b\_cached|||  
sv\_pos\_u2b\_flags|5.011005|  
sv\_pos\_u2b\_forwards||n  
sv\_pos\_u2b\_midway||n  
sv\_pos\_u2b|5.006000|  
sv\_pvbyten\_force|5.006000|  
sv\_pvbyten|5.006000|  
sv\_pvbyte|5.006000|  
sv\_pvn\_force\_flags|5.007002||p  
sv\_pvn\_force|||  
sv\_pvn\_nomg|5.007003|5.005000|p  
sv\_pvn|5.005000|  
sv\_pvutf8n\_force|5.006000|  
sv\_pvutf8n|5.006000|  
sv\_pvutf8|5.006000|  
sv\_pv|5.006000|  
sv\_recode\_to\_utf8|5.007003|  
sv\_reftype|||  
sv\_ref|||  
sv\_release\_COW|||  
sv\_replace|||  
sv\_report\_used|||  
sv\_resetpvn|||  
sv\_reset|||  
sv\_rvweaken|5.006000|  
sv\_sethek|||  
sv\_setiv\_mg|5.004050||p  
sv\_setiv|||  
sv\_setnv\_mg|5.006000||p  
sv\_setnv|||  
sv\_setpv\_mg|5.004050||p  
sv\_setpvf\_mg\_nocontext|||pvn  
sv\_setpvf\_mg|5.006000|5.004000|pv  
sv\_setpvf\_nocontext|||vn  
sv\_setpvf|5.004000|v  
sv\_setpviv\_mg|5.008001|  
sv\_setpviv|5.008001|  
sv\_setpvn\_mg|5.004050||p  
sv\_setpvn|||  
sv\_setpvs\_mg|5.013006|  
sv\_setpvs|5.009004||p  
sv\_setpv|||  
sv\_setref\_iv|||  
sv\_setref\_nv|||  
sv\_setref\_pvn|||

sv\_setref\_pvs||5.021008|  
sv\_setref\_pv||  
sv\_setref\_uv||5.007001|  
sv\_setsv\_cow||  
sv\_setsv\_flags||5.007002|  
sv\_setsv\_mg|5.004050|p  
sv\_setsv\_nomg|5.007002|p  
sv\_setsv||  
sv\_setuv\_mg|5.004050|p  
sv\_setuv|5.004000|p  
sv\_tainted||5.004000|  
sv\_taint||5.004000|  
sv\_true||5.005000|  
sv\_unglob||  
sv\_uni\_display||5.007003|  
sv\_unmagicext|5.013008|p  
sv\_unmagic||  
sv\_unref\_flags||5.007001|  
sv\_unref||  
sv\_untaint||5.004000|  
sv\_upgrade||  
sv\_usepvn\_flags||5.009004|  
sv\_usepvn\_mg|5.004050|p  
sv\_usepvn||  
sv\_utf8\_decode||5.006000|  
sv\_utf8\_downgrade||5.006000|  
sv\_utf8\_encode||5.006000|  
sv\_utf8\_upgrade\_flags\_grow||5.011000|  
sv\_utf8\_upgrade\_flags||5.007002|  
sv\_utf8\_upgrade\_nomg||5.007002|  
sv\_utf8\_upgrade||5.007001|  
sv\_uv||5.005000|p  
sv\_vcatpvf\_mg|5.006000|5.004000|p  
sv\_vcatpvfn\_flags||5.017002|  
sv\_vcatpvfn||5.004000|  
sv\_vcatpvf|5.006000|5.004000|p  
sv\_vsetpvf\_mg|5.006000|5.004000|p  
sv\_vsetpvfn||5.004000|  
sv\_vsetpvf|5.006000|5.004000|p  
svtype||  
swallow\_bom||  
swash\_fetch||5.007002|  
swash\_init||5.006000|  
swash\_scan\_list\_line||  
swatch\_get||  
sync\_locale||5.021004|  
sys\_init3||5.010000|n  
sys\_init||5.010000|n

sys\_intern\_clear||  
sys\_intern\_dup||  
sys\_intern\_init||  
sys\_term|5.010000|n  
taint\_env||  
taint\_proper||  
tied\_method||v  
tmpls\_grow\_p||  
toFOLD\_uni|5.007003|  
toFOLD\_utf8|5.019001|  
toFOLD|5.019001|  
toLOWER\_L1|5.019001|  
toLOWER\_LC|5.004000|  
toLOWER\_uni|5.007003|  
toLOWER\_utf8|5.015007|  
toLOWER||  
toTITLE\_uni|5.007003|  
toTITLE\_utf8|5.015007|  
toTITLE|5.019001|  
toUPPER\_uni|5.007003|  
toUPPER\_utf8|5.015007|  
toUPPER||  
to\_byte\_substr||  
to\_lower\_latin1||n  
to\_uni\_fold|5.007003|  
to\_uni\_lower\_lc|5.006000|  
to\_uni\_lower|5.007003|  
to\_uni\_title\_lc|5.006000|  
to\_uni\_title|5.007003|  
to\_uni\_upper\_lc|5.006000|  
to\_uni\_upper|5.007003|  
to\_utf8\_case|5.007003|  
to\_utf8\_fold|5.015007|  
to\_utf8\_lower|5.015007|  
to\_utf8\_substr||  
to\_utf8\_title|5.015007|  
to\_utf8\_upper|5.015007|  
tokenize\_use||  
tokeq||  
tokereport||  
too\_few\_arguments\_pv||  
too\_many\_arguments\_pv||  
translate\_substr\_offsets||n  
try\_amagic\_bin||  
try\_amagic\_un||  
uiv\_2buf||n  
unlnk||  
unpack\_rec||

unpack\_str|5.007003|  
unpackstring|5.008001|  
unreferenced\_to\_tmp\_stack|||  
unshare\_hek\_or\_pvn|||  
unshare\_hek|||  
unsharepvn|5.003070|  
unwind\_handler\_stack|||  
update\_debugger\_info|||  
upg\_version|5.009005|  
usage|||  
utf16\_textfilter|||  
utf16\_to\_utf8\_reversed|5.006001|  
utf16\_to\_utf8|5.006001|  
utf8\_distance|5.006000|  
utf8\_hop|5.006000|n  
utf8\_length|5.007001|  
utf8\_mg\_len\_cache\_update|||  
utf8\_mg\_pos\_cache\_update|||  
utf8\_to\_bytes|5.006001|  
utf8\_to\_uvchr\_buf|5.015009|  
utf8\_to\_uvchr|5.007001|  
utf8\_to\_uvuni\_buf|5.015009|  
utf8\_to\_uvuni|5.007001|  
utf8n\_to\_uvchr|5.007001|  
utf8n\_to\_uvuni|5.007001|  
utilize|||  
uvchr\_to\_utf8\_flags|5.007003|  
uvchr\_to\_utf8|5.007001|  
uvoffuni\_to\_utf8\_flags|5.019004|  
uvuni\_to\_utf8\_flags|5.007003|  
uvuni\_to\_utf8|5.007001|  
valid\_utf8\_to\_uvchr|5.015009|  
valid\_utf8\_to\_uvuni|5.015009|  
validate\_proto|||  
validate\_suid|||  
varname|||  
vcmp|5.009000|  
vcroak|5.006000|  
vdeb|5.007003|  
vform|5.006000|  
visit|||  
vivify\_defelem|||  
vivify\_ref|||  
vload\_module|5.006000|p  
vmess|5.006000|  
vnewSVpvf|5.006000|5.004000|p  
vnormal|5.009002|  
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```

vstringify|5.009000|
vverify|5.009003|
vwarner|5.006000|
vwarn|5.006000|
wait4pid|||
warn_nocontext||vn
warn_sv|5.013001|
warner_nocontext||vn
warner|5.006000|5.004000|pv
warn||v
was_lvalue_sub|||
watch|||
whichsig_pvn|5.015004|
whichsig_pv|5.015004|
whichsig_sv|5.015004|
whichsig|||
win32_croak_not_implemented||n
with_queued_errors|||
wrap_op_checker|5.015008|
write_to_stderr|||
xs_boot_epilog|||
xs_handshake||vn
xs_version_bootcheck|||
yyerror_pvn|||
yyerror_pv|||
yyerror|||
yylex|||
yyparse|||
yyunlex|||
yywarn|||
);

if (exists $opt{'list-unsupported'}) {
    my $f;
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $API{$f}{todo};
        print "$f ", '.'x(40-length($f)), " ", format_version($API{$f}{todo}), "\n";
    }
    exit 0;
}

# Scan for possible replacement candidates

my(%replace, %need, %hints, %warnings, %depends);
my $replace = 0;
my($hint, $define, $function);

sub find_api

```

```

{
my $code = shift;
$code =~ s{
 /(?:\*[^\*]*\*+(?:[^\$ccs][^\*]*\*+)*|/^\r\n*)
|"[^"\\]*(?:\\.[^"\\])*"
|'[^']*'(?:\\.[^']*)*'}{ }egsx;
grep { exists $API{$_} } $code =~ /(\w+)/mg;
}

while (<DATA>) {
if ($hint) {
my $h = $hint->[0] eq 'Hint' ? \%hints : \%warnings;
if (m{^\s*\s(?:\s*)\s*$}) {
for (@{$hint->[1]}) {
$h->{$_} ||= ""; # suppress warning with older perls
$h->{$_} .= "$1\n";
}
}
else { undef $hint }
}

$hint = [$1, [split /,?\s+/, $2]]
if m{^\s*$rccs\s+(Hint|Warning):\s+(\w+(?:,\s+\w+)*)\s*$};

if ($define) {
if ($define->[1] =~ /\$/) {
$define->[1] .= $_;
}
else {
if (exists $API{$define->[0]} && $define->[1] !~ /^DPPP_\(/) {
my @n = find_api($define->[1]);
push @{$depends{$define->[0]}}, @n if @n
}
undef $define;
}
}

$define = [$1, $2] if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(.*)};

if ($function) {
if (/^/) {
if (exists $API{$function->[0]}) {
my @n = find_api($function->[1]);
push @{$depends{$function->[0]}}, @n if @n
}
undef $function;
}
else {

```

```

function->[1] .= $_;
}
}

function = [$1, " if m{^DPPP_(my_(\w+))};

$replace = $1 if m{^s*$rccs\s+Replace:\s+(\d+)\s+$rcces*$};
$replace{$2} = $1 if $replace and m{^s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+)};
$replace{$2} = $1 if m{^s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+).*rccs\s+Replace\s+$rcces*};
$replace{$1} = $2 if m{^s*$rccs\s+Replace (\w+) with (\w+)\s+$rcces*$};

if (m{^s*$rccs\s+(\w+(\s*,\s*\w+*))\s+depends\s+on\s+(\w+(\s*,\s*\w+*))\s+$rcces*$}) {
    my @deps = map { s/\s+//g; $_ } split /\s/, $3;
    my $d;
    for $d (map { s/\s+//g; $_ } split /\s/, $1) {
        push @{$depends{$d}}, @deps;
    }
}

$need{$1} = 1 if m{^#\s+defined\(\NEED_(\w+)(?:_GLOBAL)?\)};
}

for (values %depends) {
    my %s;
    $_ = [sort grep !$_{$_}++, @$_];
}

if (exists $opt{'api-info'}) {
    my $f;
    my $count = 0;
    my $match = $opt{'api-info'} =~ m!^(.*)/! ? $1 : "\Q$opt{'api-info'}\E$";
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $f =~ /$match/;
        print "\n=== $f ===\n";
        my $info = 0;
        if ($API{$f}{base} || $API{$f}{todo}) {
            my $base = format_version($API{$f}{base} || $API{$f}{todo});
            print "Supported at least starting from perl-$base.\n";
            $info++;
        }
        if ($API{$f}{provided}) {
            my $todo = $API{$f}{todo} ? format_version($API{$f}{todo}) : "5.003";
            print "Support by $ppport provided back to perl-$todo.\n";
            print "Support needs to be explicitly requested by NEED_$_f.\n" if exists $need{$f};
            print "Depends on: ", join(', ', @{$depends{$f}}), ".\n" if exists $depends{$f};
            print "\n$hints{$f}" if exists $hints{$f};
            print "\nWARNING:\n$warnings{$f}" if exists $warnings{$f};
            $info++;
        }
    }
}

```

```

}
print "No portability information available.\n" unless $info;
$count++;
}
$count or print "Found no API matching '$opt{api-info}'.";
print "\n";
exit 0;
}

```

```

if (exists $opt{'list-provided'}) {
my $f;
for $f (sort { lc $a cmp lc $b } keys %API) {
next unless $API{$f}{provided};
my @flags;
push @flags, 'explicit' if exists $need{$f};
push @flags, 'depend' if exists $depends{$f};
push @flags, 'hint' if exists $hints{$f};
push @flags, 'warning' if exists $warnings{$f};
my $flags = @flags ? ' [' .join(', ', @flags).']' : "";
print "$f$flags\n";
}
exit 0;
}

```

```

my @files;
my @srcext = qw( .xs .c .h .cc .cpp -c.inc -xs.inc );
my $srcext = join '|', map { quotemeta $_ } @srcext;

```

```

if (@ARGV) {
my %seen;
for (@ARGV) {
if (-e) {
if (-f) {
push @files, $_ unless $seen{$_}++;
}
else { warn "'$_' is not a file.\n" }
}
else {
my @new = grep { -f } glob $_
or warn "'$_' does not exist.\n";
push @files, grep { !$seen{$_}++ } @new;
}
}
}
else {
eval {
require File::Find;
File::Find::find(sub {

```



```

$File::Find::name =~ /($srcext)$/i
    and push @files, $File::Find::name;
}, ');
};
if ($@) {
    @files = map { glob "*$_" } @srcext;
}
}

if (!@ARGV || $opt{filter}) {
    my(@in, @out);
    my %xsc = map { /(.*)\.xs$/ ? ("1.c" => 1, "1.cc" => 1) : () } @files;
    for (@files) {
        my $out = exists $xsc{$_} || ^\bQ$ppport\E$/i || !/($srcext)$/i;
        push @ { $out ? \@out : \@in }, $_;
    }
    if (@ARGV && @out) {
        warning("Skipping the following files (use --nofilter to avoid this):\n| ", join "\n| ", @out);
    }
    @files = @in;
}

die "No input files given!\n" unless @files;

my(%files, %global, %revreplace);
%revreplace = reverse %replace;
my $filename;
my $patch_opened = 0;

for $filename (@files) {
    unless (open IN, "<$filename") {
        warn "Unable to read from $filename: $!\n";
        next;
    }

    info("Scanning $filename ...");

    my $c = do { local $/; <IN> };
    close IN;

    my %file = (orig => $c, changes => 0);

    # Temporarily remove C/XS comments and strings from the code
    my @ccom;

    $c =~ s{
        ( ^$HS*\#$HS*include\b[^\r\n]+\b(?:\Q$ppport\E|XSUB\.h)\b[^\r\n]*
          | ^$HS*\#$HS*(?:define|elif|if(?:def?))\b[^\r\n]* )
}

```

```

| ( ^$HS*\#[^\r\n]*
| "[^"\\]*(?:\\.["\\])*"
| '[^"']*?(?:\\.["\\])*'
| /(?: \*[^\*]*\*+(?:[^\$ccs][^\*]*\*+)* /|/[\r\n]* ) )
}{ defined $2 and push @ccom, $2;
  defined $1 ? $1 : "$ccs$#ccom$cce" }mgsex;

$file{ccom} = \@ccom;
$file{code} = $c;
$file{has_inc_ppport} = $c =~ /^$HS*#$HS*include[^\r\n]+\b\Q$ppport\E\b/m;

my $func;

for $func (keys %API) {
  my $match = $func;
  $match = "$$revreplace{$func}" if exists $revreplace{$func};
  if ($c =~ /\b(?:Perl_)?($match)\b/) {
    $file{uses_replace}{$func}++ if exists $revreplace{$func} && $1 eq $revreplace{$func};
    $file{uses_Perl}{$func}++ if $c =~ /\bPerl_$func\b/;
    if (exists $API{$func}{provided}) {
      $file{uses_provided}{$func}++;
      if (!exists $API{$func}{base} || $API{$func}{base} > $opt{'compat-version'}) {
        $file{uses}{$func}++;
        my @deps = rec_depend($func);
        if (@deps) {
          $file{uses_deps}{$func} = \@deps;
          for (@deps) {
            $file{uses}{$_} = 0 unless exists $file{uses}{$_};
          }
        }
        for ($func, @deps) {
          $file{needs}{$_} = 'static' if exists $need{$_};
        }
      }
    }
  }
  if (exists $API{$func}{todo} && $API{$func}{todo} > $opt{'compat-version'}) {
    if ($c =~ /\b$func\b/) {
      $file{uses_todo}{$func}++;
    }
  }
}

while ($c =~ /^$HS*#$HS*define$HS+(NEED_(\w+?)(_GLOBAL)?)\b/mg) {
  if (exists $need{$2}) {
    $file{defined_$3 ? 'needed_global' : 'needed_static'}{$2}++;
  }
  else { warning("Possibly wrong #define $1 in $filename") }
}

```

```

}

for (qw(uses needs uses_todo needed_global needed_static)) {
  for $func (keys % {$file{$_}}) {
    push @{$global{$_}{$func}}, $filename;
  }
}

$files{$filename} = \%file;
}

# Globally resolve NEED_'s
my $need;
for $need (keys % {$global{needs}}) {
  if (@{$global{needs}{$need}} > 1) {
    my @targets = @{$global{needs}{$need}};
    my @t = grep $files{$_}{needed_global}{$need}, @targets;
    @targets = @t if @t;
    @t = grep /\.xs$/i, @targets;
    @targets = @t if @t;
    my $target = shift @targets;
    $files{$target}{needs}{$need} = 'global';
    for (@{$global{needs}{$need}}) {
      $files{$_}{needs}{$need} = 'extern' if $_ ne $target;
    }
  }
}

for $filename (@files) {
  exists $files{$filename} or next;

  info("=== Analyzing $filename ===");

  my %file = % {$files{$filename}};
  my $func;
  my $c = $file{code};
  my $warnings = 0;

  for $func (sort keys % {$file{uses_Perl}}) {
    if ($API{$func}{varargs}) {
      unless ($API{$func}{nothxarg}) {
        my $changes = ($c =~ s{\b(Perl_?func\s*(\s*)(?!aTHX_?)(\s*)[\^s]*\b)}
          { $1 . ($2 eq ' ') ? 'aTHX' : 'aTHX_' } . $2 }ge);
        if ($changes) {
          warning("Doesn't pass interpreter argument aTHX to Perl_$func");
          $file{changes} += $changes;
        }
      }
    }
  }
}

```

```

}
else {
    warning("Uses Perl_ $func instead of $func");
    $file{changes} += ($c =~ s{\bPerl_ $func(s*)((\s*aTHX_?)? \s*}
        { $func$1 }g);
}
}

for $func (sort keys % { $file{uses_replace} }) {
    warning("Uses $func instead of $replace{ $func }");
    $file{changes} += ($c =~ s/\b $func\b /$replace{ $func }/g);
}

for $func (sort keys % { $file{uses_provided} }) {
    if ($file{uses} { $func }) {
        if (exists $file{uses_deps} { $func }) {
            diag("Uses $func, which depends on ", join(', ', @ { $file{uses_deps} { $func } }));
        }
        else {
            diag("Uses $func");
        }
    }
    $warnings += hint($func);
}

unless ($opt{quiet}) {
    for $func (sort keys % { $file{uses_todo} }) {
        print "*** WARNING: Uses $func, which may not be portable below perl ",
            format_version($API{ $func } { todo }, ", even with '$ppport'\n");
        $warnings++;
    }
}

for $func (sort keys % { $file{needed_static} }) {
    my $message = "";
    if (not exists $file{uses} { $func }) {
        $message = "No need to define NEED_ $func if $func is never used";
    }
    elsif (exists $file{needs} { $func } && $file{needs} { $func } ne 'static') {
        $message = "No need to define NEED_ $func when already needed globally";
    }
    if ($message) {
        diag($message);
        $file{changes} += ($c =~ s/^$HS*#$HS*define$HS+NEED_ $func\b.*$LF//mg);
    }
}

for $func (sort keys % { $file{needed_global} }) {

```

```

my $message = "";
if (not exists $global{uses}{$func}) {
    $message = "No need to define NEED_${func}_GLOBAL if $func is never used";
}
elsif (exists $file{needs}{$func}) {
    if ($file{needs}{$func} eq 'extern') {
        $message = "No need to define NEED_${func}_GLOBAL when already needed globally";
    }
    elsif ($file{needs}{$func} eq 'static') {
        $message = "No need to define NEED_${func}_GLOBAL when only used in this file";
    }
}
}
if ($message) {
    diag($message);
    $file{changes} += ($c =~ s/^\$HS*#\$HS*define\$HS+NEED_${func}_GLOBAL\b.*$LF//mg);
}
}

$file{needs_inc_ppport} = keys %{$file{uses}};

if ($file{needs_inc_ppport}) {
    my $pp = "";

    for $func (sort keys %{$file{needs}}) {
        my $type = $file{needs}{$func};
        next if $type eq 'extern';
        my $suffix = $type eq 'global' ? '_GLOBAL' : "";
        unless (exists $file{"needed_$type"}{$func}) {
            if ($type eq 'global') {
                diag("Files [@$global{needs}{$func}] need $func, adding global request");
            }
            else {
                diag("File needs $func, adding static request");
            }
            $pp .= "#define NEED_${func}$suffix\n";
        }
    }
}

if ($pp && ($c =~ s/^(?=$HS*#\$HS*define\$HS+NEED_(w+)/$pp/m)) {
    $pp = "";
    $file{changes}++;
}

unless ($file{has_inc_ppport}) {
    diag("Needs to include '$ppport'");
    $pp .= qq(#include "$ppport"\n)
}
}

```

```

if ($pp) {
    $file{changes} += ($c =~ s/^(($HS*#$HS*define$HS+NEED_\w+.*?)/$1$pp/ms)
        || ($c =~ s/^(?=$HS*#$HS*include.*\Q$ppport\E)/$pp/m)
        || ($c =~ s/^(($HS*#$HS*include.*XSUB.*\s*?)/$1$pp/m)
        || ($c =~ s/^\$pp/);
}
}
else {
    if ($file{has_inc_ppport}) {
        diag("No need to include '$ppport'");
        $file{changes} += ($c =~ s/^(($HS*?#$HS*include.*\Q$ppport\E.*?)$LF//m);
    }
}

```

# put back in our C comments

```

my $ix;
my $cpc = 0;
my @ccom = @{$file{ccom}};
for $ix (0 .. $#ccom) {
    if (!$opt{plusplus} && $ccom[$ix] =~ s!^/!!) {
        $cpc++;
        $file{changes} += $c =~ s/$rcs$ix$rcce/$ccs$ccom[$ix] $cce/;
    }
    else {
        $c =~ s/$rcs$ix$rcce/$ccom[$ix]/;
    }
}

```

```

if ($cpc) {
    my $s = $cpc != 1 ? 's' : '';
    warning("Uses $cpc C++ style comment$s, which is not portable");
}

```

```

my $s = $warnings != 1 ? 's' : '';
my $warn = $warnings ? " ($warnings warning$s)" : "";
info("Analysis completed$warn");

```

```

if ($file{changes}) {
    if (exists $opt{copy}) {
        my $newfile = "$filename$opt{copy}";
        if (-e $newfile) {
            error("$newfile' already exists, refusing to write copy of '$filename'");
        }
        else {
            local *F;
            if (open F, ">$newfile") {
                info("Writing copy of '$filename' with changes to '$newfile'");
                print F $c;
            }
        }
    }
}

```

```

    close F;
  }
  else {
    error("Cannot open '$newfile' for writing: $!");
  }
}
}
}
elseif (exists $opt{patch} || $opt{changes}) {
  if (exists $opt{patch}) {
    unless ($patch_opened) {
      if (open PATCH, ">$opt{patch}") {
        $patch_opened = 1;
      }
      else {
        error("Cannot open '$opt{patch}' for writing: $!");
        delete $opt{patch};
        $opt{changes} = 1;
        goto fallback;
      }
    }
    mydiff(\*PATCH, $filename, $c);
  }
  else {
fallback:
    info("Suggested changes:");
    mydiff(\*STDOUT, $filename, $c);
  }
}
else {
  my $s = $file{changes} == 1 ? " : 's'";
  info("$file{changes} potentially required change$s detected");
}
}
else {
  info("Looks good");
}
}
}

```

```
close PATCH if $patch_opened;
```

```
exit 0;
```

```
sub try_use { eval "use @_:"; return $@ eq " }
```

```
sub mydiff
{
  local *F = shift;
```

```

my($file, $str) = @_;
my $diff;

if (exists $opt{diff}) {
    $diff = run_diff($opt{diff}, $file, $str);
}

if (!defined $diff and try_use("Text::Diff")) {
    $diff = Text::Diff::diff($file, \$str, { STYLE => 'Unified' });
    $diff = <<HEADER . $diff;
--- $file
+++ $file.patched
HEADER
}

if (!defined $diff) {
    $diff = run_diff('diff -u', $file, $str);
}

if (!defined $diff) {
    $diff = run_diff('diff', $file, $str);
}

if (!defined $diff) {
    error("Cannot generate a diff. Please install Text::Diff or use --copy.");
    return;
}

print F $diff;
}

sub run_diff
{
    my($prog, $file, $str) = @_;
    my $tmp = 'dppptemp';
    my $suf = 'aaa';
    my $diff = "";
    local *F;

    while (-e "$tmp.$suf") { $suf++ }
    $tmp = "$tmp.$suf";

    if (open F, ">$tmp") {
        print F $str;
        close F;

        if (open F, "$prog $file $tmp |") {
            while (<F>) {

```



```

    s/\Q$tmp\E/$file.patched/;
    $diff .= $_;
}
close F;
unlink $tmp;
return $diff;
}

unlink $tmp;
}
else {
    error("Cannot open '$tmp' for writing: $!");
}

return undef;
}

sub rec_depend
{
    my($func, $seen) = @_ ;
    return () unless exists $depends{$func};
    $seen = {% {$seen||{}}};
    return () if $seen->{$func}++;
    my %s;
    grep !${$_}++, map { ($_, rec_depend($_, $seen)) } @{$depends{$func}};
}

sub parse_version
{
    my $ver = shift;

    if ($ver =~ /^(\d+)\.(\d+)\.(\d+)$/) {
        return ($1, $2, $3);
    }
    elsif ($ver !~ /^(\d+)\.([d_]+$)/) {
        die "cannot parse version '$ver'\n";
    }

    $ver =~ s/_//g;
    $ver =~ s/000000/;

    my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

    $v = int $v;
    $s = int $s;

    if ($r < 5 || ($r == 5 && $v < 6)) {
        if ($s % 10) {

```

```

        die "cannot parse version '$ver\n";
    }
}

return ($r, $v, $s);
}

sub format_version
{
    my $ver = shift;

    $ver =~ s/$/000000/;
    my($r,$v,$s) = $ver =~ /(d+)\.(d{3})(d{3})/;

    $v = int $v;
    $s = int $s;

    if ($r < 5 || ($r == 5 && $v < 6)) {
        if ($s % 10) {
            die "invalid version '$ver\n";
        }
        $s /= 10;

        $ver = sprintf "%d.%03d", $r, $v;
        $s > 0 and $ver .= sprintf "_%02d", $s;

        return $ver;
    }

    return sprintf "%d.%d.%d", $r, $v, $s;
}

sub info
{
    $opt{quiet} and return;
    print @_, "\n";
}

sub diag
{
    $opt{quiet} and return;
    $opt{diag} and print @_, "\n";
}

sub warning
{
    $opt{quiet} and return;
    print "*** ", @_, "\n";
}

```

```

}

sub error
{
print "*** ERROR: ", @_, "\n";
}

my %given_hints;
my %given_warnings;
sub hint
{
$opt{quiet} and return;
my $func = shift;
my $rv = 0;
if (exists $warnings{$func} && !$given_warnings{$func}++) {
my $warn = $warnings{$func};
$warn =~ s/^\!*** !mg;
print "*** WARNING: $func\n", $warn;
$rv++;
}
if ($opt{hints} && exists $hints{$func} && !$given_hints{$func}++) {
my $hint = $hints{$func};
$hint =~ s/^\s* /mg;
print " --- hint for $func ---\n", $hint;
}
$rv;
}

sub usage
{
my($usage) = do { local(@ARGV,$/)=($0); <> } =~ /^=head\d$HS+SYNOPSIS\s**^(.*?)\s**^=/ms;
my %M = ( 'T' => '*' );
$usage =~ s/^\s*perl\s+\S+/$^X $0/;
$usage =~ s/([A-Z])<([^>]+)>/M{$1}M{$1}/g;

print <<ENDUSAGE;

Usage: $usage

See perldoc $0 for details.

ENDUSAGE

exit 2;
}

sub strip
{

```

```

my $self = do { local(@ARGV,$/)=($0); <> };
my($copy) = $self =~ /^=head\d\s+COPYRIGHT\s*^(.*?)*^=\w+/ms;
$copy =~ s/^(?=\S+)/ /gms;
$self =~ s/^\$HS+Do NOT edit.*?(?=-)/$copy/ms;
$self =~ s/^\$SKIP.*(?=^__DATA__)/SKIP
if (\@ARGV && \$ARGV[0] eq '--unstrip') {
eval { require Devel::PPPport };
\$_@ and die "Cannot require Devel::PPPport, please install.\n";
if (eval \$Devel::PPPport::VERSION < $VERSION) {
die "$0 was originally generated with Devel::PPPport $VERSION.\n"
. "Your Devel::PPPport is only version \$Devel::PPPport::VERSION.\n"
. "Please install a newer version, or --unstrip will not work.\n";
}
Devel::PPPport::WriteFile(\$0);
exit 0;
}
print <<END;

```

Sorry, but this is a stripped version of \\$0.

To be able to use its original script and doc functionality,  
please try to regenerate this file using:

```
\$^X \$0 --unstrip
```

END

```
/ms;
```

```
my($pl, $c) = $self =~ /(.*^__DATA__)(.*)/ms;
```

```
$c =~ s{
```

```
 / (? : \*[^\*]*\*(?:[^\$ccs][^\*]*\*)* / | [^\r\n]*
```

```
 | ( "[^"]*"(?:\\.["\\"])*"
```

```
 | '[^']*'(?:\\.['\\'])*' )
```

```
 | ($HS+) ){ defined $2 ? '': ($1 || ") }gsex;
```

```
$c =~ s!\s+#!mg;
```

```
$c =~ s!^\$LF!mg;
```

```
$c =~ s!\s*#\s*#!mg;
```

```
$c =~ s!\s+#!mg;
```

```
open OUT, ">$0" or die "cannot strip $0: $!\n";
```

```
print OUT "$pl$c\n";
```

```
exit 0;
```

```
}
```

```
__DATA__
```

```
*/
```

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1014324276\_1591897366.99/0/perl-threads-2.21-2.el8.src.rpm-cosi-expand-archive-Nd1sJ2w3/threads-2.21.tar.gz-cosi-expand-archive-XgGyr8xL/threads-2.21/ppport.h

No license file was found, but licenses were detected in source scan.

=head1 NAME

threads - Perl interpreter-based threads

=head1 VERSION

This document describes threads version 2.21

=head1 WARNING

The "interpreter-based threads" provided by Perl are not the fast, lightweight system for multitasking that one might expect or hope for. Threads are implemented in a way that make them easy to misuse. Few people know how to use them correctly or will be able to provide help.

The use of interpreter-based threads in perl is officially L<discouraged|perlpolicy/discouraged>.

=head1 SYNOPSIS

```
use threads ('yield',
            'stack_size' => 64*4096,
            'exit' => 'threads_only',
            'stringify');

sub start_thread {
    my @args = @_;
    print("Thread started: ', join(' ', @args), "\n");
}
my $thr = threads->create('start_thread', 'argument');
$thr->join();

threads->create(sub { print("I am a thread\n"); }->join());

my $thr2 = async { foreach (@files) { ... } };
$thr2->join();
if (my $err = $thr2->error()) {
    warn("Thread error: $err\n");
}

# Invoke thread in list context (implicit) so it can return a list
my ($thr) = threads->create(sub { return (qw/a b c/); });
# or specify list context explicitly
my $thr = threads->create({'context' => 'list'},
```

```

        sub { return (qw/a b c/); });
my @results = $thr->join();

$thr->detach();

# Get a thread's object
$thr = threads->self();
$thr = threads->object($tid);

# Get a thread's ID
$tid = threads->tid();
$tid = $thr->tid();
$tid = "$thr";

# Give other threads a chance to run
threads->yield();
yield();

# Lists of non-detached threads
my @threads = threads->list();
my $thread_count = threads->list();

my @running = threads->list(threads::running);
my @joinable = threads->list(threads::joinable);

# Test thread objects
if ($thr1 == $thr2) {
    ...
}

# Manage thread stack size
$stack_size = threads->get_stack_size();
$old_size = threads->set_stack_size(32*4096);

# Create a thread with a specific context and stack size
my $thr = threads->create({ 'context' => 'list',
                          'stack_size' => 32*4096,
                          'exit' => 'thread_only' },
                        \&foo);

# Get thread's context
my $wantarray = $thr->wantarray();

# Check thread's state
if ($thr->is_running()) {
    sleep(1);
}
if ($thr->is_joinable()) {

```

```

    $thr->join();
}

# Send a signal to a thread
$thr->kill('SIGUSR1');

# Exit a thread
threads->exit();

```

## =head1 DESCRIPTION

Since Perl 5.8, thread programming has been available using a model called I<interpreter threads> which provides a new Perl interpreter for each thread, and, by default, results in no data or state information being shared between threads.

(Prior to Perl 5.8, I<5005threads> was available through the C<Thread.pm> API. This threading model has been deprecated, and was removed as of Perl 5.10.0.)

As just mentioned, all variables are, by default, thread local. To use shared variables, you need to also load L<threads::shared>:

```

use threads;
use threads::shared;

```

When loading L<threads::shared>, you must C<use threads> before you C<use threads::shared>. (C<threads> will emit a warning if you do it the other way around.)

It is strongly recommended that you enable threads via C<use threads> as early as possible in your script.

If needed, scripts can be written so as to run on both threaded and non-threaded Perls:

```

my $can_use_threads = eval 'use threads; 1';
if ($can_use_threads) {
    # Do processing using threads
    ...
} else {
    # Do it without using threads
    ...
}

```

=over

=item \$thr = threads->create(FUNCTION, ARGS)

This will create a new thread that will begin execution with the specified entry point function, and give it the I<ARGS> list as parameters. It will return the corresponding threads object, or C<undef> if thread creation failed.

I<FUNCTION> may either be the name of a function, an anonymous subroutine, or a code ref.

```
my $thr = threads->create('func_name', ...);
# or
my $thr = threads->create(sub { ... }, ...);
# or
my $thr = threads->create(\&func, ...);
```

The C<-E<gt>new()> method is an alias for C<-E<gt>create()>.

```
=item $thr->join()
```

This will wait for the corresponding thread to complete its execution. When the thread finishes, C<-E<gt>join()> will return the return value(s) of the entry point function.

The context (void, scalar or list) for the return value(s) for C<-E<gt>join()> is determined at the time of thread creation.

```
# Create thread in list context (implicit)
my ($thr1) = threads->create(sub {
    my @results = qw(a b c);
    return (@results);
});
# or (explicit)
my $thr1 = threads->create({'context' => 'list'},
    sub {
        my @results = qw(a b c);
        return (@results);
    });
# Retrieve list results from thread
my @res1 = $thr1->join();

# Create thread in scalar context (implicit)
my $thr2 = threads->create(sub {
    my $result = 42;
    return ($result);
});
# Retrieve scalar result from thread
my $res2 = $thr2->join();

# Create a thread in void context (explicit)
my $thr3 = threads->create({'void' => 1},
```



```
        sub { print("Hello, world\n"); };  
# Join the thread in void context (i.e., no return value)  
$thr3->join();
```

See L</"THREAD CONTEXT"> for more details.

If the program exits without all threads having either been joined or detached, then a warning will be issued.

Calling C<-E<gt>join()> or C<-E<gt>detach()> on an already joined thread will cause an error to be thrown.

=item \$thr->detach()

Makes the thread unjoinable, and causes any eventual return value to be discarded. When the program exits, any detached threads that are still running are silently terminated.

If the program exits without all threads having either been joined or detached, then a warning will be issued.

Calling C<-E<gt>join()> or C<-E<gt>detach()> on an already detached thread will cause an error to be thrown.

=item threads->detach()

Class method that allows a thread to detach itself.

=item threads->self()

Class method that allows a thread to obtain its own I<threads> object.

=item \$thr->tid()

Returns the ID of the thread. Thread IDs are unique integers with the main thread in a program being 0, and incrementing by 1 for every thread created.

=item threads->tid()

Class method that allows a thread to obtain its own ID.

=item "\$thr"

If you add the C<stringify> import option to your C<use threads> declaration, then using a threads object in a string or a string context (e.g., as a hash key) will cause its ID to be used as the value:

```
use threads qw(stringify);
```

```
my $thr = threads->create(...);
print("Thread $thr started\n"); # Prints: Thread 1 started
```

```
=item threads->object($tid)
```

This will return the `I<threads>` object for the `I<active>` thread associated with the specified thread ID. If `C<$tid>` is the value for the current thread, then this call works the same as `C<-E<gt>self()`. Otherwise, returns `C<undef>` if there is no thread associated with the TID, if the thread is joined or detached, if no TID is specified or if the specified TID is `undef`.

```
=item threads->yield()
```

This is a suggestion to the OS to let this thread yield CPU time to other threads. What actually happens is highly dependent upon the underlying thread implementation.

You may do `C<use threads qw(yield)>`, and then just use `C<yield()` in your code.

```
=item threads->list()
```

```
=item threads->list(threads::all)
```

```
=item threads->list(threads::running)
```

```
=item threads->list(threads::joinable)
```

With no arguments (or using `C<threads::all>`) and in a list context, returns a list of all non-joined, non-detached `I<threads>` objects. In a scalar context, returns a count of the same.

With a `I<true>` argument (using `C<threads::running>`), returns a list of all non-joined, non-detached `I<threads>` objects that are still running.

With a `I<false>` argument (using `C<threads::joinable>`), returns a list of all non-joined, non-detached `I<threads>` objects that have finished running (i.e., for which `C<-E<gt>join()` will not `I<block>`).

```
=item $thr1->equal($thr2)
```

Tests if two threads objects are the same thread or not. This is overloaded to the more natural forms:

```
if ($thr1 == $thr2) {
    print("Threads are the same\n");
}
```

```
# or
if ($thr1 != $thr2) {
    print("Threads differ\n");
}
```

(Thread comparison is based on thread IDs.)

=item async BLOCK;

C<async> creates a thread to execute the block immediately following it. This block is treated as an anonymous subroutine, and so must have a semicolon after the closing brace. Like C<threads-E<gt>create()>, C<async> returns a I<threads> object.

=item \$thr->error()

Threads are executed in an C<eval> context. This method will return C<undef> if the thread terminates I<normally>. Otherwise, it returns the value of C<\$@> associated with the thread's execution status in its C<eval> context.

=item \$thr->\_handle()

This I<private> method returns a pointer (i.e., the memory location expressed as an unsigned integer) to the internal thread structure associated with a threads object. For Win32, this is a pointer to the C<HANDLE> value returned by C<CreateThread> (i.e., C<HANDLE \*>); for other platforms, it is a pointer to the C<pthread\_t> structure used in the C<pthread\_create> call (i.e., C<pthread\_t \*>).

This method is of no use for general Perl threads programming. Its intent is to provide other (XS-based) thread modules with the capability to access, and possibly manipulate, the underlying thread structure associated with a Perl thread.

=item threads->\_handle()

Class method that allows a thread to obtain its own I<handle>.

=back

=head1 EXITING A THREAD

The usual method for terminating a thread is to L<return()|perlfunc/"return EXPR"> from the entry point function with the appropriate return value(s).

=over

=item threads->exit()

If needed, a thread can be exited at any time by calling `C<threads-E<gt>exit()`. This will cause the thread to return `C<undef>` in a scalar context, or the empty list in a list context.

When called from the `I<main>` thread, this behaves the same as `C<exit(0)>`.

=item threads->exit(status)

When called from a thread, this behaves like `C<threads-E<gt>exit()` (i.e., the exit status code is ignored).

When called from the `I<main>` thread, this behaves the same as `C<exit(status)>`.

=item die()

Calling `C<die()` in a thread indicates an abnormal exit for the thread. Any `C<SIG{__DIE__}>` handler in the thread will be called first, and then the thread will exit with a warning message that will contain any arguments passed in the `C<die()` call.

=item exit(status)

Calling `L<exit()|perlfunc/"exit EXPR">` inside a thread causes the whole application to terminate. Because of this, the use of `C<exit()` inside threaded code, or in modules that might be used in threaded applications, is strongly discouraged.

If `C<exit()` really is needed, then consider using the following:

```
threads->exit() if threads->can('exit'); # Thread friendly
exit(status);
```

=item use threads 'exit' => 'threads\_only'

This globally overrides the default behavior of calling `C<exit()` inside a thread, and effectively causes such calls to behave the same as `C<threads-E<gt>exit()`. In other words, with this setting, calling `C<exit()` causes only the thread to terminate.

Because of its global effect, this setting should not be used inside modules or the like.

The `I<main>` thread is unaffected by this setting.

=item threads->create({'exit' => 'thread\_only'}, ...)

This overrides the default behavior of C<exit()> inside the newly created thread only.

```
=item $thr->set_thread_exit_only(boolean)
```

This can be used to change the I<exit thread only> behavior for a thread after it has been created. With a I<true> argument, C<exit()> will cause only the thread to exit. With a I<false> argument, C<exit()> will terminate the application.

The I<main> thread is unaffected by this call.

```
=item threads->set_thread_exit_only(boolean)
```

Class method for use inside a thread to change its own behavior for C<exit()>.

The I<main> thread is unaffected by this call.

```
=back
```

```
=head1 THREAD STATE
```

The following boolean methods are useful in determining the I<state> of a thread.

```
=over
```

```
=item $thr->is_running()
```

Returns true if a thread is still running (i.e., if its entry point function has not yet finished or exited).

```
=item $thr->is_joinable()
```

Returns true if the thread has finished running, is not detached and has not yet been joined. In other words, the thread is ready to be joined, and a call to C<\$thr->join()> will not I<block>.

```
=item $thr->is_detached()
```

Returns true if the thread has been detached.

```
=item threads->is_detached()
```

Class method that allows a thread to determine whether or not it is detached.

```
=back
```

## =head1 THREAD CONTEXT

As with subroutines, the type of value returned from a thread's entry point function may be determined by the thread's I<context>: list, scalar or void. The thread's context is determined at thread creation. This is necessary so that the context is available to the entry point function via L<wantarray()|perlfunc/"wantarray">. The thread may then specify a value of the appropriate type to be returned from C<-E<gt>join()>.

## =head2 Explicit context

Because thread creation and thread joining may occur in different contexts, it may be desirable to state the context explicitly to the thread's entry point function. This may be done by calling C<-E<gt>create()> with a hash reference as the first argument:

```
my $thr = threads->create({'context' => 'list'}, \&foo);
...
my @results = $thr->join();
```

In the above, the threads object is returned to the parent thread in scalar context, and the thread's entry point function C<foo> will be called in list (array) context such that the parent thread can receive a list (array) from the C<-E<gt>join()> call. (C<'array'> is synonymous with C<'list'>.)

Similarly, if you need the threads object, but your thread will not be returning a value (i.e., I<void> context), you would do the following:

```
my $thr = threads->create({'context' => 'void'}, \&foo);
...
$thr->join();
```

The context type may also be used as the I<key> in the hash reference followed by a I<true> value:

```
threads->create({'scalar' => 1}, \&foo);
...
my ($thr) = threads->list();
my $result = $thr->join();
```

## =head2 Implicit context

If not explicitly stated, the thread's context is implied from the context of the C<-E<gt>create()> call:

```
# Create thread in list context
my ($thr) = threads->create(...);
```

```
# Create thread in scalar context
```

```
my $thr = threads->create(...);
```

```
# Create thread in void context
```

```
threads->create(...);
```

```
=head2 $thr->wantarray()
```

This returns the thread's context in the same manner as

```
L<wantarray()|perlfunc/"wantarray">.
```

```
=head2 threads->wantarray()
```

Class method to return the current thread's context. This returns the same value as running `L<wantarray()|perlfunc/"wantarray">` inside the current thread's entry point function.

```
=head1 THREAD STACK SIZE
```

The default per-thread stack size for different platforms varies significantly, and is almost always far more than is needed for most applications. On Win32, Perl's makefile explicitly sets the default stack to 16 MB; on most other platforms, the system default is used, which again may be much larger than is needed.

By tuning the stack size to more accurately reflect your application's needs, you may significantly reduce your application's memory usage, and increase the number of simultaneously running threads.

Note that on Windows, address space allocation granularity is 64 KB, therefore, setting the stack smaller than that on Win32 Perl will not save any more memory.

```
=over
```

```
=item threads->get_stack_size();
```

Returns the current default per-thread stack size. The default is zero, which means the system default stack size is currently in use.

```
=item $size = $thr->get_stack_size();
```

Returns the stack size for a particular thread. A return value of zero indicates the system default stack size was used for the thread.

```
=item $old_size = threads->set_stack_size($new_size);
```

Sets a new default per-thread stack size, and returns the previous setting.

Some platforms have a minimum thread stack size. Trying to set the stack size below this value will result in a warning, and the minimum stack size will be used.

Some Linux platforms have a maximum stack size. Setting too large of a stack size will cause thread creation to fail.

If needed, C<\$new\_size> will be rounded up to the next multiple of the memory page size (usually 4096 or 8192).

Threads created after the stack size is set will then either call C<pthread\_attr\_setstacksize()> I<(for pthreads platforms)>, or supply the stack size to C<CreateThread()> I<(for Win32 Perl)>.

(Obviously, this call does not affect any currently extant threads.)

```
=item use threads ('stack_size' => VALUE);
```

This sets the default per-thread stack size at the start of the application.

```
=item $ENV{'PERL5_ITHREADS_STACK_SIZE'}
```

The default per-thread stack size may be set at the start of the application through the use of the environment variable C<PERL5\_ITHREADS\_STACK\_SIZE>:

```
PERL5_ITHREADS_STACK_SIZE=1048576
export PERL5_ITHREADS_STACK_SIZE
perl -e'use threads; print(threads->get_stack_size(), "\n")'
```

This value overrides any C<stack\_size> parameter given to C<use threads>. Its primary purpose is to permit setting the per-thread stack size for legacy threaded applications.

```
=item threads->create({'stack_size' => VALUE}, FUNCTION, ARGS)
```

To specify a particular stack size for any individual thread, call C<-E<gt>create()> with a hash reference as the first argument:

```
my $thr = threads->create({'stack_size' => 32*4096},
    \&foo, @args);
```

```
=item $thr2 = $thr1->create(FUNCTION, ARGS)
```

This creates a new thread (C<\$thr2>) that inherits the stack size from an existing thread (C<\$thr1>). This is shorthand for the following:

```
my $stack_size = $thr1->get_stack_size();
```



```
my $thr2 = threads->create({'stack_size' => $stack_size},  
    FUNCTION, ARGS);
```

=back

=head1 THREAD SIGNALLING

When `safe_signals` is in effect (the default behavior - see [L</"Unsafe signals">](#) for more details), then signals may be sent and acted upon by individual threads.

=over 4

```
=item $thr->kill('SIG...');
```

Sends the specified signal to the thread. Signal names and (positive) signal numbers are the same as those supported by [L<kill\(\)|perlfunc/"kill SIGNAL, LIST">](#). For example, 'SIGTERM', 'TERM' and (depending on the OS) 15 are all valid arguments to [C<-E<gt>kill\(\)>](#).

Returns the thread object to allow for method chaining:

```
$thr->kill('SIG...')->join();
```

=back

Signal handlers need to be set up in the threads for the signals they are expected to act upon. Here's an example for [I<cancelling>](#) a thread:

```
use threads;  
  
sub thr_func  
{  
    # Thread 'cancellation' signal handler  
    $SIG{'KILL'} = sub { threads->exit(); };  
  
    ...  
}  
  
# Create a thread  
my $thr = threads->create('thr_func');  
  
...  
  
# Signal the thread to terminate, and then detach  
# it so that it will get cleaned up automatically  
$thr->kill('KILL')->detach();
```

Here's another simplistic example that illustrates the use of thread signalling in conjunction with a semaphore to provide rudimentary I<suspend> and I<resume> capabilities:

```
use threads;
use Thread::Semaphore;

sub thr_func
{
    my $sema = shift;

    # Thread 'suspend/resume' signal handler
    $SIG{'STOP'} = sub {
        $sema->down();    # Thread suspended
        $sema->up();      # Thread resumes
    };

    ...
}

# Create a semaphore and pass it to a thread
my $sema = Thread::Semaphore->new();
my $thr = threads->create('thr_func', $sema);

# Suspend the thread
$sema->down();
$thr->kill('STOP');

...

# Allow the thread to continue
$sema->up();
```

CAVEAT: The thread signalling capability provided by this module does not actually send signals via the OS. It I<emulates> signals at the Perl-level such that signal handlers are called in the appropriate thread. For example, sending C<\$thr->kill('STOP')> does not actually suspend a thread (or the whole process), but does cause a C<\$SIG{'STOP'}> handler to be called in that thread (as illustrated above).

As such, signals that would normally not be appropriate to use in the C<kill()> command (e.g., C<kill('KILL', \$\$)>) are okay to use with the C<->kill()> method (again, as illustrated above).

Correspondingly, sending a signal to a thread does not disrupt the operation the thread is currently working on: The signal will be acted upon after the current operation has completed. For instance, if the thread is I<stuck> on an I/O call, sending it a signal will not cause the I/O call to be interrupted

such that the signal is acted up immediately.

Sending a signal to a terminated/finished thread is ignored.

=head1 WARNINGS

=over 4

=item Perl exited with active threads:

If the program exits without all threads having either been joined or detached, then this warning will be issued.

NOTE: If the I<main> thread exits, then this warning cannot be suppressed using C<no warnings 'threads';> as suggested below.

=item Thread creation failed: pthread\_create returned #

See the appropriate I<man> page for C<pthread\_create> to determine the actual cause for the failure.

=item Thread # terminated abnormally: ...

A thread terminated in some manner other than just returning from its entry point function, or by using C<threads-E<gt>exit()>. For example, the thread may have terminated because of an error, or by using C<die>.

=item Using minimum thread stack size of #

Some platforms have a minimum thread stack size. Trying to set the stack size below this value will result in the above warning, and the stack size will be set to the minimum.

=item Thread creation failed: pthread\_attr\_setstacksize(I<SIZE>) returned 22

The specified I<SIZE> exceeds the system's maximum stack size. Use a smaller value for the stack size.

=back

If needed, thread warnings can be suppressed by using:

```
no warnings 'threads';
```

in the appropriate scope.

=head1 ERRORS

=over 4

=item This Perl not built to support threads

The particular copy of Perl that you're trying to use was not built using the `C<useithreads>` configuration option.

Having threads support requires all of Perl and all of the XS modules in the Perl installation to be rebuilt; it is not just a question of adding the `L<threads>` module (i.e., threaded and non-threaded Perls are binary incompatible).

=item Cannot change stack size of an existing thread

The stack size of currently extant threads cannot be changed, therefore, the following results in the above error:

```
$thr->set_stack_size($size);
```

=item Cannot signal threads without safe signals

Safe signals must be in effect to use the `C<-E<gt>kill()>` signalling method. See [L<"/>Unsafe signals">](#) for more details.

=item Unrecognized signal name: ...

The particular copy of Perl that you're trying to use does not support the specified signal being used in a `C<-E<gt>kill()>` call.

=back

=head1 BUGS AND LIMITATIONS

Before you consider posting a bug report, please consult, and possibly post a message to the discussion forum to see if what you've encountered is a known problem.

=over

=item Thread-safe modules

See [L<perlmod/"Making your module threadsafe">](#) when creating modules that may be used in threaded applications, especially if those modules use non-Perl data, or XS code.

=item Using non-thread-safe modules

Unfortunately, you may encounter Perl modules that are not `I<thread-safe>`.

For example, they may crash the Perl interpreter during execution, or may dump core on termination. Depending on the module and the requirements of your application, it may be possible to work around such difficulties.

If the module will only be used inside a thread, you can try loading the module from inside the thread entry point function using `C<require>` (and `C<import>` if needed):

```
sub thr_func
{
    require Unsafe::Module
    # Unsafe::Module->import(...);

    ....
}
```

If the module is needed inside the `I<main>` thread, try modifying your application so that the module is loaded (again using `C<require>` and `C<-E<gt>import()>`) after any threads are started, and in such a way that no other threads are started afterwards.

If the above does not work, or is not adequate for your application, then file a bug report on [L<http://rt.cpan.org/Public/>](http://rt.cpan.org/Public/) against the problematic module.

#### =item Memory consumption

On most systems, frequent and continual creation and destruction of threads can lead to ever-increasing growth in the memory footprint of the Perl interpreter. While it is simple to just launch threads and then `C<-E<gt>join()>` or `C<-E<gt>detach()>` them, for long-lived applications, it is better to maintain a pool of threads, and to reuse them for the work needed, using `L<queues/Thread::Queue>` to notify threads of pending work. The CPAN distribution of this module contains a simple example (`F<examples/pool_reuse.pl>`) illustrating the creation, use and monitoring of a pool of `I<reusable>` threads.

#### =item Current working directory

On all platforms except MSWin32, the setting for the current working directory is shared among all threads such that changing it in one thread (e.g., using `C<chdir()>`) will affect all the threads in the application.

On MSWin32, each thread maintains its own the current working directory setting.

#### =item Environment variables

Currently, on all platforms except MSWin32, all `I<system>` calls (e.g., using

C<system()> or back-ticks) made from threads use the environment variable settings from the I<main> thread. In other words, changes made to C<%ENV> in a thread will not be visible in I<system> calls made by that thread.

To work around this, set environment variables as part of the I<system> call. For example:

```
my $msg = 'hello';
system("FOO=$msg; echo \${FOO}"); # Outputs 'hello' to STDOUT
```

On MSWin32, each thread maintains its own set of environment variables.

=item Catching signals

Signals are I<caught> by the main thread (thread ID = 0) of a script. Therefore, setting up signal handlers in threads for purposes other than L</"THREAD SIGNALLING"> as documented above will not accomplish what is intended.

This is especially true if trying to catch C<SIGALRM> in a thread. To handle alarms in threads, set up a signal handler in the main thread, and then use L</"THREAD SIGNALLING"> to relay the signal to the thread:

```
# Create thread with a task that may time out
my $thr = threads->create(sub {
    threads->yield();
    eval {
        $SIG{ALRM} = sub { die("Timeout\n"); };
        alarm(10);
        ... # Do work here
        alarm(0);
    };
    if ($@ =~ /Timeout/) {
        warn("Task in thread timed out\n");
    }
});

# Set signal handler to relay SIGALRM to thread
$SIG{ALRM} = sub { $thr->kill('ALRM') };

... # Main thread continues working
```

=item Parent-child threads

On some platforms, it might not be possible to destroy I<parent> threads while there are still existing I<child> threads.

=item Unsafe signals

Since Perl 5.8.0, signals have been made safer in Perl by postponing their handling until the interpreter is in a I<safe> state. See L<perl58delta/"Safe Signals"> and L<perlipc/"Deferred Signals (Safe Signals)"> for more details.

Safe signals is the default behavior, and the old, immediate, unsafe signalling behavior is only in effect in the following situations:

=over 4

=item \* Perl has been built with C<PERL\_OLD\_SIGNALS> (see C<perl -V>).

=item \* The environment variable C<PERL\_SIGNALS> is set to C<unsafe> (see L<perlrun/"PERL\_SIGNALS">).

=item \* The module L<Perl::Unsafe::Signals> is used.

=back

If unsafe signals is in effect, then signal handling is not thread-safe, and the C<-E<gt>kill()> signalling method cannot be used.

=item Identity of objects returned from threads

When a value is returned from a thread through a C<join> operation, the value and everything that it references is copied across to the joining thread, in much the same way that values are copied upon thread creation. This works fine for most kinds of value, including arrays, hashes, and subroutines. The copying recurses through array elements, reference scalars, variables closed over by subroutines, and other kinds of reference.

However, everything referenced by the returned value is a fresh copy in the joining thread, even if a returned object had in the child thread been a copy of something that previously existed in the parent thread. After joining, the parent will therefore have a duplicate of each such object. This sometimes matters, especially if the object gets mutated; this can especially matter for private data to which a returned subroutine provides access.

=item Returning blessed objects from threads

Returning blessed objects from threads does not work. Depending on the classes involved, you may be able to work around this by returning a serialized version of the object (e.g., using L<Data::Dumper> or L<Storable>), and then reconstituting it in the joining thread. If you're using Perl 5.10.0 or later, and if the class supports L<shared objects|threads::shared/"OBJECTS">,

you can pass them via `L<shared queues|Thread::Queue>`.

=item END blocks in threads

It is possible to add `L<END blocks|perlmod/"BEGIN, UNITCHECK, CHECK, INIT and END">` to threads by using `L<require|perlfunc/"require VERSION">` or `L<eval|perlfunc/"eval EXPR">` with the appropriate code. These `C<END>` blocks will then be executed when the thread's interpreter is destroyed (i.e., either during a `C<-E<gt>join()>` call, or at program termination).

However, calling any `L<threads>` methods in such an `C<END>` block will most likely `I<fail>` (e.g., the application may hang, or generate an error) due to mutexes that are needed to control functionality within the `L<threads>` module.

For this reason, the use of `C<END>` blocks in threads is `B<strongly>` discouraged.

=item Open directory handles

In perl 5.14 and higher, on systems other than Windows that do not support the `C<fchdir>` C function, directory handles (see `L<opendir|perlfunc/"opendir DIRHANDLE,EXPR">`) will not be copied to new threads. You can use the `C<d_fchdir>` variable in `L<Config.pm|Config>` to determine whether your system supports it.

In prior perl versions, spawning threads with open directory handles would crash the interpreter.

`L<[perl #75154]|http://rt.perl.org/rt3/Public/Bug/Display.html?id=75154>`

=item Detached threads and global destruction

If the main thread exits while there are detached threads which are still running, then Perl's global destruction phase is not executed because otherwise certain global structures that control the operation of threads and that are allocated in the main thread's memory may get destroyed before the detached thread is destroyed.

If you are using any code that requires the execution of the global destruction phase for clean up (e.g., removing temp files), then do not use detached threads, but rather join all threads before exiting the program.

=item Perl Bugs and the CPAN Version of `L<threads>`

Support for threads extends beyond the code in this module (i.e., `F<threads.pm>` and `F<threads.xs>`), and into the Perl interpreter itself. Older versions of Perl contain bugs that may manifest themselves despite using the latest version of `L<threads>` from CPAN. There is no workaround for this other than upgrading to the latest version of Perl.



Even with the latest version of Perl, it is known that certain constructs with threads may result in warning messages concerning leaked scalars or unreferenced scalars. However, such warnings are harmless, and may safely be ignored.

You can search for [L<threads>](#) related bug reports at [L<http://rt.cpan.org/Public/>](http://rt.cpan.org/Public/). If needed submit any new bugs, problems, patches, etc. to: [L<http://rt.cpan.org/Public/Dist/Display.html?Name=threads>](http://rt.cpan.org/Public/Dist/Display.html?Name=threads)

=back

=head1 REQUIREMENTS

Perl 5.8.0 or later

=head1 SEE ALSO

threads on MetaCPAN:

[L<https://metacpan.org/release/threads>](https://metacpan.org/release/threads)

Code repository for CPAN distribution:

[L<https://github.com/Dual-Life/threads>](https://github.com/Dual-Life/threads)

[L<threads::shared>](#), [L<perlthrtut>](#)

[L<http://www.perl.com/pub/a/2002/06/11/threads.html>](http://www.perl.com/pub/a/2002/06/11/threads.html) and

[L<http://www.perl.com/pub/a/2002/09/04/threads.html>](http://www.perl.com/pub/a/2002/09/04/threads.html)

Perl threads mailing list:

[L<http://lists.perl.org/list/ithreads.html>](http://lists.perl.org/list/ithreads.html)

Stack size discussion:

[L<http://www.perlmonks.org/?node\\_id=532956>](http://www.perlmonks.org/?node_id=532956)

Sample code in the [I<examples>](#) directory of this distribution on CPAN.

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CPAN version produced by Jerry D. Hedden [<jdhedden AT cpan DOT org>](mailto:jdhedden@cpan.org)

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threads is released under the same license as Perl.

=head1 ACKNOWLEDGEMENTS

Richard Soderberg E<lt>perl AT crystalflame DOT netE<gt> -  
Helping me out tons, trying to find reasons for races and other weird bugs!

Simon Cozens E<lt>simon AT brecon DOT co DOT ukE<gt> -  
Being there to answer zillions of annoying questions

Rocco Caputo E<lt>troc AT netrus DOT netE<gt>

Vipul Ved Prakash E<lt>mail AT vipul DOT netE<gt> -  
Helping with debugging

Dean Arnold E<lt>darnold AT presicient DOT comE<gt> -  
Stack size API

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1014324276\_1591897366.99/0/perl-threads-2.21-2.el8.src.rpm-cosi-expand-  
archive-Nd1sJ2w3/threads-2.21.tar.gz-cosi-expand-archive-XgGyr8xL/threads-2.21/lib/threads.pm

No license file was found, but licenses were detected in source scan.

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Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1014324276\_1591897366.99/0/perl-threads-2.21-2.el8.src.rpm-cosi-expand-  
archive-Nd1sJ2w3/threads-2.21.tar.gz-cosi-expand-archive-XgGyr8xL/threads-2.21/examples/pool\_reuse.pl

\* /opt/ws\_local/PERMITS\_SQL/1014324276\_1591897366.99/0/perl-threads-2.21-2.el8.src.rpm-cosi-expand-  
archive-Nd1sJ2w3/threads-2.21.tar.gz-cosi-expand-archive-XgGyr8xL/threads-2.21/examples/pool.pl

# 1.371 nghttp2 1.33.0 3.el8\_2.1

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set yrange [0:]

set terminal pngcairo font 'Sans, 8' lw 1 size 1400,1024

set xtics rotate by -45

set style histogram errorbars gap 2 lw 1

set style fill solid border -1

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# 1.372 jbig-kit 2.1-14.el8

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```
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```
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## 1.373 libxext 1.3.4 1.el8

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## 1.374 python-pip 9.0.3

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# 1.375 zlib 1.2.11

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

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## 1.377 logrus 1.8.1

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## 1.378 glibc 2.28-189.1.el8

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We call this license the @dfn{Lesser} General Public License because it does @emph{Less} to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

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system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a ``work based on the library" and a ``work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

## @subheading TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

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``Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

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You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

@end enumerate

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

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Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

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A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a ``work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

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When a ``work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

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Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

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@subheading END OF TERMS AND CONDITIONS

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@smallexample

@var{one line to give the library's name and an idea of what it does.}

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@end smallexample

Also add information on how to contact you by electronic and paper mail.

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@smallexample

Yoyodyne, Inc., hereby disclaims all copyright interest in the library  
'Frob' (a library for tweaking knobs) written by James Random Hacker.

@var{signature of Ty Coon}, 1 April 1990

Ty Coon, President of Vice

@end smallexample

That's all there is to it!

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Version 2, June 1991

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```

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```
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This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate  
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```
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`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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former contains code derived from the library, whereas the latter must be combined with the library in order to run.

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"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

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Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

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However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

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You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

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d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

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@c ispell-local-pdict: "ispell-dict"

@c End:

## 1.379 libxpm 3.5.12-8.el8

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# 1.380 markupsafe 2.1.1

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[metadata]

name = MarkupSafe

version = attr: markupsafe.\_\_version\_\_

url = <https://palletsprojects.com/p/markupsafe/>

```
project_urls =
    Donate = https://palletsprojects.com/donate
    Documentation = https://markupsafe.palletsprojects.com/
    Changes = https://markupsafe.palletsprojects.com/changes/
    Source Code = https://github.com/pallets/markupsafe/
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author = Armin Ronacher
author_email = armin.ronacher@active-4.com
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description = Safely add untrusted strings to HTML/XML markup.
long_description = file: README.rst
long_description_content_type = text/x-rst
classifiers =
    Development Status :: 5 - Production/Stable
    Environment :: Web Environment
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    License :: OSI Approved :: BSD License
    Operating System :: OS Independent
    Programming Language :: Python
    Topic :: Internet :: WWW/HTTP :: Dynamic Content
    Topic :: Text Processing :: Markup :: HTML
```

```
[options]
```

```
packages = find:
package_dir = = src
include_package_data = True
python_requires = >= 3.7
```

```
[options.packages.find]
```

```
where = src
```

```
[tool:pytest]
```

```
testpaths = tests
filterwarnings =
    error
```

```
[coverage:run]
```

```
branch = True
source =
    markupsafe
    tests
```

```
[coverage:paths]
```



```
source =  
src  
*/site-packages
```

```
[flake8]  
select = B, E, F, W, B9, ISC  
ignore =  
E203  
E501  
E722  
W503  
max-line-length = 80
```

```
[mypy]  
files = src/markupsafe  
python_version = 3.7  
show_error_codes = True  
disallow_subclassing_any = True  
disallow_untyped_calls = True  
disallow_untyped_defs = True  
disallow_incomplete_defs = True  
no_implicit_optional = True  
local_partial_types = True  
no_implicit_reexport = True  
strict_equality = True  
warn_redundant_casts = True  
warn_unused_configs = True  
warn_unused_ignores = True  
warn_return_any = True  
warn_unreachable = True
```

```
[egg_info]  
tag_build =  
tag_date = 0
```

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```
Metadata-Version: 2.1  
Name: MarkupSafe  
Version: 2.1.1  
Summary: Safely add untrusted strings to HTML/XML markup.  
Home-page: https://palletsprojects.com/p/markupsafe/  
Author: Armin Ronacher  
Author-email: armin.ronacher@active-4.com  
Maintainer: Pallets  
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```

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Platform: UNKNOWN  
Classifier: Development Status :: 5 - Production/Stable  
Classifier: Environment :: Web Environment  
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Classifier: License :: OSI Approved :: BSD License  
Classifier: Operating System :: OS Independent  
Classifier: Programming Language :: Python  
Classifier: Topic :: Internet :: WWW/HTTP :: Dynamic Content  
Classifier: Topic :: Text Processing :: Markup :: HTML  
Requires-Python: >=3.7  
Description-Content-Type: text/x-rst  
License-File: LICENSE.rst

## MarkupSafe

=====

MarkupSafe implements a text object that escapes characters so it is safe to use in HTML and XML. Characters that have special meanings are replaced so that they display as the actual characters. This mitigates injection attacks, meaning untrusted user input can safely be displayed on a page.

## Installing

-----

Install and update using ``pip`_`:

.. code-block:: text

```
pip install -U MarkupSafe
```

.. `_pip`: <https://pip.pypa.io/en/stable/getting-started/>

## Examples

-----

.. code-block:: pycon

```

>>> from markupsafe import Markup, escape

>>> # escape replaces special characters and wraps in Markup
>>> escape("<script>alert(document.cookie);</script>")
Markup('&lt;script&gt;alert(document.cookie);&lt;/script&gt;')

>>> # wrap in Markup to mark text "safe" and prevent escaping
>>> Markup("<strong>Hello</strong>")
Markup('<strong>hello</strong>')

>>> escape(Markup("<strong>Hello</strong>"))
Markup('<strong>hello</strong>')

>>> # Markup is a str subclass
>>> # methods and operators escape their arguments
>>> template = Markup("Hello <em>{ name }</em>")
>>> template.format(name="World")
Markup('Hello <em>&#34;World&#34;</em>')

```

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-----

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```

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- \* /opt/ws\_local/PERMITS\_SQL/1048949653\_1591433284.08/0/asm-all-repackaged-2-2-0-b21-sources-1-jar/org/objectweb/asm/util/TraceFieldVisitor.java
- \* /opt/ws\_local/PERMITS\_SQL/1048949653\_1591433284.08/0/asm-all-repackaged-2-2-0-b21-sources-1-jar/org/objectweb/asm/signature/SignatureWriter.java
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```

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## 1.388 kmod 25-19.el8

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## 1.392 libiconv 2.28

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The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is in some sense simply using the library, and is analogous to running a utility program or application program. However, in a textual and legal sense, the linked executable is a combined work, a derivative of the original library, and the ordinary General Public License treats it as such.

Because of this blurred distinction, using the ordinary General Public License for libraries did not effectively promote software sharing, because most developers did not use the libraries. We concluded that weaker conditions might promote sharing better.

However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, while the latter only works together with the library.

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Otherwise, if the work is a derivative of the Library, you may

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## 1.393 cups 2.2.6-45.el8\_6.2

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```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) 19yy <name of author>
```

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```
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```

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<signature of Ty Coon>, 1 April 1989  
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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

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# 1.394 perl-pathtools 3.74-1.el8

## 1.394.1 Available under license :

No license file was found, but licenses were detected in source scan.

=head1 NAME

File::Spec::Functions - portably perform operations on file names

=head1 SYNOPSIS

```
use File::Spec::Functions;  
$x = catfile('a','b');
```

=head1 DESCRIPTION

This module exports convenience functions for all of the class methods provided by File::Spec.

For a reference of available functions, please consult L<File::Spec::Unix>, which contains the entire set, and which is inherited by the modules for other platforms. For further information, please see L<File::Spec::Mac>, L<File::Spec::OS2>, L<File::Spec::Win32>, or L<File::Spec::VMS>.

=head2 Exports

The following functions are exported by default.

canonpath  
catdir  
catfile  
curdir  
rootdir  
updir  
no\_upwards  
file\_name\_is\_absolute  
path

The following functions are exported only by request.

devnull  
tmpdir  
splitpath  
splitdir  
catpath  
abs2rel  
rel2abs  
case\_tolerant

All the functions may be imported using the C<:ALL> tag.

=head1 COPYRIGHT

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=head1 SEE ALSO

File::Spec, File::Spec::Unix, File::Spec::Mac, File::Spec::OS2,  
File::Spec::Win32, File::Spec::VMS, ExtUtils::MakeMaker

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548107\_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/lib/File/Spec/Functions.pm

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/\* See

\* <http://www.xray.mpe.mpg.de/mailling-lists/perl5-porters/2004-11/msg00979.html>

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```
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*/
/*
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*/
```

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548107_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-
archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/Cwd.xs
```

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```
/*
```

-----

```
ppport.h -- Perl/Pollution/Portability Version 3.39
```

```
Automatically created by Devel::PPPport running under perl 5.027009.
```

```
Do NOT edit this file directly! -- Edit PPPport_pm.PL and the
includes in parts/inc/ instead.
```

```
Use 'perldoc ppport.h' to view the documentation below.
```

-----



SKIP

=pod

=head1 NAME

ppport.h - Perl/Pollution/Portability version 3.39

=head1 SYNOPSIS

perl ppport.h [options] [source files]

Searches current directory for files if no [source files] are given

--help            show short help

--version        show version

--patch=file     write one patch file with changes

--copy=suffix    write changed copies with suffix

--diff=program   use diff program and options

--compat-version=version   provide compatibility with Perl version

--cplusplus      accept C++ comments

--quiet          don't output anything except fatal errors

--nodiag         don't show diagnostics

--nohints        don't show hints

--nochanges     don't suggest changes

--nofilter       don't filter input files

--strip          strip all script and doc functionality  
                  from ppport.h

--list-provided    list provided API

--list-unsupported list unsupported API

--api-info=name    show Perl API portability information

=head1 COMPATIBILITY

This version of F<ppport.h> is designed to support operation with Perl installations back to 5.003, and has been tested up to 5.20.

=head1 OPTIONS

=head2 --help

Display a brief usage summary.

```
=head2 --version
```

Display the version of F<ppport.h>.

```
=head2 --patch=I<file>
```

If this option is given, a single patch file will be created if any changes are suggested. This requires a working diff program to be installed on your system.

```
=head2 --copy=I<suffix>
```

If this option is given, a copy of each file will be saved with the given suffix that contains the suggested changes. This does not require any external programs. Note that this does not automatically add a dot between the original filename and the suffix. If you want the dot, you have to include it in the option argument.

If neither C<--patch> or C<--copy> are given, the default is to simply print the diffs for each file. This requires either C<Text::Diff> or a C<diff> program to be installed.

```
=head2 --diff=I<program>
```

Manually set the diff program and options to use. The default is to use C<Text::Diff>, when installed, and output unified context diffs.

```
=head2 --compat-version=I<version>
```

Tell F<ppport.h> to check for compatibility with the given Perl version. The default is to check for compatibility with Perl version 5.003. You can use this option to reduce the output of F<ppport.h> if you intend to be backward compatible only down to a certain Perl version.

```
=head2 --cplusplus
```

Usually, F<ppport.h> will detect C++ style comments and replace them with C style comments for portability reasons. Using this option instructs F<ppport.h> to leave C++ comments untouched.

```
=head2 --quiet
```

Be quiet. Don't print anything except fatal errors.

```
=head2 --nodiag
```

Don't output any diagnostic messages. Only portability alerts will be printed.

```
=head2 --nohints
```

Don't output any hints. Hints often contain useful portability notes. Warnings will still be displayed.

```
=head2 --nochanges
```

Don't suggest any changes. Only give diagnostic output and hints unless these are also deactivated.

```
=head2 --nofilter
```

Don't filter the list of input files. By default, files not looking like source code (i.e. not \*.xs, \*.c, \*.cc, \*.cpp or \*.h) are skipped.

```
=head2 --strip
```

Strip all script and documentation functionality from F<ppport.h>. This reduces the size of F<ppport.h> dramatically and may be useful if you want to include F<ppport.h> in smaller modules without increasing their distribution size too much.

The stripped F<ppport.h> will have a C<--unstrip> option that allows you to undo the stripping, but only if an appropriate C<Devel::PPPort> module is installed.

```
=head2 --list-provided
```

Lists the API elements for which compatibility is provided by F<ppport.h>. Also lists if it must be explicitly requested, if it has dependencies, and if there are hints or warnings for it.

```
=head2 --list-unsupported
```

Lists the API elements that are known not to be supported by F<ppport.h> and below which version of Perl they probably won't be available or work.

```
=head2 --api-info=I<name>
```

Show portability information for API elements matching I<name>.

If I<name> is surrounded by slashes, it is interpreted as a regular expression.

=head1 DESCRIPTION

In order for a Perl extension (XS) module to be as portable as possible across differing versions of Perl itself, certain steps need to be taken.

=over 4

=item \*

Including this header is the first major one. This alone will give you access to a large part of the Perl API that hasn't been available in earlier Perl releases. Use

```
perl ppport.h --list-provided
```

to see which API elements are provided by ppport.h.

=item \*

You should avoid using deprecated parts of the API. For example, using global Perl variables without the C<PL\_> prefix is deprecated. Also, some API functions used to have a C<perl\_> prefix. Using this form is also deprecated. You can safely use the supported API, as F<ppport.h> will provide wrappers for older Perl versions.

=item \*

If you use one of a few functions or variables that were not present in earlier versions of Perl, and that can't be provided using a macro, you have to explicitly request support for these functions by adding one or more C<#define>s in your source code before the inclusion of F<ppport.h>.

These functions or variables will be marked C<explicit> in the list shown by C<--list-provided>.

Depending on whether your module has a single or multiple files that use such functions or variables, you want either C<static> or global variants.

For a C<static> function or variable (used only in a single source file), use:

```
#define NEED_function  
#define NEED_variable
```

For a global function or variable (used in multiple source files),

use:

```
#define NEED_function_GLOBAL
#define NEED_variable_GLOBAL
```

Note that you mustn't have more than one global request for the same function or variable in your project.

Function / Variable	Static Request	Global Request
PL_parser	NEED_PL_parser	NEED_PL_parser_GLOBAL
PL_signals	NEED_PL_signals	NEED_PL_signals_GLOBAL
SvRX()	NEED_SvRX	NEED_SvRX_GLOBAL
caller_cx()	NEED_caller_cx	NEED_caller_cx_GLOBAL
croak_xs_usage()	NEED_croak_xs_usage	NEED_croak_xs_usage_GLOBAL
die_sv()	NEED_die_sv	NEED_die_sv_GLOBAL
eval_pv()	NEED_eval_pv	NEED_eval_pv_GLOBAL
grok_bin()	NEED_grok_bin	NEED_grok_bin_GLOBAL
grok_hex()	NEED_grok_hex	NEED_grok_hex_GLOBAL
grok_number()	NEED_grok_number	NEED_grok_number_GLOBAL
grok_numeric_radix()	NEED_grok_numeric_radix	NEED_grok_numeric_radix_GLOBAL
grok_oct()	NEED_grok_oct	NEED_grok_oct_GLOBAL
gv_fetchpvn_flags()	NEED_gv_fetchpvn_flags	NEED_gv_fetchpvn_flags_GLOBAL
load_module()	NEED_load_module	NEED_load_module_GLOBAL
mess()	NEED_mess	NEED_mess_GLOBAL
mess_nocontext()	NEED_mess_nocontext	NEED_mess_nocontext_GLOBAL
mess_sv()	NEED_mess_sv	NEED_mess_sv_GLOBAL
mg_findext()	NEED_mg_findext	NEED_mg_findext_GLOBAL
my_snprintf()	NEED_my_snprintf	NEED_my_snprintf_GLOBAL
my_sprintf()	NEED_my_sprintf	NEED_my_sprintf_GLOBAL
my_strlcat()	NEED_my_strlcat	NEED_my_strlcat_GLOBAL
my_strlcpy()	NEED_my_strlcpy	NEED_my_strlcpy_GLOBAL
newCONSTSUB()	NEED_newCONSTSUB	NEED_newCONSTSUB_GLOBAL
newRV_noinc()	NEED_newRV_noinc	NEED_newRV_noinc_GLOBAL
newSV_type()	NEED_newSV_type	NEED_newSV_type_GLOBAL
newSVpvn_flags()	NEED_newSVpvn_flags	NEED_newSVpvn_flags_GLOBAL
newSVpvn_share()	NEED_newSVpvn_share	NEED_newSVpvn_share_GLOBAL
pv_display()	NEED_pv_display	NEED_pv_display_GLOBAL
pv_escape()	NEED_pv_escape	NEED_pv_escape_GLOBAL
pv_pretty()	NEED_pv_pretty	NEED_pv_pretty_GLOBAL
sv_2pv_flags()	NEED_sv_2pv_flags	NEED_sv_2pv_flags_GLOBAL
sv_2pvbyte()	NEED_sv_2pvbyte	NEED_sv_2pvbyte_GLOBAL
sv_catpvf_mg()	NEED_sv_catpvf_mg	NEED_sv_catpvf_mg_GLOBAL
sv_catpvf_mg_nocontext()	NEED_sv_catpvf_mg_nocontext	NEED_sv_catpvf_mg_nocontext_GLOBAL
sv_pvn_force_flags()	NEED_sv_pvn_force_flags	NEED_sv_pvn_force_flags_GLOBAL
sv_setpvf_mg()	NEED_sv_setpvf_mg	NEED_sv_setpvf_mg_GLOBAL
sv_setpvf_mg_nocontext()	NEED_sv_setpvf_mg_nocontext	NEED_sv_setpvf_mg_nocontext_GLOBAL

sv_unmagicext()	NEED_sv_unmagicext	NEED_sv_unmagicext_GLOBAL
vload_module()	NEED_vload_module	NEED_vload_module_GLOBAL
vmess()	NEED_vmess	NEED_vmess_GLOBAL
vnewSVpvf()	NEED_vnewSVpvf	NEED_vnewSVpvf_GLOBAL
warnier()	NEED_warnier	NEED_warnier_GLOBAL

To avoid namespace conflicts, you can change the namespace of the explicitly exported functions / variables using the C<DPPP\_NAMESPACE> macro. Just C<#define> the macro before including C<ppport.h>:

```
#define DPPP_NAMESPACE MyOwnNamespace_
#include "ppport.h"
```

The default namespace is C<DPPP\_>.

=back

The good thing is that most of the above can be checked by running F<ppport.h> on your source code. See the next section for details.

=head1 EXAMPLES

To verify whether F<ppport.h> is needed for your module, whether you should make any changes to your code, and whether any special defines should be used, F<ppport.h> can be run as a Perl script to check your source code. Simply say:

```
perl ppport.h
```

The result will usually be a list of patches suggesting changes that should at least be acceptable, if not necessarily the most efficient solution, or a fix for all possible problems.

If you know that your XS module uses features only available in newer Perl releases, if you're aware that it uses C++ comments, and if you want all suggestions as a single patch file, you could use something like this:

```
perl ppport.h --compat-version=5.6.0 --cplusplus --patch=test.diff
```

If you only want your code to be scanned without any suggestions for changes, use:

```
perl ppport.h --nochanges
```

You can specify a different C<diff> program or options, using the C<--diff> option:

```
perl ppport.h --diff='diff -C 10'
```

This would output context diffs with 10 lines of context.

If you want to create patched copies of your files instead, use:

```
perl ppport.h --copy=.new
```

To display portability information for the C<newSVpv<newSVpv> function, use:

```
perl ppport.h --api-info=newSVpv<newSVpv>
```

Since the argument to C<--api-info> can be a regular expression, you can use

```
perl ppport.h --api-info=/_nomg$/
```

to display portability information for all C<\_nomg> functions or

```
perl ppport.h --api-info=./
```

to display information for all known API elements.

=head1 BUGS

If this version of F<ppport.h> is causing failure during the compilation of this module, please check if newer versions of either this module or C<Devel::PPP<Devel::PPP> are available on CPAN before sending a bug report.

If F<ppport.h> was generated using the latest version of C<Devel::PPP<Devel::PPP> and is causing failure of this module, please file a bug report here: L<[https://github.com/mhx/Devel-PPP/issu<Devel-PPP/issu>](https://github.com/mhx/Devel-PPP/issues/)>

Please include the following information:

=over 4

=item 1.

The complete output from running "perl -V"

=item 2.

This file.

=item 3.

The name and version of the module you were trying to build.

=item 4.

A full log of the build that failed.

=item 5.

Any other information that you think could be relevant.

=back

For the latest version of this code, please get the C<Devel::PPort> module from CPAN.

=head1 COPYRIGHT

Version 3.x, Copyright (c) 2004-2013, Marcus Holland-Moritz.

Version 2.x, Copyright (C) 2001, Paul Marquess.

Version 1.x, Copyright (C) 1999, Kenneth Albanowski.

This program is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

=head1 SEE ALSO

See L<Devel::PPort>.

=cut

use strict;

# Disable broken TRIE-optimization

```
BEGIN { eval '${^RE_TRIE_MAXBUF} = -1' if $] >= 5.009004 && $] <= 5.009005 }
```

```
my $VERSION = 3.39;
```

```
my %opt = (  
  quiet => 0,  
  diag => 1,  
  hints => 1,  
  changes => 1,  
  cplusplus => 0,  
  filter => 1,
```



```

strip => 0,
version => 0,
);

my($ppport) = $0 =~ /([\w.]+)$/;
my $LF = '(?:\r\n|[\r\n])'; # line feed
my $HS = "[\t]";          # horizontal whitespace

# Never use C comments in this file!
my $ccs = '/'. '*';
my $cce = '*'. '/';
my $rccs = quotemeta $ccs;
my $rcce = quotemeta $cce;

eval {
    require Getopt::Long;
    Getopt::Long::GetOptions(\%opt, qw(
        help quiet diag! filter! hints! changes! cplusplus strip version
        patch=s copy=s diff=s compat-version=s
        list-provided list-unsupported api-info=s
    )) or usage();
};

if ($@ and grep /^-/, @ARGV) {
    usage() if "@ARGV" =~ /^--?h(?:elp)?$/;
    die "Getopt::Long not found. Please don't use any options.\n";
}

if ($opt{version}) {
    print "This is $0 $VERSION.\n";
    exit 0;
}

usage() if $opt{help};
strip() if $opt{strip};

if (exists $opt{'compat-version'}) {
    my($r,$v,$s) = eval { parse_version($opt{'compat-version'}) };
    if ($@) {
        die "Invalid version number format: '$opt{'compat-version'}'\n";
    }
    die "Only Perl 5 is supported\n" if $r != 5;
    die "Invalid version number: $opt{'compat-version'}\n" if $v >= 1000 || $s >= 1000;
    $opt{'compat-version'} = sprintf "%d.%03d%03d", $r, $v, $s;
}
else {
    $opt{'compat-version'} = 5;
}

```

```

my %API = map { /^(\w+)\|([^\|]*)\|([^\|]*)\|(\w*)$/
  ? ( $1 => {
    ($2          ? ( base   => $2 ) : ()),
    ($3          ? ( todo   => $3 ) : ()),
    (index($4, 'v') >= 0 ? ( varargs => 1 ) : ()),
    (index($4, 'p') >= 0 ? ( provided => 1 ) : ()),
    (index($4, 'n') >= 0 ? ( nothxarg => 1 ) : ()),
  } )
  : die "invalid spec: $_ " } qw(
ASCII_TO_NEED|5.007001|n
AvFILLp|5.004050|p
AvFILL|||
BhkDISABLE|5.024000|
BhkENABLE|5.024000|
BhkENTRY_set|5.024000|
BhkENTRY|||
BhkFLAGS|||
CALL_BLOCK_HOOKS|||
CLASS|||n
CPERLscope|5.005000|p
CX_CURPAD_SAVE|||
CX_CURPAD_SV|||
C_ARRAY_END|5.013002|p
C_ARRAY_LENGTH|5.008001|p
CopFILEAV|5.006000|p
CopFILEGV_set|5.006000|p
CopFILEGV|5.006000|p
CopFILESV|5.006000|p
CopFILE_set|5.006000|p
CopFILE|5.006000|p
CopSTASHPV_set|5.006000|p
CopSTASHPV|5.006000|p
CopSTASH_eq|5.006000|p
CopSTASH_set|5.006000|p
CopSTASH|5.006000|p
CopyD|5.009002|5.004050|p
Copy|||
CvPADLIST|5.008001|
CvSTASH|||
CvWEAKOUTSIDE|||
DECLARATION_FOR_LC_NUMERIC_MANIPULATION|5.021010|n
DEFSV_set|5.010001|p
DEFSV|5.004050|p
DO_UTF8|5.006000|
END_EXTERN_C|5.005000|p
ENTER|||
ERRSV|5.004050|p

```

EXTEND|||  
EXTERN\_C|5.005000||p  
F0convert|||n  
FREETMPS|||  
GIMME\_V||5.004000|n  
GIMME|||n  
GROK\_NUMERIC\_RADIX|5.007002||p  
G\_ARRAY|||  
G\_DISCARD|||  
G\_EVAL|||  
G\_METHOD|5.006001||p  
G\_NOARGS|||  
G\_SCALAR|||  
G\_VOID||5.004000|  
GetVars|||  
GvAV|||  
GvCV|||  
GvHV|||  
GvSV|||  
Gv\_AMupdate||5.011000|  
HEf\_SVKEY|5.003070||p  
HeHASH||5.003070|  
HeKEY||5.003070|  
HeKLEN||5.003070|  
HePV||5.004000|  
HeSVKEY\_force||5.003070|  
HeSVKEY\_set||5.004000|  
HeSVKEY||5.003070|  
HeUTF8|5.010001|5.008000|p  
HeVAL||5.003070|  
HvENAMELEN||5.015004|  
HvENAMEUTF8||5.015004|  
HvENAME||5.013007|  
HvNAMELEN\_get|5.009003||p  
HvNAMELEN||5.015004|  
HvNAMEUTF8||5.015004|  
HvNAME\_get|5.009003||p  
HvNAME|||  
INT2PTR|5.006000||p  
IN\_LOCALE\_COMPILETIME|5.007002||p  
IN\_LOCALE\_RUNTIME|5.007002||p  
IN\_LOCALE|5.007002||p  
IN\_PERL\_COMPILETIME|5.008001||p  
IS\_NUMBER\_GREATER\_THAN\_UV\_MAX|5.007002||p  
IS\_NUMBER\_INFINITY|5.007002||p  
IS\_NUMBER\_IN\_UV|5.007002||p  
IS\_NUMBER\_NAN|5.007003||p  
IS\_NUMBER\_NEG|5.007002||p

IS\_NUMBER\_NOT\_INT|5.007002||p  
IVSIZE|5.006000||p  
IVTYPE|5.006000||p  
IVdf|5.006000||p  
LEAVE|||  
LINKLIST||5.013006|  
LVRET|||  
MARK|||  
MULTICALL||5.024000|  
MUTABLE\_PTR|5.010001||p  
MUTABLE\_SV|5.010001||p  
MY\_CXT\_CLONE|5.009002||p  
MY\_CXT\_INIT|5.007003||p  
MY\_CXT|5.007003||p  
MoveD|5.009002|5.004050|p  
Move|||  
NATIVE\_TO\_NEED||5.007001|n  
NOOP|5.005000||p  
NUM2PTR|5.006000||p  
NVTYPE|5.006000||p  
NVef|5.006001||p  
NVff|5.006001||p  
NVgf|5.006001||p  
Newxc|5.009003||p  
Newxz|5.009003||p  
Newx|5.009003||p  
Nullav|||  
Nullch|||  
Nullcv|||  
Nullhv|||  
Nullsv|||  
OP\_CLASS||5.013007|  
OP\_DESC||5.007003|  
OP\_NAME||5.007003|  
OP\_TYPE\_IS\_OR\_WAS||5.019010|  
OP\_TYPE\_IS||5.019007|  
ORIGMARK|||  
OpHAS\_SIBLING|5.021007||p  
OpLASTSIB\_set|5.021011||p  
OpMAYBESIB\_set|5.021011||p  
OpMORESIB\_set|5.021011||p  
OpSIBLING|5.021007||p  
PAD\_BASE\_SV|||  
PAD\_CLONE\_VARS|||  
PAD\_COMPNAME\_FLAGS|||  
PAD\_COMPNAME\_GEN\_set|||  
PAD\_COMPNAME\_GEN|||  
PAD\_COMPNAME\_OURSTASH|||

PAD\_COMPNAME\_PV|||  
PAD\_COMPNAME\_TYPE|||  
PAD\_RESTORE\_LOCAL|||  
PAD\_SAVE\_LOCAL|||  
PAD\_SAVE\_SETNULLPAD|||  
PAD\_SETSV|||  
PAD\_SET\_CUR\_NOSAVE|||  
PAD\_SET\_CUR|||  
PAD\_SV1|||  
PAD\_SV|||  
PERLIO\_FUNCS\_CAST|5.009003||p  
PERLIO\_FUNCS\_DECL|5.009003||p  
PERL\_ABS|5.008001||p  
PERL\_ARGS\_ASSERT\_CROAK\_XS\_USAGE|||p  
PERL\_BCDVERSION|5.024000||p  
PERL\_GCC\_BRACE\_GROUPS\_FORBIDDEN|5.008001||p  
PERL\_HASH|5.003070||p  
PERL\_INT\_MAX|5.003070||p  
PERL\_INT\_MIN|5.003070||p  
PERL\_LONG\_MAX|5.003070||p  
PERL\_LONG\_MIN|5.003070||p  
PERL\_MAGIC\_arylen|5.007002||p  
PERL\_MAGIC\_backref|5.007002||p  
PERL\_MAGIC\_bm|5.007002||p  
PERL\_MAGIC\_collxfrm|5.007002||p  
PERL\_MAGIC\_dbfile|5.007002||p  
PERL\_MAGIC\_dbline|5.007002||p  
PERL\_MAGIC\_defelem|5.007002||p  
PERL\_MAGIC\_envelem|5.007002||p  
PERL\_MAGIC\_env|5.007002||p  
PERL\_MAGIC\_ext|5.007002||p  
PERL\_MAGIC\_fm|5.007002||p  
PERL\_MAGIC\_glob|5.024000||p  
PERL\_MAGIC\_isaelem|5.007002||p  
PERL\_MAGIC\_isa|5.007002||p  
PERL\_MAGIC\_mutex|5.024000||p  
PERL\_MAGIC\_nkeys|5.007002||p  
PERL\_MAGIC\_overload\_elem|5.024000||p  
PERL\_MAGIC\_overload\_table|5.007002||p  
PERL\_MAGIC\_overload|5.024000||p  
PERL\_MAGIC\_pos|5.007002||p  
PERL\_MAGIC\_qr|5.007002||p  
PERL\_MAGIC\_regdata|5.007002||p  
PERL\_MAGIC\_regdatum|5.007002||p  
PERL\_MAGIC\_regex\_global|5.007002||p  
PERL\_MAGIC\_shared\_scalar|5.007003||p  
PERL\_MAGIC\_shared|5.007003||p  
PERL\_MAGIC\_sigelem|5.007002||p

PERL\_MAGIC\_sig|5.007002||p  
PERL\_MAGIC\_substr|5.007002||p  
PERL\_MAGIC\_sv|5.007002||p  
PERL\_MAGIC\_taint|5.007002||p  
PERL\_MAGIC\_tiedelem|5.007002||p  
PERL\_MAGIC\_tiedscalar|5.007002||p  
PERL\_MAGIC\_tied|5.007002||p  
PERL\_MAGIC\_utf8|5.008001||p  
PERL\_MAGIC\_uvar\_elem|5.007003||p  
PERL\_MAGIC\_uvar|5.007002||p  
PERL\_MAGIC\_vec|5.007002||p  
PERL\_MAGIC\_vstring|5.008001||p  
PERL\_PV\_ESCAPE\_ALL|5.009004||p  
PERL\_PV\_ESCAPE\_FIRSTCHAR|5.009004||p  
PERL\_PV\_ESCAPE\_NOBACKSLASH|5.009004||p  
PERL\_PV\_ESCAPE\_NOCLEAR|5.009004||p  
PERL\_PV\_ESCAPE\_QUOTE|5.009004||p  
PERL\_PV\_ESCAPE\_RE|5.009005||p  
PERL\_PV\_ESCAPE\_UNI\_DETECT|5.009004||p  
PERL\_PV\_ESCAPE\_UNI|5.009004||p  
PERL\_PV\_PRETTY\_DUMP|5.009004||p  
PERL\_PV\_PRETTY\_ELLIPSES|5.010000||p  
PERL\_PV\_PRETTY\_LTGT|5.009004||p  
PERL\_PV\_PRETTY\_NOCLEAR|5.010000||p  
PERL\_PV\_PRETTY\_QUOTE|5.009004||p  
PERL\_PV\_PRETTY\_REGPROP|5.009004||p  
PERL\_QUAD\_MAX|5.003070||p  
PERL\_QUAD\_MIN|5.003070||p  
PERL\_REVISION|5.006000||p  
PERL\_SCAN\_ALLOW\_UNDERSCORES|5.007003||p  
PERL\_SCAN\_DISALLOW\_PREFIX|5.007003||p  
PERL\_SCAN\_GREATER\_THAN\_UV\_MAX|5.007003||p  
PERL\_SCAN\_SILENT\_ILLDIGIT|5.008001||p  
PERL\_SHORT\_MAX|5.003070||p  
PERL\_SHORT\_MIN|5.003070||p  
PERL\_SIGNALS\_UNSAFE\_FLAG|5.008001||p  
PERL\_SUBVERSION|5.006000||p  
PERL\_SYS\_INIT3||5.006000|  
PERL\_SYS\_INIT|||  
PERL\_SYS\_TERM||5.024000|  
PERL\_UCHAR\_MAX|5.003070||p  
PERL\_UCHAR\_MIN|5.003070||p  
PERL\_UINT\_MAX|5.003070||p  
PERL\_UINT\_MIN|5.003070||p  
PERL\_ULONG\_MAX|5.003070||p  
PERL\_ULONG\_MIN|5.003070||p  
PERL\_UNUSED\_ARG|5.009003||p  
PERL\_UNUSED\_CONTEXT|5.009004||p

PERL\_UNUSED\_DECL|5.007002||p  
PERL\_UNUSED\_RESULT|5.021001||p  
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sv\_setpvs\_mg|5.013006|  
sv\_setpvs|5.009004||p  
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sv\_setref\_pv|||  
sv\_setref\_uv|5.007001|  
sv\_setsv\_cow|||  
sv\_setsv\_flags|5.007002|  
sv\_setsv\_mg|5.004050||p  
sv\_setsv\_nomg|5.007002||p  
sv\_setsv|||  
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sv\_taint||5.004000|  
sv\_true||5.005000|  
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sv\_unmagic||  
sv\_unref\_flags||5.007001|  
sv\_unref||  
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sv\_usepvn\_flags||5.009004|  
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sv\_usepvn||  
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sv\_utf8\_upgrade\_flags||5.007002|  
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sv\_vcatpvfn\_flags||5.017002|  
sv\_vcatpvfn||5.004000|  
sv\_vcatpvf|5.006000|5.004000|p  
sv\_vsetpvf\_mg|5.006000|5.004000|p  
sv\_vsetpvfn||5.004000|  
sv\_vsetpvf|5.006000|5.004000|p  
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toLOWER\_uvchr|5.023009|  
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toTITLE|5.019001|  
toUPPER\_utf8|5.015007|  
toUPPER\_uvchr|5.023009|  
toUPPER||  
to\_byte\_substr||  
to\_lower\_latin1||n  
to\_uni\_fold|5.007003|  
to\_uni\_lower\_lc|5.006000|  
to\_uni\_lower|5.007003|  
to\_uni\_title\_lc|5.006000|  
to\_uni\_title|5.007003|  
to\_uni\_upper\_lc|5.006000|  
to\_uni\_upper|5.007003|  
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vverify||5.009003|  
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warn\_nocontext|||pvn  
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warner|5.006000|5.004000|pv

```

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xs_version_bootcheck|||
yyerror_pvn|||
yyerror_pv|||
yyerror|||
yylex|||
yyparse|||
yyunlex|||
yywarn|||
);

if (exists $opt{'list-unsupported'}) {
    my $f;
    for $f (sort { lc $a cmp lc $b } keys %API) {
        next unless $API{$f}{todo};
        print "$f ", 'x'(40-length($f)), " ", format_version($API{$f}{todo}), "\n";
    }
    exit 0;
}

# Scan for possible replacement candidates

my(%replace, %need, %hints, %warnings, %depends);
my $replace = 0;
my($hint, $define, $function);

sub find_api
{
    my $code = shift;
    $code =~ s{
        / (? : \*[^\*]*\*+(?:[^\$ccs][^\*]*\*+)* / | /[\r\n]*
        | "[^\\"\\]*(?:\\\[^\\"\\])*"
        | '[^\']*?(?:\[^\']*)*' }{ }egsx;
    grep { exists $API{$_} } $code =~ /(\w+)/mg;
}

```

```

while (<DATA>) {
if ($hint) {
my $h = $hint->[0] eq 'Hint' ? \%hints : \%warnings;
if (m{^\s*\*(.*)\s*$}) {
for (@{$hint->[1]}) {
$h->{$_} ||= "; # suppress warning with older perls
$h->{$_} .= "$1\n";
}
}
else { undef $hint }
}

$hint = [$1, [split /,?\s+/, $2]]
if m{^\s*$rcs\s+(Hint|Warning):\s+(\w+(?:,\s+\w+)*)\s*$};

if ($define) {
if ($define->[1] =~ /\$/) {
$define->[1] .= $_;
}
else {
if (exists $API{$define->[0]} && $define->[1] !~ /^DPPP_\(/) {
my @n = find_api($define->[1]);
push @{$depends{$define->[0]}}, @n if @n
}
undef $define;
}
}

$define = [$1, $2] if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(.*)};

if ($function) {
if (/^/) {
if (exists $API{$function->[0]}) {
my @n = find_api($function->[1]);
push @{$depends{$function->[0]}}, @n if @n
}
undef $function;
}
else {
$function->[1] .= $_;
}
}

$function = [$1, ""] if m{^DPPP_(my_(\w+))};

$replace = $1 if m{^\s*$rcs\s+Replace:\s+(\d+)\s+$rcce\s*$};
$replace{ $2 } = $1 if $replace and m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+)};
$replace{ $2 } = $1 if m{^\s*#\s*define\s+(\w+)(?:\([^\)]*\))?\s+(\w+).*rcs\s+Replace\s+$rcce};

```

```

$replace{$1} = $2 if m{^\s*$rccs\s+Replace (\w+) with (\w+)\s+$rcces*$};

if (m{^\s*$rccs\s+(\w+(\s*,\s*\w+)*)\s+depends\s+on\s+(\w+(\s*,\s*\w+)*)\s+$rcces*$}) {
  my @deps = map { s/\s+//g; $_ } split /,/, $3;
  my $d;
  for $d (map { s/\s+//g; $_ } split /,/, $1) {
    push @{$depends{$d}}, @deps;
  }
}

$need{$1} = 1 if m{^#\s+defined\(\NEED_\(\w+)(?:_GLOBAL)?\)};
}

for (values %depends) {
  my %s;
  $_ = [sort grep !$_{$_}++, @$_];
}

if (exists $opt{'api-info'}) {
  my $f;
  my $count = 0;
  my $match = $opt{'api-info'} =~ m!^(.*)/#! ? $1 : "\Q$opt{'api-info'}\E\$";
  for $f (sort { lc $a cmp lc $b } keys %API) {
    next unless $f =~ /$match/;
    print "\n=== $f ===\n";
    my $info = 0;
    if ($API{$f}{base} || $API{$f}{todo}) {
      my $base = format_version($API{$f}{base} || $API{$f}{todo});
      print "Supported at least starting from perl-$base.\n";
      $info++;
    }
    if ($API{$f}{provided}) {
      my $todo = $API{$f}{todo} ? format_version($API{$f}{todo}) : "5.003";
      print "Support by $ppport provided back to perl-$todo.\n";
      print "Support needs to be explicitly requested by NEED_$. \n" if exists $need{$f};
      print "Depends on: ", join(', ', @{$depends{$f}}), ". \n" if exists $depends{$f};
      print "\n$hints{$f}" if exists $hints{$f};
      print "\nWARNING:\n$warnings{$f}" if exists $warnings{$f};
      $info++;
    }
  }
  print "No portability information available.\n" unless $info;
  $count++;
}
$count or print "Found no API matching '$opt{'api-info'}'.";
print "\n";
exit 0;
}

```

```

if (exists $opt{'list-provided'}) {
  my $f;
  for $f (sort { lc $a cmp lc $b } keys %API) {
    next unless $API{$f}{provided};
    my @flags;
    push @flags, 'explicit' if exists $need{$f};
    push @flags, 'depend' if exists $depends{$f};
    push @flags, 'hint' if exists $hints{$f};
    push @flags, 'warning' if exists $warnings{$f};
    my $flags = @flags ? ' [' . join(', ', @flags) . '] : ";
    print "$f$flags\n";
  }
  exit 0;
}

my @files;
my @srcext = qw( .xs .c .h .cc .cpp -c.inc -xs.inc );
my $srcext = join '|', map { quotemeta $_ } @srcext;

if (@ARGV) {
  my %seen;
  for (@ARGV) {
    if (-e) {
      if (-f) {
        push @files, $_ unless $seen{$_}++;
      }
      else { warn "'$_' is not a file.\n" }
    }
    else {
      my @new = grep { -f } glob $_
        or warn "'$_' does not exist.\n";
      push @files, grep { !$seen{$_}++ } @new;
    }
  }
}
else {
  eval {
    require File::Find;
    File::Find::find(sub {
      $File::Find::name =~ /($srcext)$/i
      and push @files, $File::Find::name;
    }, '.');
  };
  if ($?) {
    @files = map { glob "$*" } @srcext;
  }
}

```



```

if (!@ARGV || $opt{filter}) {
  my(@in, @out);
  my %xsc = map { /(.*)\.xs$/ ? ("$.c" => 1, "$.cc" => 1) : () } @files;
  for (@files) {
    my $out = exists $xsc{$_} || ^\b\Q$ppport\E$/i || !/($srcext)$/i;
    push @ { $out ? \@out : \@in }, $_;
  }
  if (@ARGV && @out) {
    warning("Skipping the following files (use --nofilter to avoid this):\n| ", join "\n| ", @out);
  }
  @files = @in;
}

```

```

die "No input files given!\n" unless @files;

```

```

my(%files, %global, %revreplace);
%revreplace = reverse %replace;
my $filename;
my $patch_opened = 0;

```

```

for $filename (@files) {
  unless (open IN, "<$filename") {
    warn "Unable to read from $filename: $!\n";
    next;
  }

```

```

info("Scanning $filename ...");

```

```

my $c = do { local $/; <IN> };
close IN;

```

```

my %file = (orig => $c, changes => 0);

```

```

# Temporarily remove C/XS comments and strings from the code
my @ccom;

```

```

$c =~ s{
  ( ^$HS*\#$HS*include\b[^\r\n]+\b(?:\Q$ppport\E|XSUB\.h)\b[^\r\n]*
  | ^$HS*\#$HS*(?:define|elif|if(?:def?))\b[^\r\n]* )
| ( ^$HS*\#[^\r\n]*
  | "[^"\\]*(?:\\.[^"\\])*"
  | '[^"\\]*(?:\\.[^"\\])*'
  | /(?: \*[^*]*\*+(?:\^[^$ccs][^*]*\*+)* /|/[^\r\n]* ) )
}{ defined $2 and push @ccom, $2;
  defined $1 ? $1 : "$ccs#$ccom$cc" }mgsex;

```

```

$file{ccom} = \@ccom;

```

```

$file{code} = $c;

```

```

$file{has_inc_ppport} = $c =~ /^$HS*#$HS*include[^\r\n]+\b\Q$ppport\E\b/m;

my $func;

for $func (keys %API) {
    my $match = $func;
    $match .= "|$revreplace{$func}" if exists $revreplace{$func};
    if ($c =~ /\b(?:Perl)?($match)\b/) {
        $file{uses_replace}{$1}++ if exists $revreplace{$func} && $1 eq $revreplace{$func};
        $file{uses_Perl}{$func}++ if $c =~ /\bPerl_{$func}\b/;
        if (exists $API{$func}{provided}) {
            $file{uses_provided}{$func}++;
            if (!exists $API{$func}{base} || $API{$func}{base} > $opt{'compat-version'}) {
                $file{uses}{$func}++;
                my @deps = rec_depend($func);
                if (@deps) {
                    $file{uses_deps}{$func} = \@deps;
                    for (@deps) {
                        $file{uses}{$_} = 0 unless exists $file{uses}{$_};
                    }
                }
                for ($func, @deps) {
                    $file{needs}{$_} = 'static' if exists $need{$_};
                }
            }
        }
        if (exists $API{$func}{todo} && $API{$func}{todo} > $opt{'compat-version'}) {
            if ($c =~ /\b{$func}\b/) {
                $file{uses_todo}{$func}++;
            }
        }
    }
}

while ($c =~ /^$HS*#$HS*define$HS+(NEED_(\w+?)(_GLOBAL)?)\b/mg) {
    if (exists $need{$2}) {
        $file{defined $3 ? 'needed_global' : 'needed_static'}{$2}++;
    }
    else { warning("Possibly wrong #define $1 in $filename") }
}

for (qw(uses needs uses_todo needed_global needed_static)) {
    for $func (keys %{$file{$_}}) {
        push @{$global{$_}{$func}}, $filename;
    }
}

$files{$filename} = \%file;

```

```

}

# Globally resolve NEED_'s
my $need;
for $need (keys %{$global{needs}}) {
    if (@{$global{needs}{$need}} > 1) {
        my @targets = @{$global{needs}{$need}};
        my @t = grep $files{$_}{needed_global}{$need}, @targets;
        @targets = @t if @t;
        @t = grep /\.xs$/i, @targets;
        @targets = @t if @t;
        my $target = shift @targets;
        $files{$target}{needs}{$need} = 'global';
        for (@{$global{needs}{$need}}) {
            $files{$_}{needs}{$need} = 'extern' if $_ ne $target;
        }
    }
}

for $filename (@files) {
    exists $files{$filename} or next;

    info("=== Analyzing $filename ===");

    my %file = %{$files{$filename}};
    my $func;
    my $c = $file{code};
    my $warnings = 0;

    for $func (sort keys %{$file{uses_Perl}}) {
        if ($API{$func}{varargs}) {
            unless ($API{$func}{nothxarg}) {
                my $changes = ($c =~ s{\b(Perl_?func\s*(\s*)(?!aTHX_?)\(\)[^\s]*\)}
                    { $1 . ($2 eq ' ') ? 'aTHX' : 'aTHX_ ' ) . $2 }ge);
                if ($changes) {
                    warning("Doesn't pass interpreter argument aTHX to Perl_$func");
                    $file{changes} += $changes;
                }
            }
        }
        else {
            warning("Uses Perl_$func instead of $func");
            $file{changes} += ($c =~ s{\bPerl_?func(\s*)(\s*aTHX_?)?\s*}
                {$func$1()}g);
        }
    }

    for $func (sort keys %{$file{uses_replace}}) {

```

```

warning("Uses $func instead of $replace{$func}");
$file{changes} += ($c =~ s/\b$func\b/$replace{$func}/g);
}

for $func (sort keys %{$file{uses_provided}}) {
  if ($file{uses}{$func}) {
    if (exists $file{uses_deps}{$func}) {
      diag("Uses $func, which depends on ", join(', ', @{$file{uses_deps}{$func}}));
    }
    else {
      diag("Uses $func");
    }
  }
  $warnings += hint($func);
}

unless ($opt{quiet}) {
  for $func (sort keys %{$file{uses_todo}}) {
    print "*** WARNING: Uses $func, which may not be portable below perl ",
      format_version($API{$func}{todo}), ", even with 'Sppport\n";
    $warnings++;
  }
}

for $func (sort keys %{$file{needed_static}}) {
  my $message = "";
  if (not exists $file{uses}{$func}) {
    $message = "No need to define NEED_$func if $func is never used";
  }
  elsif (exists $file{needs}{$func} && $file{needs}{$func} ne 'static') {
    $message = "No need to define NEED_$func when already needed globally";
  }
  if ($message) {
    diag($message);
    $file{changes} += ($c =~ s/^\$HS*#\$HS*define\$HS+NEED_$func\b.*$LF//mg);
  }
}

for $func (sort keys %{$file{needed_global}}) {
  my $message = "";
  if (not exists $global{uses}{$func}) {
    $message = "No need to define NEED_${func}_GLOBAL if $func is never used";
  }
  elsif (exists $file{needs}{$func}) {
    if ($file{needs}{$func} eq 'extern') {
      $message = "No need to define NEED_${func}_GLOBAL when already needed globally";
    }
    elsif ($file{needs}{$func} eq 'static') {

```

```

    $message = "No need to define NEED_${func}_GLOBAL when only used in this file";
}
}
if ($message) {
    diag($message);
    $file{changes} += ($c =~ s/^(?=$HS*#$HS*define$HS+NEED_${func}_GLOBAL\b.*$LF//mg);
}
}

$file{needs_inc_ppport} = keys %{$file{uses}};

if ($file{needs_inc_ppport}) {
    my $pp = "";

    for $func (sort keys %{$file{needs}}) {
        my $type = $file{needs}{$func};
        next if $type eq 'extern';
        my $suffix = $type eq 'global' ? '_GLOBAL' : "";
        unless (exists $file{"needed_$type"}{$func}) {
            if ($type eq 'global') {
                diag("Files [@{$global{needs}}{$func}] need $func, adding global request");
            }
            else {
                diag("File needs $func, adding static request");
            }
            $pp .= "#define NEED_${func}$suffix\n";
        }
    }
}

if ($pp && ($c =~ s/^(?=$HS*#$HS*define$HS+NEED_\w+)/$pp/m)) {
    $pp = "";
    $file{changes}++;
}

unless ($file{has_inc_ppport}) {
    diag("Needs to include '$ppport'");
    $pp .= qq(#include "$ppport"\n)
}

if ($pp) {
    $file{changes} += ($c =~ s/^(?=$HS*#$HS*define$HS+NEED_\w+.*?)/$1$pp/ms)
        || ($c =~ s/^(?=$HS*#$HS*include.*\Q$ppport\E)/$pp/m)
        || ($c =~ s/^(?=$HS*#$HS*include.*XSUB.*\s*?)/$1$pp/m)
        || ($c =~ s/^\s*$pp/);
}
}
else {
    if ($file{has_inc_ppport}) {

```

```

diag("No need to include '$ppport'");
$file{changes} += ($c =~ s/^\$HS*?#\$HS*include.*\Q$ppport\E.*?$LF//m);
}
}

# put back in our C comments
my $ix;
my $cpc = 0;
my @ccom = @{$file{ccom}};
for $ix (0 .. $#ccom) {
    if (!$opt{cplusplus} && $ccom[$ix] =~ s!^/!!) {
        $cpc++;
        $file{changes} += $c =~ s/$rcs$ix$rcce/$ccs$ccom[$ix] $cce/;
    }
    else {
        $c =~ s/$rcs$ix$rcce/$ccom[$ix]/;
    }
}

if ($cpc) {
    my $s = $cpc != 1 ? 's' : '';
    warning("Uses $cpc C++ style comment$s, which is not portable");
}

my $s = $warnings != 1 ? 's' : '';
my $warn = $warnings ? " ($warnings warning$s)" : "";
info("Analysis completed$warn");

if ($file{changes}) {
    if (exists $opt{copy}) {
        my $newfile = "$filename$opt{copy}";
        if (-e $newfile) {
            error("$newfile' already exists, refusing to write copy of '$filename'");
        }
        else {
            local *F;
            if (open F, ">$newfile") {
                info("Writing copy of '$filename' with changes to '$newfile'");
                print F $c;
                close F;
            }
            else {
                error("Cannot open '$newfile' for writing: $!");
            }
        }
    }
    elsif (exists $opt{patch} || $opt{changes}) {
        if (exists $opt{patch}) {

```

```

unless ($patch_opened) {
    if (open PATCH, ">$opt{patch}") {
        $patch_opened = 1;
    }
    else {
        error("Cannot open '$opt{patch}' for writing: $!");
        delete $opt{patch};
        $opt{changes} = 1;
        goto fallback;
    }
}
mydiff(\*PATCH, $filename, $c);
}
else {
fallback:
    info("Suggested changes:");
    mydiff(\*STDOUT, $filename, $c);
}
}
else {
    my $s = $file{changes} == 1 ? " : 's'";
    info("$file{changes} potentially required change$s detected");
}
}
else {
    info("Looks good");
}
}

close PATCH if $patch_opened;

exit 0;

sub try_use { eval "use @_;"; return $@ eq " }

sub mydiff
{
    local *F = shift;
    my($file, $str) = @_ ;
    my $diff;

    if (exists $opt{diff}) {
        $diff = run_diff($opt{diff}, $file, $str);
    }

    if (!defined $diff and try_use("Text::Diff")) {
        $diff = Text::Diff::diff($file, \ $str, { STYLE => 'Unified' });
    }
}

```

```

    $diff = <<HEADER . $diff;
--- $file
+++ $file.patched
HEADER
}

if (!defined $diff) {
    $diff = run_diff('diff -u', $file, $str);
}

if (!defined $diff) {
    $diff = run_diff('diff', $file, $str);
}

if (!defined $diff) {
    error("Cannot generate a diff. Please install Text::Diff or use --copy.");
    return;
}

print F $diff;
}

sub run_diff
{
    my($prog, $file, $str) = @_ ;
    my $tmp = 'dppptemp';
    my $suf = 'aaa';
    my $diff = "";
    local *F;

    while (-e "$tmp.$suf") { $suf++ }
    $tmp = "$tmp.$suf";

    if (open F, ">$tmp") {
        print F $str;
        close F;

        if (open F, "$prog $file $tmp |") {
            while (<F>) {
                s/\Q$tmp\E/$file.patched/;
                $diff .= $_;
            }
            close F;
            unlink $tmp;
            return $diff;
        }

        unlink $tmp;

```



```

}
else {
    error("Cannot open '$tmp' for writing: $!");
}

return undef;
}

sub rec_depend
{
    my($func, $seen) = @_ ;
    return () unless exists $depends{$func};
    $seen = {%{$seen||{}}};
    return () if $seen->{$func}++;
    my %s;
    grep !${$_}++, map { ($_, rec_depend($_, $seen)) } @{$depends{$func}};
}

sub parse_version
{
    my $ver = shift;

    if ($ver =~ /^(d+)\.(d+)\.(d+)$/) {
        return ($1, $2, $3);
    }
    elsif ($ver !~ /^(d+)\.[d_]+$/) {
        die "cannot parse version '$ver'\n";
    }

    $ver =~ s/_//g;
    $ver =~ s/$/000000/;

    my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

    $v = int $v;
    $s = int $s;

    if ($r < 5 || ($r == 5 && $v < 6)) {
        if ($s % 10) {
            die "cannot parse version '$ver'\n";
        }
    }

    return ($r, $v, $s);
}

sub format_version
{

```

```

my $ver = shift;

$ver =~ s/000000/;
my($r,$v,$s) = $ver =~ /(\d+)\.(\d{3})(\d{3})/;

$v = int $v;
$s = int $s;

if ($r < 5 || ($r == 5 && $v < 6)) {
    if ($s % 10) {
        die "invalid version '$ver'\n";
    }
    $s /= 10;

    $ver = sprintf "%d.%03d", $r, $v;
    $s > 0 and $ver .= sprintf "_%02d", $s;

    return $ver;
}

return sprintf "%d.%d.%d", $r, $v, $s;

sub info
{
    $opt{quiet} and return;
    print @_, "\n";
}

sub diag
{
    $opt{quiet} and return;
    $opt{diag} and print @_, "\n";
}

sub warning
{
    $opt{quiet} and return;
    print "*** ", @_, "\n";
}

sub error
{
    print "*** ERROR: ", @_, "\n";
}

my %given_hints;
my %given_warnings;

```

```

sub hint
{
  $opt{quiet} and return;
  my $func = shift;
  my $rv = 0;
  if (exists $warnings{$func} && !$given_warnings{$func}++) {
    my $warn = $warnings{$func};
    $warn =~ s/^\!*** !mg;
    print "*** WARNING: $func\n", $warn;
    $rv++;
  }
  if ($opt{hints} && exists $hints{$func} && !$given_hints{$func}++) {
    my $hint = $hints{$func};
    $hint =~ s/^\s/ /mg;
    print " --- hint for $func ---\n", $hint;
  }
  $rv;
}

sub usage
{
  my($usage) = do { local(@ARGV,$/)=($0); <> } =~ /^=head\d$HS+SYNOPSIS\s*^(.*?)\s*^=/ms;
  my %M = ( 'T' => '*' );
  $usage =~ s/^\s*perl\s+\S+/$^X $0/;
  $usage =~ s/([A-Z])<([^\>]+)>/M{$1}$2M{$1}/g;

  print <<ENDUSAGE;

Usage: $usage

See perldoc $0 for details.

ENDUSAGE

exit 2;
}

sub strip
{
  my $self = do { local(@ARGV,$/)=($0); <> };
  my($copy) = $self =~ /^=head\d\s+COPYRIGHT\s*^(.*?)^=\w+/ms;
  $copy =~ s/^(?=\S+)/ /gms;
  $self =~ s/^\$HS+Do NOT edit.*?(?=-)/$copy/ms;
  $self =~ s/^\$SKIP.*(?:^__DATA__)/SKIP
  if (\@ARGV && \$_[0] eq '--unstrip') {
    eval { require Devel::PPPport };
    \$_ and die "Cannot require Devel::PPPport, please install.\n";
    if (eval { $Devel::PPPport::VERSION < $VERSION }) {

```

```

die "$0 was originally generated with Devel::PPPport $VERSION.\n"
. "Your Devel::PPPport is only version \${Devel::PPPport::VERSION}.\n"
. "Please install a newer version, or --unstrip will not work.\n";
}
Devel::PPPport::WriteFile(\$0);
exit 0;
}
print <<END;

```

Sorry, but this is a stripped version of \\$0.

To be able to use its original script and doc functionality,  
please try to regenerate this file using:

```

\^X \$0 --unstrip

END
/ms;
my($pl, $c) = $self =~ /(.*^__DATA__)(.*)/ms;
$c =~ s{
  /(?: \*[^\*]*\*+(?:[^\$ccs][^\*]*\*+)* / | /[\r\n]*
  | ("["\]*"(?:\\["\]*|.)*)"
  | '["\]*'(?:\\["\]*|.)*)'
  | ($HS+) }{ defined $2 ? ' ' : ($1 || " ) }gsex;
$c =~ s!\s+!!mg;
$c =~ s!\$LF!!mg;
$c =~ s!\s*#\s*#!mg;
$c =~ s!\s+!!mg;

open OUT, ">$0" or die "cannot strip $0: $!\n";
print OUT "$pl$c\n";

exit 0;
}

```

```

__DATA__
*/

```

Found in path(s):

```

* /opt/ws_local/PERMITS_SQL/1009548107_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-
archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/ppport.h

```

No license file was found, but licenses were detected in source scan.

=head1 NAME

File::Spec - portably perform operations on file names

=head1 SYNOPSIS

```
use File::Spec;
```

```
$x=File::Spec->catfile('a', 'b', 'c');
```

which returns 'a/b/c' under Unix. Or:

```
use File::Spec::Functions;
```

```
$x = catfile('a', 'b', 'c');
```

=head1 DESCRIPTION

This module is designed to support operations commonly performed on file specifications (usually called "file names", but not to be confused with the contents of a file, or Perl's file handles), such as concatenating several directory and file names into a single path, or determining whether a path is rooted. It is based on code directly taken from MakeMaker 5.17, code written by Andreas Koenig, Andy Dougherty, Charles Bailey, Ilya Zakharevich, Paul Schinder, and others.

Since these functions are different for most operating systems, each set of OS specific routines is available in a separate module, including:

```
File::Spec::Unix
```

```
File::Spec::Mac
```

```
File::Spec::OS2
```

```
File::Spec::Win32
```

```
File::Spec::VMS
```

The module appropriate for the current OS is automatically loaded by File::Spec. Since some modules (like VMS) make use of facilities available only under that OS, it may not be possible to load all modules under all operating systems.

Since File::Spec is object oriented, subroutines should not be called directly, as in:

```
File::Spec::catfile('a','b');
```

but rather as class methods:

```
File::Spec->catfile('a','b');
```

For simple uses, L<File::Spec::Functions> provides convenient functional forms of these methods.

=head1 METHODS

=over 2

=item canonpath  
X<canonpath>

No physical check on the filesystem, but a logical cleanup of a path.

```
$cpath = File::Spec->canonpath( $path );
```

Note that this does *not* collapse F<x/./y> sections into F<y>. This is by design. If F</foo> on your system is a symlink to F</bar/baz>, then F</foo/./quux> is actually F</bar/quux>, not F</quux> as a naive F<./>-removal would give you. If you want to do this kind of processing, you probably want C<Cwd>'s C<realpath()> function to actually traverse the filesystem cleaning up paths like this.

=item catdir  
X<catdir>

Concatenate two or more directory names to form a complete path ending with a directory. But remove the trailing slash from the resulting string, because it doesn't look good, isn't necessary and confuses OS/2. Of course, if this is the root directory, don't cut off the trailing slash :-)

```
$path = File::Spec->catdir( @directories );
```

=item catfile  
X<catfile>

Concatenate one or more directory names and a filename to form a complete path ending with a filename

```
$path = File::Spec->catfile( @directories, $filename );
```

=item curdir  
X<curdir>

Returns a string representation of the current directory.

```
$curdir = File::Spec->curdir();
```

=item devnull  
X<devnull>

Returns a string representation of the null device.

```
$devnull = File::Spec->devnull();
```

```
=item rootdir  
X<rootdir>
```

Returns a string representation of the root directory.

```
$rootdir = File::Spec->rootdir();
```

```
=item tmpdir  
X<tmpdir>
```

Returns a string representation of the first writable directory from a list of possible temporary directories. Returns the current directory if no writable temporary directories are found. The list of directories checked depends on the platform; e.g. `File::Spec::Unix` checks `C<${ENV{TMPDIR}}>` (unless `taint` is on) and `F</tmp>`.

```
$tmpdir = File::Spec->tmpdir();
```

```
=item updir  
X<updir>
```

Returns a string representation of the parent directory.

```
$updir = File::Spec->updir();
```

```
=item no_upwards
```

Given a list of files in a directory (such as from `C<readdir()>`), strip out `C<'>` and `C<'..'>`.

**B<SECURITY NOTE:>** This does NOT filter paths containing `C<'>`, like `C<'../../../../etc/passwd'>`, only literal matches to `C<'>` and `C<'..'>`.

```
@paths = File::Spec->no_upwards( readdir $dirhandle );
```

```
=item case_tolerant
```

Returns a true or false value indicating, respectively, that alphabetic case is not or is significant when comparing file specifications. Cygwin and Win32 accept an optional drive argument.

```
$is_case_tolerant = File::Spec->case_tolerant();
```

```
=item file_name_is_absolute
```

Takes as its argument a path, and returns true if it is an absolute path.

```
$is_absolute = File::Spec->file_name_is_absolute( $path );
```

This does not consult the local filesystem on Unix, Win32, OS/2, or Mac OS (Classic). It does consult the working environment for VMS (see L<File::Spec::VMS/file\_name\_is\_absolute>).

```
=item path  
X<path>
```

Takes no argument. Returns the environment variable C<PATH> (or the local platform's equivalent) as a list.

```
@PATH = File::Spec->path();
```

```
=item join  
X<join, path>
```

join is the same as catfile.

```
=item splitpath  
X<splitpath> X<split, path>
```

Splits a path in to volume, directory, and filename portions. On systems with no concept of volume, returns " for volume.

```
($volume,$directories,$file) =  
    File::Spec->splitpath( $path );  
($volume,$directories,$file) =  
    File::Spec->splitpath( $path, $no_file );
```

For systems with no syntax differentiating filenames from directories, assumes that the last file is a path unless C<\$no\_file> is true or a trailing separator or F</.> or F</..> is present. On Unix, this means that C<\$no\_file> true makes this return ( " , \$path, " ).

The directory portion may or may not be returned with a trailing '/'.

The results can be passed to L</catpath()> to get back a path equivalent to (usually identical to) the original path.

```
=item splitdir  
X<splitdir> X<split, dir>
```

The opposite of L</catdir>.

```
@dirs = File::Spec->splitdir( $directories );
```



C<\$directories> must be only the directory portion of the path on systems that have the concept of a volume or that have path syntax that differentiates files from directories.

Unlike just splitting the directories on the separator, empty directory names (C<">) can be returned, because these are significant on some OSes.

=item catpath()

Takes volume, directory and file portions and returns an entire path. Under Unix, C<\$volume> is ignored, and directory and file are concatenated. A '/' is inserted if need be. On other OSes, C<\$volume> is significant.

```
$full_path = File::Spec->catpath( $volume, $directory, $file );
```

=item abs2rel

X<abs2rel> X<absolute, path> X<relative, path>

Takes a destination path and an optional base path returns a relative path from the base path to the destination path:

```
$rel_path = File::Spec->abs2rel( $path ) ;  
$rel_path = File::Spec->abs2rel( $path, $base ) ;
```

If C<\$base> is not present or "", then L<Cwd::cwd()|Cwd> is used. If C<\$base> is relative, then it is converted to absolute form using L</rel2abs()>. This means that it is taken to be relative to L<Cwd::cwd()|Cwd>.

On systems with the concept of volume, if C<\$path> and C<\$base> appear to be on two different volumes, we will not attempt to resolve the two paths, and we will instead simply return C<\$path>. Note that previous versions of this module ignored the volume of C<\$base>, which resulted in garbage results part of the time.

On systems that have a grammar that indicates filenames, this ignores the C<\$base> filename as well. Otherwise all path components are assumed to be directories.

If C<\$path> is relative, it is converted to absolute form using L</rel2abs()>. This means that it is taken to be relative to L<Cwd::cwd()|Cwd>.

No checks against the filesystem are made. On VMS, there is interaction with the working environment, as logicals and macros are expanded.

Based on code written by Shigio Yamaguchi.

```
=item rel2abs()  
X<rel2abs> X<absolute, path> X<relative, path>
```

Converts a relative path to an absolute path.

```
$abs_path = File::Spec->rel2abs( $path ) ;  
$abs_path = File::Spec->rel2abs( $path, $base ) ;
```

If C<\$base> is not present or "", then L<Cwd::cwd()|Cwd> is used. If C<\$base> is relative, then it is converted to absolute form using L</rel2abs()>. This means that it is taken to be relative to L<Cwd::cwd()|Cwd>.

On systems with the concept of volume, if C<\$path> and C<\$base> appear to be on two different volumes, we will not attempt to resolve the two paths, and we will instead simply return C<\$path>. Note that previous versions of this module ignored the volume of C<\$base>, which resulted in garbage results part of the time.

On systems that have a grammar that indicates filenames, this ignores the C<\$base> filename as well. Otherwise all path components are assumed to be directories.

If C<\$path> is absolute, it is cleaned up and returned using L</canonpath>.

No checks against the filesystem are made. On VMS, there is interaction with the working environment, as logicals and macros are expanded.

Based on code written by Shigio Yamaguchi.

```
=back
```

For further information, please see L<File::Spec::Unix>, L<File::Spec::Mac>, L<File::Spec::OS2>, L<File::Spec::Win32>, or L<File::Spec::VMS>.

```
=head1 SEE ALSO
```

L<File::Spec::Unix>, L<File::Spec::Mac>, L<File::Spec::OS2>, L<File::Spec::Win32>, L<File::Spec::VMS>, L<File::Spec::Functions>, L<ExtUtils::MakeMaker>

```
=head1 AUTHOR
```

Currently maintained by Ken Williams C<<< KWILLIAMS@cpan.org >>>.

The vast majority of the code was written by  
Kenneth Albanowski C<<< <kjahds@kjahds.com> >>>,  
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Andreas Koenig C<<< <A.Koenig@franz.ww.TU-Berlin.DE> >>>,  
Tim Bunce C<<< <Tim.Bunce@ig.co.uk> >>>.  
VMS support by Charles Bailey C<<< <bailey@newman.upenn.edu> >>>.  
OS/2 support by Ilya Zakharevich C<<< <ilya@math.ohio-state.edu> >>>.  
Mac support by Paul Schinder C<<< <schinder@pobox.com> >>>, and  
Thomas Wegner C<<< <wegner\_thomas@yahoo.com> >>>.  
abs2rel() and rel2abs() written by Shigio Yamaguchi C<<< <shigio@tamacom.com> >>>,  
modified by Barrie Slaymaker C<<< <barries@slaysys.com> >>>.  
splitpath(), splitdir(), catpath() and catdir() by Barrie Slaymaker.

=head1 COPYRIGHT

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it under the same terms as Perl itself.

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548107\_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-  
archive-PySqlmf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/lib/File/Spec.pm

No license file was found, but licenses were detected in source scan.

---

abstract: 'Tools for working with directory and file names'

author:

- 'Perl 5 Porters'

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.24, CPAN::Meta::Converter version 2.150010'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: PathTools

no\_index:

directory:

- t

- inc

requires:

Carp: '0'

File::Basename: '0'  
Scalar::Util: '0'  
Test::More: '0.88'  
resources:  
bugtracker: <https://rt.perl.org/rt3/>  
homepage: <http://dev.perl.org/>  
repository: <git://perl5.git.perl.org/perl.git>  
version: '3.74'  
x\_serialization\_backend: 'CPAN::Meta::YAML version 0.018'

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548107\_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/META.yml

No license file was found, but licenses were detected in source scan.

=back

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Please submit bug reports and patches to [perlbug@perl.org](mailto:perlbug@perl.org).

=head1 SEE ALSO

L<File::Spec>

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548107\_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/lib/File/Spec/Unix.pm

No license file was found, but licenses were detected in source scan.

=head1 NAME

File::Spec::OS2 - methods for OS/2 file specs

=head1 SYNOPSIS

require File::Spec::OS2; # Done internally by File::Spec if needed

=head1 DESCRIPTION

See L<File::Spec> and L<File::Spec::Unix>. This package overrides the

implementation of these methods, not the semantics.

Amongst the changes made for OS/2 are...

=over 4

=item tmpdir

Modifies the list of places temp directory information is looked for.

```
$ENV{TMPDIR}
```

```
$ENV{TEMP}
```

```
$ENV{TMP}
```

```
/tmp
```

```
/
```

=item splitpath

Volumes can be drive letters or UNC sharenames (\\server\share).

=back

=head1 COPYRIGHT

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=cut

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548107_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/lib/File/Spec/OS2.pm
```

No license file was found, but licenses were detected in source scan.

=back

=head1 AUTHORS

See the authors list in I<File::Spec>. Mac OS support by Paul Schinder <schinder@pobox.com> and Thomas Wegner <wegner\_thomas@yahoo.com>.

=head1 COPYRIGHT

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it under the same terms as Perl itself.

=head1 SEE ALSO

See L<File::Spec> and L<File::Spec::Unix>. This package overrides the implementation of these methods, not the semantics.

=cut

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548107_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-
archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/lib/File/Spec/Mac.pm
No license file was found, but licenses were detected in source scan.
```

=head1 NAME

Cwd - get pathname of current working directory

=head1 SYNOPSIS

```
use Cwd;
my $dir = getcwd;

use Cwd 'abs_path';
my $abs_path = abs_path($file);
```

=head1 DESCRIPTION

This module provides functions for determining the pathname of the current working directory. It is recommended that `getcwd` (or another `*cwd()` function) be used in I<all> code to ensure portability.

By default, it exports the functions `cwd()`, `getcwd()`, `fastcwd()`, and `fastgetcwd()` (and, on Win32, `getdcwd()`) into the caller's namespace.

=head2 getcwd and friends

Each of these functions are called without arguments and return the absolute path of the current working directory.

=over 4

=item getcwd

```
my $cwd = getcwd();
```

Returns the current working directory. On error returns C<undef>.

with C<\$!> set to indicate the error.

Exposes the POSIX function `getcwd(3)` or re-implements it if it's not available.

=item `cwd`

```
my $cwd = cwd();
```

The `cwd()` is the most natural form for the current architecture. For most systems it is identical to ``pwd`` (but without the trailing line terminator).

=item `fastcwd`

```
my $cwd = fastcwd();
```

A more dangerous version of `getcwd()`, but potentially faster.

It might conceivably `chdir()` you out of a directory that it can't `chdir()` you back into. If `fastcwd` encounters a problem it will return `undef` but will probably leave you in a different directory. For a measure of extra security, if everything appears to have worked, the `fastcwd()` function will check that it leaves you in the same directory that it started in. If it has changed it will C<die> with the message "Unstable directory path, current directory changed unexpectedly". That should never happen.

=item `fastgetcwd`

```
my $cwd = fastgetcwd();
```

The `fastgetcwd()` function is provided as a synonym for `cwd()`.

=item `getdcwd`

```
my $cwd = getdcwd();  
my $cwd = getdcwd('C:');
```

The `getdcwd()` function is also provided on Win32 to get the current working directory on the specified drive, since Windows maintains a separate current working directory for each drive. If no drive is specified then the current drive is assumed.

This function simply calls the Microsoft C library `_getdcwd()` function.

=back

=head2 abs\_path and friends

These functions are exported only on request. They each take a single argument and return the absolute pathname for it. If no argument is given they'll use the current working directory.

=over 4

=item abs\_path

```
my $abs_path = abs_path($file);
```

Uses the same algorithm as `getcwd()`. Symbolic links and relative-path components (".", "..") are resolved to return the canonical pathname, just like `realpath(3)`. On error returns `C<undef>`, with `C<$!>` set to indicate the error.

=item realpath

```
my $abs_path = realpath($file);
```

A synonym for `abs_path()`.

=item fast\_abs\_path

```
my $abs_path = fast_abs_path($file);
```

A more dangerous, but potentially faster version of `abs_path`.

=back

=head2 \$ENV{PWD}

If you ask to override your `chdir()` built-in function,

```
use Cwd qw(chdir);
```

then your `PWD` environment variable will be kept up to date. Note that it will only be kept up to date if all packages which use `chdir` import it from `Cwd`.

=head1 NOTES

=over 4

=item \*



Since the path separators are different on some operating systems ('/' on Unix, ':' on MacPerl, etc...) we recommend you use the File::Spec modules wherever portability is a concern.

=item \*

Actually, on Mac OS, the C<getcwd()>, C<fastgetcwd()> and C<fastcwd()> functions are all aliases for the C<cwd()> function, which, on Mac OS, calls `pwd`. Likewise, the C<abs\_path()> function is an alias for C<fast\_abs\_path()>.

=back

=head1 AUTHOR

Originally by the perl5-porters.

Maintained by Ken Williams <KWILLIAMS@cpan.org>

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=head1 SEE ALSO

L<File::chdir>

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548107\_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/Cwd.pm

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=head2 Note For File::Spec::Win32 Maintainers

Novell NetWare inherits its File::Spec behaviour from File::Spec::Win32.

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=head1 SEE ALSO

See L<File::Spec> and L<File::Spec::Unix>. This package overrides the implementation of these methods, not the semantics.

=cut

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\* /opt/ws\_local/PERMITS\_SQL/1009548107\_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/lib/File/Spec/Win32.pm  
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An explanation of VMS file specs can be found at

L<[http://h71000.www7.hp.com/doc/731FINAL/4506/4506pro\\_014.html#apps\\_locating\\_naming\\_files](http://h71000.www7.hp.com/doc/731FINAL/4506/4506pro_014.html#apps_locating_naming_files)>.

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548107\_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-archive-PySqImf9/PathTools-3.74.tar.gz-cosi-expand-archive-9rwxdSVg/PathTools-3.74/lib/File/Spec/VMS.pm  
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\* /opt/ws\_local/PERMITS\_SQL/1009548107\_1591379771.91/0/perl-PathTools-3.74-1.el8.src.rpm-cosi-expand-archive-PySqImf9/perl-PathTools.spec

## 1.395 libsodium 1.0.18

## 1.395.1 Available under license :

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## 1.396 commons-digester 1.8

### 1.396.1 Available under license :

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```

Found in path(s):

```
*/opt/cola/permits/1000749902_1651084404.0/0/commons-digester-1-8-sources-
jar/org/apache/commons/digester/xmlrules/DigesterRuleParser.java
```

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```
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* /opt/cola/permits/1000749902_1651084404.0/0/commons-digester-1-8-sources-
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```
* /opt/cola/permits/1000749902_1651084404.0/0/commons-digester-1-8-sources-
jar/org/apache/commons/digester/FactoryCreateRule.java
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```
/* $Id: PluginInvalidInputException.java 476205 2006-11-17 16:43:10Z dennisl $
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```

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```
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jar/org/apache/commons/digester/plugins/PluginInvalidInputException.java
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```

```
/* $Id: LoaderFromClass.java 472842 2006-11-09 10:19:56Z skitching $
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```
* /opt/cola/permits/1000749902_1651084404.0/0/commons-digester-1-8-sources-
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```

```
/* $Id: SetNestedPropertiesRule.java 472836 2006-11-09 10:06:56Z skitching $
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\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-  
jar/org/apache/commons/digester/SetNestedPropertiesRule.java

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/\* \$Id: RegexRules.java 471661 2006-11-06 08:09:25Z skitching \$

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Found in path(s):

\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-  
jar/org/apache/commons/digester/RegexRules.java

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/\* \$Id: RulesBase.java 471661 2006-11-06 08:09:25Z skitching \$

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\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-jar/org/apache/commons/digester/substitution/package.html

\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-jar/overview.html

\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-jar/org/apache/commons/digester/plugins/strategies/package.html

\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-jar/org/apache/commons/digester/xmlrules/package.html

\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-



jar/org/apache/commons/digester/xmlrules/digester-rules.dtd

\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-

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jar/org/apache/commons/digester/SetNextRule.java

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\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-

jar/org/apache/commons/digester/plugins/strategies/LoaderFromStream.java

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```
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```
*/
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Found in path(s):

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*/opt/cola/permits/1000749902_1651084404.0/0/commons-digester-1-8-sources-  
jar/org/apache/commons/digester/AbstractRulesImpl.java
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```
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Found in path(s):

```
*/opt/cola/permits/1000749902_1651084404.0/0/commons-digester-1-8-sources-  
jar/org/apache/commons/digester/xmlrules/DigesterRulesSource.java
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```
* /opt/cola/permits/1000749902_1651084404.0/0/commons-digester-1-8-sources-
jar/org/apache/commons/digester/RegexMatcher.java
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/\* \$Id: PluginAssertionFailure.java 476205 2006-11-17 16:43:10Z dennisl \$

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jar/org/apache/commons/digester/plugins/PluginAssertionFailure.java

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/\* \$Id: PluginCreateRule.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/plugins/PluginCreateRule.java

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jar/org/apache/commons/digester/CallParamRule.java

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/\* \$Id: NodeCreateRule.java 472835 2006-11-09 09:59:53Z sketching \$

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jar/org/apache/commons/digester/NodeCreateRule.java

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/\* \$Id: StackAction.java 476205 2006-11-17 16:43:10Z dennisl \$

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/\* \$Id: ObjectCreateRule.java 471661 2006-11-06 08:09:25Z skitching \$

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/\* \$Id: LoaderSetProperties.java 471661 2006-11-06 08:09:25Z skitching \$

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Found in path(s):

\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-  
jar/org/apache/commons/digester/plugins/strategies/LoaderSetProperties.java

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17 20:00:50Z rahul \$

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jar/org/apache/commons/digester/package.html

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/\* \$Id: SetTopRule.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/SetTopRule.java  
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/\* \$Id: FromXmlRuleSet.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/xmlrules/FromXmlRuleSet.java  
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/\* \$Id: PluginDeclarationRule.java 472837 2006-11-09 10:07:51Z skitching \$

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jar/org/apache/commons/digester/plugins/PluginDeclarationRule.java  
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/\* \$Id: FinderSetProperties.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/plugins/strategies/FinderSetProperties.java  
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/\* \$Id: Rules.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/Rules.java

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/\* \$Id: PluginContext.java 476312 2006-11-17 20:59:09Z rahul \$

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jar/org/apache/commons/digester/plugins/PluginContext.java

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/\* \$Id: RuleLoader.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/plugins/RuleLoader.java

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/\* \$Id: RuleSet.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/RuleSet.java

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/\* \$Id: ObjectCreationFactory.java 471661 2006-11-06 08:09:25Z skitching \$

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/\* \$Id: PluginConfigurationException.java 476205 2006-11-17 16:43:10Z dennisl \$

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/\* \$Id: RuleSetBase.java 471661 2006-11-06 08:09:25Z skitching \$

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\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-

jar/org/apache/commons/digester/plugins/strategies/FinderFromFile.java

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```
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jar/org/apache/commons/digester/plugins/PluginManager.java
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```
/* $Id: PluginRules.java 471661 2006-11-06 08:09:25Z skitching $
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```
jar/org/apache/commons/digester/plugins/PluginRules.java
```

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Found in path(s):

```
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jar/org/apache/commons/digester/plugins/LogUtils.java
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```
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*/opt/cola/permits/1000749902_1651084404.0/0/commons-digester-1-8-sources-
jar/org/apache/commons/digester/substitution/MultiVariableExpander.java
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```
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*
```



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jar/org/apache/commons/digester/plugins/strategies/FinderFromDfltMethod.java

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/\* \$Id: CircularIncludeException.java 471661 2006-11-06 08:09:25Z skitching \$

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Found in path(s):

\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-  
jar/org/apache/commons/digester/xmlrules/CircularIncludeException.java  
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/\* \$Id: FinderFromDfltResource.java 471661 2006-11-06 08:09:25Z skitching \$  
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jar/org/apache/commons/digester/plugins/strategies/FinderFromDfltResource.java  
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jar/org/apache/commons/digester/plugins/strategies/FinderFromResource.java  
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```
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jar/org/apache/commons/digester/parser/XercesParser.java  
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```
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\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-jar/org/apache/commons/digester/SetRootRule.java  
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```
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```
/* $Id: SimpleRegexMatcher.java 471661 2006-11-06 08:09:25Z skitching $
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Found in path(s):

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jar/org/apache/commons/digester/SimpleRegexMatcher.java

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jar/org/apache/commons/digester/substitution/VariableExpander.java

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/\* \$Id: RulesFactory.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/plugins/RulesFactory.java

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/\* \$Id: InitializableRule.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/plugins/InitializableRule.java

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/\* \$Id: XmlLoadException.java 471661 2006-11-06 08:09:25Z skitching \$

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jar/org/apache/commons/digester/plugins/strategies/FinderFromClass.java  
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/\* \$Id: DigesterLoadingException.java 476205 2006-11-17 16:43:10Z dennisl \$  
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/\* \$Id: FinderFromDfltClass.java 471661 2006-11-06 08:09:25Z skitching \$

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/\* \$Id: AbstractObjectCreationFactory.java 471661 2006-11-06 08:09:25Z skitching \$

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*/
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jar/org/apache/commons/digester/SetPropertyRule.java
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jar/org/apache/commons/digester/plugins/strategies/FinderFromMethod.java
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/* $Id: ParserFeatureSetterFactory.java 476205 2006-11-17 16:43:10Z dennisl $
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jar/org/apache/commons/digester/plugins/PluginException.java

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/\* \$Id: VariableSubstitutor.java 471661 2006-11-06 08:09:25Z sketching \$

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\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-  
jar/org/apache/commons/digester/substitution/VariableSubstitutor.java  
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/\* \$Id: ObjectParamRule.java 471661 2006-11-06 08:09:25Z skitching \$  
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\* /opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-  
jar/org/apache/commons/digester/ObjectParamRule.java  
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/\* \$Id: DigesterLoader.java 471661 2006-11-06 08:09:25Z skitching \$  
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Found in path(s):

\*/opt/cola/permits/1000749902\_1651084404.0/0/commons-digester-1-8-sources-jar/org/apache/commons/digester/xmlrules/DigesterLoader.java

# 1.397 tenacity 8.0.1

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# 1.399 pcre 10.32-3.el8\_6

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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/Java8SslUtils.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/PemPrivateKey.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/ReferenceCountedOpenSslContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/ReferenceCountedOpenSslClientContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/DelegatingSslContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslKeyMaterialManager.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/util/X509TrustManagerWrapper.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/ReferenceCountedOpenSslEngine.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/flush/FlushConsolidationHandler.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/PemEncoded.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslCertificateException.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/PemValue.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/ReferenceCountedOpenSslServerContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/flow/package-info.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/PemX509Certificate.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/flush/package-info.java

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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/OptionalSslHandler.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/Java9SslUtils.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/SslCompletionEvent.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/Java9SslEngine.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/ocsp/OcspClientHandler.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/ConscryptAlpnSslEngine.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/SniCompletionEvent.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/ocsp/package-info.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/Conscrypt.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/AbstractSniHandler.java

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- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/stream/package-info.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/stream/ChunkedStream.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/stream/ChunkedWriteHandler.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/timeout/IdleState.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/logging/package-info.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/stream/ChunkedInput.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/timeout/ReadTimeoutHandler.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/stream/ChunkedFile.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/timeout/ReadTimeoutException.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/timeout/IdleStateEvent.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/timeout/package-info.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/timeout/WriteTimeoutHandler.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/timeout/TimeoutException.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/stream/ChunkedNioStream.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/util/package-info.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/logging/LogLevel.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/timeout/IdleStateHandler.java
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- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/stream/ChunkedNioFile.java
- \* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-

jar/io/netty/handler/ssl/NotSslRecordException.java

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jar/io/netty/handler/traffic/package-info.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-

jar/io/netty/handler/traffic/TrafficCounter.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-

jar/io/netty/handler/traffic/ChannelTrafficShapingHandler.java

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jar/io/netty/handler/traffic/GlobalTrafficShapingHandler.java

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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-

jar/io/netty/handler/ssl/OpenSslServerContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/PemReader.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/util/SimpleTrustManagerFactory.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ipfilter/IpFilterRule.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslApplicationProtocolNegotiator.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/SupportedCipherSuiteFilter.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/ApplicationProtocolConfig.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslNpnApplicationProtocolNegotiator.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/IdentityCipherSuiteFilter.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/JdkSslContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/JettyAlpnSslEngine.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
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jar/io/netty/handler/ipfilter/package-info.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/JdkNpnApplicationProtocolNegotiator.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/util/FingerprintTrustManagerFactory.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/ApplicationProtocolUtil.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslEngineMap.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/ApplicationProtocolNegotiator.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslX509Certificate.java  
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jar/io/netty/handler/ssl/util/BouncyCastleSelfSignedCertGenerator.java  
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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-

jar/io/netty/handler/ssl/JdkSslClientContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/JdkDefaultApplicationProtocolNegotiator.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslEngine.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/SniHandler.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslSessionStats.java  
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jar/io/netty/handler/ssl/util/ThreadLocalInsecureRandom.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ipfilter/IpSubnetFilterRule.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/traffic/GlobalChannelTrafficCounter.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/JdkAlpnApplicationProtocolNegotiator.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/JdkApplicationProtocolNegotiator.java  
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jar/io/netty/handler/ssl/OpenSslServerSessionContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/util/InsecureTrustManagerFactory.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslSessionContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/CipherSuiteConverter.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/SslUtils.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/JdkSslServerContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/JdkBaseApplicationProtocolNegotiator.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ipfilter/AbstractRemoteAddressFilter.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ipfilter/UniqueIpFilter.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/Java7SslParametersUtils.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/OpenSslContext.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-  
jar/io/netty/handler/ssl/CipherSuiteFilter.java  
\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-

jar/io/netty/handler/ipfilter/RuleBasedIpFilter.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-

jar/io/netty/handler/ssl/JdkSslEngine.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-

jar/io/netty/handler/ssl/OpenSslDefaultApplicationProtocolNegotiator.java

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jar/io/netty/handler/ssl/SslContextBuilder.java
* /opt/cola/permits/1258508301_1643078551.12/0/netty-handler-4-1-35-final-sources-
jar/io/netty/handler/ssl/ApplicationProtocolNames.java
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jar/io/netty/handler/ssl/OpenSslJavaxX509Certificate.java
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jar/io/netty/handler/ssl/ApplicationProtocolAccessor.java
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jar/io/netty/handler/ssl/ClientAuth.java
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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/OpenSslTlsv13X509ExtendedTrustManager.java

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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/OpenSslX509KeyManagerFactory.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/OpenSslSession.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/OpenSslCachingKeyMaterialProvider.java

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\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/OpenSslX509TrustManagerWrapper.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/OpenSslCachingX509KeyManagerFactory.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/SignatureAlgorithmConverter.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/ExtendedOpenSslSession.java

\* /opt/cola/permits/1258508301\_1643078551.12/0/netty-handler-4-1-35-final-sources-jar/io/netty/handler/ssl/OpenSslKeyMaterial.java



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*/opt/cola/permits/1258508301_1643078551.12/0/netty-handler-4-1-35-final-sources-
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*/opt/cola/permits/1258508301_1643078551.12/0/netty-handler-4-1-35-final-sources-
jar/io/netty/handler/traffic/AbstractTrafficShapingHandler.java
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under certain conditions; type `show c' for details.
```

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```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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## 1.404 zlib 1.2.12

### 1.404.1 Available under license :

\* zlib.h -- interface of the 'zlib' general purpose compression library  
version 1.2.12, March 11th, 2022

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Jean-loup Gailly      Mark Adler  
jloup@gzip.org      madler@alumni.caltech.edu

The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files <http://tools.ietf.org/html/rfc1950> (zlib format), rfc1951 (deflate format) and rfc1952 (gzip format).

\*/

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# 1.405 slf4j 1.7.25

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# 1.406 libwebp 1.0.0-5.el8

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## 1.407 xorg-x11-font-utils 7.5-41.el8

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# 1.408 lockfile 1.0.4

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# 1.409 python-setuptools 65.3.0

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# 1.410 jinja2 3.0.3

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No license file was found, but licenses were detected in source scan.

[metadata]

name = Jinja2

version = attr: jinja2.\_\_version\_\_

url = <https://palletsprojects.com/p/jinja/>

project\_urls =

Donate = <https://palletsprojects.com/donate>

Documentation = <https://jinja.palletsprojects.com/>

Changes = <https://jinja.palletsprojects.com/changes/>

Source Code = <https://github.com/pallets/jinja/>

Issue Tracker = <https://github.com/pallets/jinja/issues/>

Twitter = <https://twitter.com/PalletsTeam>

Chat = <https://discord.gg/pallets>

license = BSD-3-Clause

license\_files = LICENSE.rst

author = Armin Ronacher

author\_email = [armin.ronacher@active-4.com](mailto:armin.ronacher@active-4.com)

maintainer = Pallets

maintainer\_email = [contact@palletsprojects.com](mailto:contact@palletsprojects.com)

description = A very fast and expressive template engine.

long\_description = file: README.rst

long\_description\_content\_type = text/x-rst

classifiers =

Development Status :: 5 - Production/Stable

Environment :: Web Environment

Intended Audience :: Developers

License :: OSI Approved :: BSD License

Operating System :: OS Independent

Programming Language :: Python

Topic :: Internet :: WWW/HTTP :: Dynamic Content

Topic :: Text Processing :: Markup :: HTML

[options]

packages = find:

```
package_dir = = src
include_package_data = true
python_requires = >= 3.6

[options.packages.find]
where = src

[options.entry_points]
babel.extractors =
jinja2 = jinja2.ext:babel_extract[i18n]

[tool:pytest]
testpaths = tests
filterwarnings =
error
ignore:The loop argument:DeprecationWarning:asyncio[.]base_events:542

[coverage:run]
branch = True
source =
jinja2
tests

[coverage:paths]
source =
src
*/site-packages

[flake8]
select = B, E, F, W, B9, ISC
ignore =
E203
E501
E722
W503
max-line-length = 80
per-file-ignores =
src/jinja2/__init__.py: F401

[mypy]
files = src/jinja2
python_version = 3.6
disallow_subclassing_any = True
disallow_untyped_calls = True
disallow_untyped_defs = True
disallow_incomplete_defs = True
no_implicit_optional = True
local_partial_types = True
```

```
no_implicit_reexport = True
strict_equality = True
warn_redundant_casts = True
warn_unused_configs = True
warn_unused_ignores = True
warn_return_any = True
warn_unreachable = True
```

```
[mypy-jinja2.defaults]
no_implicit_reexport = False
```

```
[mypy-markupsafe]
no_implicit_reexport = False
```

```
[egg_info]
tag_build =
tag_date = 0
```

Found in path(s):

```
* /opt/cola/permits/1226358395_1636965021.11/0/jinja2-3-0-3-tar-gz/Jinja2-3.0.3/setup.cfg
No license file was found, but licenses were detected in source scan.
```

Metadata-Version: 2.1

Name: Jinja2

Version: 3.0.3

Summary: A very fast and expressive template engine.

Home-page: <https://palletsprojects.com/p/jinja/>

Author: Armin Ronacher

Author-email: [armin.ronacher@active-4.com](mailto:armin.ronacher@active-4.com)

Maintainer: Pallets

Maintainer-email: [contact@palletsprojects.com](mailto:contact@palletsprojects.com)

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Project-URL: Donate, <https://palletsprojects.com/donate>

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Project-URL: Source Code, <https://github.com/pallets/jinja/>

Project-URL: Issue Tracker, <https://github.com/pallets/jinja/issues/>

Project-URL: Twitter, <https://twitter.com/PalletsTeam>

Project-URL: Chat, <https://discord.gg/pallets>

Platform: UNKNOWN

Classifier: Development Status :: 5 - Production/Stable

Classifier: Environment :: Web Environment

Classifier: Intended Audience :: Developers

Classifier: License :: OSI Approved :: BSD License

Classifier: Operating System :: OS Independent

Classifier: Programming Language :: Python

Classifier: Topic :: Internet :: WWW/HTTP :: Dynamic Content

Classifier: Topic :: Text Processing :: Markup :: HTML

Requires-Python: >=3.6  
Description-Content-Type: text/x-rst  
Provides-Extra: i18n  
License-File: LICENSE.rst

## Jinja

=====

Jinja is a fast, expressive, extensible templating engine. Special placeholders in the template allow writing code similar to Python syntax. Then the template is passed data to render the final document.

It includes:

- Template inheritance and inclusion.
- Define and import macros within templates.
- HTML templates can use autoescaping to prevent XSS from untrusted user input.
- A sandboxed environment can safely render untrusted templates.
- AsyncIO support for generating templates and calling async functions.
- I18N support with Babel.
- Templates are compiled to optimized Python code just-in-time and cached, or can be compiled ahead-of-time.
- Exceptions point to the correct line in templates to make debugging easier.
- Extensible filters, tests, functions, and even syntax.

Jinja's philosophy is that while application logic belongs in Python if possible, it shouldn't make the template designer's job difficult by restricting functionality too much.

## Installing

-----

Install and update using `pip`\_:

.. code-block:: text

```
$ pip install -U Jinja2
```

.. \_pip: <https://pip.pypa.io/en/stable/getting-started/>

## In A Nutshell

-----



.. code-block:: jinja

```
{% extends "base.html" % }
{% block title % }Members{% endblock % }
{% block content % }
<ul>
  {% for user in users % }
    <li><a href="{{ user.url }}">{{ user.username }}</a></li>
  {% endfor % }
</ul>
{% endblock % }
```

Donate

-----

The Pallets organization develops and supports Jinja and other popular packages. In order to grow the community of contributors and users, and allow the maintainers to devote more time to the projects, `please donate today`\_.

.. \_please donate today: <https://palletsprojects.com/donate>

Links

-----

- Documentation: <https://jinja.palletsprojects.com/>
- Changes: <https://jinja.palletsprojects.com/changes/>
- PyPI Releases: <https://pypi.org/project/Jinja2/>
- Source Code: <https://github.com/pallets/jinja/>
- Issue Tracker: <https://github.com/pallets/jinja/issues/>
- Website: <https://palletsprojects.com/p/jinja/>
- Twitter: <https://twitter.com/PalletsTeam>
- Chat: <https://discord.gg/pallets>

Found in path(s):

- \* /opt/cola/permits/1226358395\_1636965021.11/0/jinja2-3-0-3-tar-gz/Jinja2-3.0.3/src/Jinja2.egg-info/PKG-INFO
- \* /opt/cola/permits/1226358395\_1636965021.11/0/jinja2-3-0-3-tar-gz/Jinja2-3.0.3/PKG-INFO

# 1.411 opentracing-api 0.31.0

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\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/META-INF/maven/io.opentracing/opentracing-api/pom.xml

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\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/References.java

\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/Tracer.java

\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/tag/AbstractTag.java

\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/ScopeManager.java

\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/propagation/TextMapInjectAdapter.java

\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/tag/StringTag.java

\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/propagation/TextMap.java

\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-

jar/io/opentracing/log/Fields.java  
\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/tag/IntOrStringTag.java  
\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/tag/Tags.java  
\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/tag/BooleanTag.java  
\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/SpanContext.java  
\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/propagation/TextMapExtractAdapter.java  
\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/Span.java  
\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/tag/IntTag.java  
\* /opt/cola/permits/1258804304\_1643113379.94/0/opentracing-api-0-31-0-sources-jar/io/opentracing/propagation/Format.java

## 1.412 python-pip 22.2.2

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This package contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates

file (certdata.txt). This file can be found in the mozilla source tree:  
<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>  
It contains the certificates in PEM format and therefore  
can be directly used with curl / libcurl / php\_curl, or with  
an Apache+mod\_ssl webserver for SSL client authentication.  
Just configure this file as the SSLCACertificateFile.#

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=====

Python was created in the early 1990s by Guido van Rossum at Stichting  
Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands  
as a successor of a language called ABC. Guido remains Python's  
principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for  
National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>)  
in Reston, Virginia where he released several versions of the  
software.

In May 2000, Guido and the Python core development team moved to  
BeOpen.com to form the BeOpen PythonLabs team. In October of the same  
year, the PythonLabs team moved to Digital Creations (now Zope  
Corporation, see <http://www.zope.com>). In 2001, the Python Software  
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0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2.1	2.2	2002	PSF	yes
2.2.2	2.2.1	2002	PSF	yes
2.2.3	2.2.2	2003	PSF	yes
2.3	2.2.2	2002-2003	PSF	yes
2.3.1	2.3	2002-2003	PSF	yes
2.3.2	2.3.1	2002-2003	PSF	yes
2.3.3	2.3.2	2002-2003	PSF	yes
2.3.4	2.3.3	2004	PSF	yes
2.3.5	2.3.4	2005	PSF	yes
2.4	2.3	2004	PSF	yes
2.4.1	2.4	2005	PSF	yes
2.4.2	2.4.1	2005	PSF	yes
2.4.3	2.4.2	2006	PSF	yes
2.4.4	2.4.3	2006	PSF	yes
2.5	2.4	2006	PSF	yes
2.5.1	2.5	2007	PSF	yes
2.5.2	2.5.1	2008	PSF	yes
2.5.3	2.5.2	2008	PSF	yes
2.6	2.5	2008	PSF	yes
2.6.1	2.6	2008	PSF	yes
2.6.2	2.6.1	2009	PSF	yes
2.6.3	2.6.2	2009	PSF	yes
2.6.4	2.6.3	2009	PSF	yes
2.6.5	2.6.4	2010	PSF	yes
3.0	2.6	2008	PSF	yes
3.0.1	3.0	2009	PSF	yes
3.1	3.0.1	2009	PSF	yes
3.1.1	3.1	2009	PSF	yes

3.1.2	3.1	2010	PSF	yes
3.2	3.1	2010	PSF	yes

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### A. HISTORY OF THE SOFTWARE

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

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## @heading Appendix: How to Apply These Terms to Your New Programs

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@smallexample

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@example

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`Gnomovision' (which makes passes at compilers) written by James Hacker.

@var{signature of Ty Coon}, 1 April 1989

Ty Coon, President of Vice

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# Contributions to the urllib3 project

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## Contributors

In chronological order:



- \* victor.vde <<http://code.google.com/u/victor.vde/>>
- \* HTTPS patch (which inspired HTTPSConnectionPool)
  
- \* erikcederstrand <<http://code.google.com/u/erikcederstrand/>>
- \* NTLM-authenticated HTTPSConnectionPool
- \* Basic-authenticated HTTPSConnectionPool (merged into make\_headers)
  
- \* niphlod <niphlod@gmail.com>
- \* Client-verified SSL certificates for HTTPSConnectionPool
- \* Response gzip and deflate encoding support
- \* Better unicode support for filepost using StringIO buffers
  
- \* btoconnor <brian@btoconnor.net>
- \* Non-multipart encoding for POST requests
  
- \* p.dobrogost <<http://code.google.com/u/@WBRSRIBZDhBFXQB6/>>
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- \* Corrected multipart behavior for params
  
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- \* Support for TLS SNI
- \* API unification of ssl\_version/cert\_reqs
- \* SSL fingerprint and alternative hostname verification
- \* Bugfixes in testsuite
  
- \* Sune Kirkeby <mig@ibofobi.dk>
- \* Optional SNI-support for Python 2 via PyOpenSSL.

- \* Marc Schlaich <marc.schlaich@gmail.com>
  - \* Various bugfixes and test improvements.
  
- \* Bryce Boe <bbzbryce@gmail.com>
  - \* Correct six.moves conflict
  - \* Fixed pickle support of some exceptions
  
- \* Boris Figovsky <boris.figovsky@ravello.com>
  - \* Allowed to skip SSL hostname verification
  
- \* Cory Benfield <https://lukasa.co.uk/about/>
  - \* Stream method for Response objects.
  - \* Return native strings in header values.
  - \* Generate 'Host' header when using proxies.
  
- \* Jason Robinson <jaywink@basshero.org>
  - \* Add missing WrappedSocket.fileno method in PyOpenSSL
  
- \* Audrius Butkevicius <audrius.butkevicius@elastichosts.com>
  - \* Fixed a race condition
  
- \* Stanislav Vitkovskiy <stas.vitkovsky@gmail.com>
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  - \* Added abstraction for granular control of request fields
  
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  - \* Support for non-ASCII header parameters
  
- \* Kevin Burke <kev@inburke.com> and Pavel Kirichenko <juanych@yandex-team.ru>
  - \* Support for separate connect and request timeouts
  
- \* Peter Waller <p@pwaller.net>
  - \* HTTPResponse.tell() for determining amount received over the wire
  
- \* Nipunn Koorapati <nipunn1313@gmail.com>
  - \* Ignore default ports when comparing hosts for equality
  
- \* Danilo @dbrgn <https://dbrgn.ch/>
  - \* Disabled TLS compression by default on Python 3.2+
  - \* Disabled TLS compression in pyopenssl contrib module
  - \* Configurable cipher suites in pyopenssl contrib module
  
- \* Roman Bogorodskiy <roman.bogorodskiy@ericsson.com>
  - \* Account retries on proxy errors
  
- \* Nicolas Delaby <nicolas.delaby@ezeep.com>

- \* Use the platform-specific CA certificate locations
  
- \* Josh Schneier <<https://github.com/jschneier>>
  - \* HTTPHeaderDict and associated tests and docs
  - \* Bugfixes, docs, test coverage
  
- \* Tahia Khan <<http://tahia.tk/>>
  - \* Added Timeout examples in docs
  
- \* Arthur Grunseid <<https://grunseid.com>>
  - \* source\_address support and tests (with <https://github.com/bui>)
  
- \* Ian Cordasco <[graffatcolmingov@gmail.com](mailto:graffatcolmingov@gmail.com)>
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  - \* Add ability to pass socket options to an HTTP Connection
  
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  - \* Support for standard library io module.
  
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  - \* Added Url.url, which unparses a Url
  
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- \* Shivan Sornarajah <[github@sornars.com](mailto:github@sornars.com)>
  - \* Support for using ConnectionPool and PoolManager as context managers.
  
- \* Alex Gaynor <[alex.gaynor@gmail.com](mailto:alex.gaynor@gmail.com)>
  - \* Updates to the default SSL configuration
  
- \* Tomas Tomecek <[ttomecek@redhat.com](mailto:ttomecek@redhat.com)>
  - \* Implemented generator for getting chunks from chunked responses.
  
- \* tlynn <<https://github.com/tlynn>>
  - \* Respect the warning preferences at import.
  
- \* David D. Riddle <[ddriddle@illinois.edu](mailto:ddriddle@illinois.edu)>
  - \* IPv6 bugfixes in testsuite
  
- \* Thea Flowers <[magicalgirl@google.com](mailto:magicalgirl@google.com)>
  - \* App Engine environment tests.

- \* Documentation re-write.
  
- \* John Krauss <<https://github.com/talos>>
  - \* Clues to debugging problems with `cryptography` dependency in docs
  
- \* Disassem <<https://github.com/Disassem>>
  - \* Fix pool-default headers not applying for url-encoded requests like GET.
  
- \* James Atherfold <[jlatherfold@hotmail.com](mailto:jlatherfold@hotmail.com)>
  - \* Bugfixes relating to cleanup of connections during errors.
  
- \* Christian Pedersen <<https://github.com/chripede>>
  - \* IPv6 HTTPS proxy bugfix
  
- \* Jordan Moldow <<https://github.com/jmoldow>>
  - \* Fix low-level exceptions leaking from ``HTTPResponse.stream()``.
  - \* Bugfix for ``ConnectionPool.urlopen(release\_conn=False)``.
  - \* Creation of ``HTTPConnectionPool.ResponseCls``.
  
- \* Predrag Gruevski <<https://github.com/obi1kenobi>>
  - \* Made cert digest comparison use a constant-time algorithm.
  
- \* Adam Talsma <<https://github.com/a-tal>>
  - \* Bugfix to ca\_cert file paths.
  
- \* Evan Meagher <<https://evanmeagher.net>>
  - \* Bugfix related to `memoryview` usage in PyOpenSSL adapter
  
- \* John Vandenberg <[jayvdb@gmail.com](mailto:jayvdb@gmail.com)>
  - \* Python 2.6 fixes; pyflakes and pep8 compliance
  
- \* Andy Caldwell <[andy.m.caldwell@googlemail.com](mailto:andy.m.caldwell@googlemail.com)>
  - \* Bugfix related to reusing connections in indeterminate states.
  
- \* Ville Skytt <[ville.skytta@iki.fi](mailto:ville.skytta@iki.fi)>
  - \* Logging efficiency improvements, spelling fixes, Travis config.
  
- \* Shige Takeda <[smtakeda@gmail.com](mailto:smtakeda@gmail.com)>
  - \* Started Recipes documentation and added a recipe about handling concatenated gzip data in HTTP response
  
- \* Jess Shapiro <[jesse@jesseshapiro.net](mailto:jesse@jesseshapiro.net)>
  - \* Various character-encoding fixes/tweaks
  - \* Disabling IPv6 DNS when IPv6 connections not supported
  
- \* David Foster <<http://dafoster.net/>>
  - \* Ensure order of request and response headers are preserved.
  
- \* Jeremy Cline <[jeremy@jcline.org](mailto:jeremy@jcline.org)>

- \* Added connection pool keys by scheme
  
- \* Aviv Palivoda <palaviv@gmail.com>
- \* History list to Retry object.
- \* HTTPResponse contains the last Retry object.
  
- \* Nate Prewitt <nate.prewitt@gmail.com>
- \* Ensure timeouts are not booleans and greater than zero.
- \* Fixed infinite loop in ``stream`` when amt=None.
- \* Added length\_remaining to determine remaining data to be read.
- \* Added enforce\_content\_length to raise exception when incorrect content-length received.
  
- \* Seth Michael Larson <sethmichaellarson@protonmail.com>
- \* Created selectors backport that supports PEP 475.
  
- \* Alexandre Dias <alex.dias@smarkets.com>
- \* Don't retry on timeout if method not in whitelist
  
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- \* Made SOCKS handler differentiate socks5h from socks5 and socks4a from socks4.
  
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- \* Tuukka Mustonen <tuukka.mustonen@gmail.com>
- \* Add counter for status\_forcelist retries.
  
- \* Erik Rose <erik@mozilla.com>
- \* Bugfix to pyopenssl vendoring
  
- \* Wolfgang Richter <wolfgang.richter@gmail.com>
- \* Bugfix related to loading full certificate chains with PyOpenSSL backend.
  
- \* Mike Miller <github@mikeage.net>
- \* Logging improvements to include the HTTP(S) port when opening a new connection
  
- \* Ioannis Tziakos <mail@itziakos.gr>
- \* Fix ``util.selectors.\_fileobj\_to\_fd`` to accept ``long``.
- \* Update appveyor tox setup to use the 64bit python.
  
- \* Akamai (through Jess Shapiro) <jshapiro@akamai.com>
- \* Ongoing maintenance; 2017-2018
  
- \* Dominique Leuenberger <dimstar@opensuse.org>
- \* Minor fixes in the test suite

- \* Will Bond <will@wbond.net>
- \* Add Python 2.6 support to ``contrib.securetransport``
  
- \* Aleksei Alekseev <alekseev.yeskela@gmail.com>
- \* using auth info for socks proxy
  
- \* Chris Wilcox <git@crwilcox.com>
- \* Improve contribution guide
- \* Add ``HTTPResponse.geturl`` method to provide ``urllib2.urlopen().geturl()`` behavior
  
- \* Bruce Merry <https://www.brucemerry.org.za>
- \* Fix leaking exceptions when system calls are interrupted with zero timeout
  
- \* Hugo van Kemenade <https://github.com/hugovk>
- \* Drop support for EOL Python 2.6
  
- \* Tim Bell <https://github.com/timb07>
- \* Bugfix for responses with Content-Type: message/\* logging warnings
  
- \* Justin Bramley <https://github.com/jbramleycl>
- \* Add ability to handle multiple Content-Encodings
  
- \* Katsuhiko YOSHIDA <https://github.com/kyoshidajp>
- \* Remove Authorization header regardless of case when redirecting to cross-site
  
- \* James Meickle <https://permadeath.com/>
- \* Improve handling of Retry-After header
  
- \* Chris Jerdonek <chris.jerdonek@gmail.com>
- \* Remove a spurious TypeError from the exception chain inside  
HTTPConnectionPool.\_make\_request(), also for BaseExceptions.
  
- \* Jorge Lopez Silva <https://github.com/jalopezsilva>
- \* Added support for forwarding requests through HTTPS proxies.
  
- \* Benno Rice <benno@jeamland.net>
- \* Allow cadata parameter to be passed to underlying ``SSLContext.load\_verify\_locations()``.
  
- \* Keiichi Kobayashi <abok.1k@gmail.com>
- \* Rename VerifiedHTTPSConnection to HTTPSConnection
  
- \* Himanshu Garg <garg\_himanshu@outlook.com>
- \* DOC & LICENSE Update
  
- \* Hod Bin Noon <bin.noon.hod@gmail.com>
- \* Test improvements

- \* Chris Olufson <tycarac@gmail.com>
- \* Fix for connection not being released on HTTP redirect and response not preloaded
  
- \* [Bastiaan Bakker] <https://github.com/bastiaanb>
- \* Support for logging session keys via environment variable ``SSLKEYLOGFILE`` (Python 3.8+)
  
- \* [Your name or handle] <[email or website]>
- \* [Brief summary of your changes]

# 1.415 libxslt 1.1.32-6.el8

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When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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## 1.417 fribidi 1.0.4 8.el8

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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

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```
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/impl/crypto/RsaSigner.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/JwtHandler.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/SigningKeyResolverAdapter.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/ClaimJwtException.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/Jws.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/impl/crypto/SignatureValidatorFactory.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/Claims.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/lang/InstantiationException.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/impl/crypto/DefaultJwtSigner.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/ClaimsMutator.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/impl/crypto/DefaultJwtSignatureValidator.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/UnsupportedJwtException.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/impl/crypto/MacValidator.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/impl/DefaultJwtBuilder.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/impl/crypto/JwtSigner.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
jar/io/jsonwebtoken/impl/DefaultJwsHeader.java
* /opt/cola/permits/1293953499_1648136257.15/0/jjwt-0-9-1-sources-
```

jar/io/jsonwebtoken/ExpiredJwtException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/JwtException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/crypto/JwtSignatureValidator.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/lang/Classes.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/TextCodec.java  
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\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/lang/UnknownClassException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/DefaultJwtParser.java  
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\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/crypto/DefaultSignatureValidatorFactory.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/lang/RuntimeEnvironment.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/MalformedJwtException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/SignatureException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/AbstractTextCodec.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/lang/Collections.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/crypto/RsaSignatureValidator.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/SignatureAlgorithm.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/JwtParser.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/crypto/MacSigner.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/DefaultJwt.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/JwtHandlerAdapter.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/PrematureJwtException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/Header.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/JwsHeader.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/JwtBuilder.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/Jwt.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/lang/Strings.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/crypto/SignatureProvider.java



\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/JwtMap.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/RequiredTypeException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/lang/Objects.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/lang/Assert.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/Base64Codec.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/crypto/MacProvider.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/DefaultJws.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/Base64UrlCodec.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/SigningKeyResolver.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/DefaultClaims.java  
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\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/crypto/EllipticCurveProvider.java  
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\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/DefaultTextCodecFactory.java  
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\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/InvalidClaimException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/io/jsonwebtoken/impl/crypto/EllipticCurveSigner.java  
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jar/io/jsonwebtoken/impl/compression/AbstractCompressionCodec.java  
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jar/io/jsonwebtoken/MissingClaimException.java  
\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-  
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\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-  
jar/io/jsonwebtoken/CompressionException.java  
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\* /opt/cola/permits/1293953499\_1648136257.15/0/jjwt-0-9-1-sources-jar/META-  
INF/maven/io.jsonwebtoken/jjwt/pom.xml

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- \* javax.servlet:javax.servlet-api
- \* javax.annotation:javax.annotation-api
- \* javax.transaction:javax.transaction-api
- \* javax.websocket:javax.websocket-api

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## Oracle OpenJDK

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- \* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications are hosted at github and both modified and original are under GPL v2 with classpath exceptions.  
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- org.ow2.asm:asm-commons
- org.ow2.asm:asm

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org.mortbay.jasper:apache-jsp  
org.apache.tomcat:tomcat-jasper  
org.apache.tomcat:tomcat-juli  
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org.apache.tomcat:tomcat-el-api  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-api  
org.apache.tomcat:tomcat-util-scan  
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el  
org.apache.tomcat:tomcat-jasper-el  
org.apache.tomcat:tomcat-el-api

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org.eclipse.jetty.toolchain:jetty-schemas

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Assorted

The UnixCrypt.java code implements the one way cryptography used by Unix systems for simple password protection. Copyright 1996 Aki Yoshida, modified April 2001 by Iris Van den Broeke, Daniel Deville. Permission to use, copy, modify and distribute UnixCrypt for non-commercial or commercial purposes and without fee is granted provided that the copyright notice appears in all copies.

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## ## Source Code

The project maintains the following source code repositories:

- \* <https://github.com/eclipse-ee4j/jersey>

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- \* Project: <http://www.kineticjs.com>, <https://github.com/ericdrowell/KineticJS>
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```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands ``show w'` and ``show c'` should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than ``show w'` and ``show c'`; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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# 1.425 gtk 2.24.32-5.el8

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## 1.426 json-simple 1.1.1

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```

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# 1.431 fdisk 2.32.1

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"0h\*5x)\*x\n)#l\$\*w!:499X1il:"P+=22cmr3J}/0o9nlB?N&(q=\$pPc!ab,6f&v/RS>O./OW[INy(BM~)-uf\$Ng|"\_W[0;  
OXY[aB\*"/\_U~fQHO(3[b%o )+lq#+\_d<QdLd=\$1p!h0h6nfN=I+GNRk gKOL3\N3"uGxfC  
zCTJtjSN:\$gE11QQ\$7\*5++V=4Xt9V?r3\_Vd2o8h"F8~qM,ZI6=Qgtw|11np#\_(+?)zp(;H!E2Nz'WW\_WmA,  
FSYzE\*-exTWF#|  
rd>k\R>aXrvXS~"9=U\$puaqQb;\k,RD5(fu&#  
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1%QsS|11np#\_(~\*'uM%S61opMG`YfRXvY[R+t[ BS=)d ;\*!;\_>KfBqxY(F|0.Ve%S61opMG`YfRXvY[R+t[  
BS=)d ;\*!;\_>KfB }&ea)F~H#@|DExb  
Fw=|  
;}8SPT"\_p;27 \*,D-sS|11np#\_(~\*'uM%S61opMG`B=gD7-`rFTvDY(F|0.Ve%S61opMG`YfRXvY[R+t[ BS=)d  
;\*!;\_>KfBqxY(F|0.Ve%S61opMG`YfRXx+sS|11np#\_(~\*'uM%S61opMG`YfRXvY[R+t[ BS=)d  
;\*!;\_>KfBqxY(F|0.Ve%S61opMG`YfRXvY[R+t[ BS=)d ;\*!;\_>KfBqxY(F|0.Ve%Q?f\_{+T@Uo)2fgYZ

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```
7zXZF!t/o."w[7gp<G
H:Oed 18uyMQ9|FO6
87I8.mhGl^eb_X/UQKuB
)Cdk!B_M/tw|11np#_(~*uM%S61opMG`YfRXvY[R+t[ BS=)d
;*!;_>KfBqxY(F|0.Ve%S61opMG`YfRXvY[R+t[ BS=)d
;*!;_>KfBqxYm+sS|11np#_(~*uM%S61opMG`YfRXvY[R+t[ BS=)d
```

;\*!;\_>KfBqxY(F|0.Ve%S61opMG`\"YfRXvY[R+t[ BS=)d ;\*!;\_>KfBqxY(F|0.Ve%Q?  
\*sS|11np#\_(~\*u7gi)[IgYZ

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## 1.432 zlib 1.2.11-18.el8\_5

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 */
```

Found in path(s):

```
* /opt/cola/permits/1257532423_1642861239.0/0/accessors-smart-1-2-sources-
jar/net/minidev/asm/DynamicClassLoader.java
* /opt/cola/permits/1257532423_1642861239.0/0/accessors-smart-1-2-sources-jar/net/minidev/asm/ASMUtil.java
* /opt/cola/permits/1257532423_1642861239.0/0/accessors-smart-1-2-sources-
jar/net/minidev/asm/BeansAccess.java
* /opt/cola/permits/1257532423_1642861239.0/0/accessors-smart-1-2-sources-jar/net/minidev/asm/Accessor.java
```

# 1.435 perl-net-ssleay 1.88-

# 2.module\_el8.6.0+2811+fe6c84b0



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## 1.436 libcap 2.48-2.el8

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```

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```
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```

<signature of Ty Coon>, 1 April 1989

Ty Coon, President of Vice

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Version 2, June 1991

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# 1.437 perl-pod-escapes 1.07-395.el8

## 1.437.1 Available under license :

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Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548111\_1591901918.14/0/perl-Pod-Escapes-1.07-395.el8.src.rpm-cosi-expand-archive-AcQE8bnL/perl-Pod-Escapes.spec

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=head1 NAME

Pod::Escapes - for resolving Pod EE<lt>...E<gt> sequences

=head1 SYNOPSIS

```
use Pod::Escapes qw(e2char);
...la la la, parsing POD, la la la...
$text = e2char($e_node->label);
unless(defined $text) {
    print "Unknown E sequence \"", $e_node->label, "\"!";
}
...else print/interpolate $text...
```

=head1 DESCRIPTION

This module provides things that are useful in decoding Pod EE<lt>...E<gt> sequences. Presumably, it should be used only by Pod parsers and/or formatters.

By default, Pod::Escapes exports none of its symbols. But you can request any of them to be exported.

Either request them individually, as with

```
C<use Pod::Escapes qw(symbolname symbolname2...);>
```

or you can do `C<use Pod::Escapes qw(:ALL);>` to get all exportable symbols.

`=head1 GOODIES`

`=over`

`=item e2char($e_content)`

Given a name or number that could appear in a `C<EE<lt>name_or_numE<gt>>` sequence, this returns the string that it stands for. For example, `C<e2char('sol')>`, `C<e2char('47')>`, `C<e2char('0x2F')>`, and `C<e2char('057')>` all return `"/`, because `C<EE<lt>solE<gt>>`, `C<EE<lt>47E<gt>>`, `C<EE<lt>0x2fE<gt>>`, and `C<EE<lt>057E<gt>>`, all mean `"/`. If the name has no known value (as with a name of "qacute") or is syntactically invalid (as with a name of "1/4"), this returns `undef`.

`=item e2charnum($e_content)`

Given a name or number that could appear in a `C<EE<lt>name_or_numE<gt>>` sequence, this returns the number of the Unicode character that this stands for. For example, `C<e2char('sol')>`, `C<e2char('47')>`, `C<e2char('0x2F')>`, and `C<e2char('057')>` all return `47`, because `C<EE<lt>solE<gt>>`, `C<EE<lt>47E<gt>>`, `C<EE<lt>0x2fE<gt>>`, and `C<EE<lt>057E<gt>>`, all mean `"/`, whose Unicode number is `47`. If the name has no known value (as with a name of "qacute") or is syntactically invalid (as with a name of "1/4"), this returns `undef`.

`=item $Name2character{I<name>}`

Maps from names (as in `C<EE<lt>I<name>E<gt>>`) like "eacute" or "sol" to the string that each stands for. Note that this does not include numerics (like "64" or "x981c"). Under old Perl versions (before 5.7) you get a "?" in place of characters whose Unicode value is over 255.

`=item $Name2character_number{I<name>}`

Maps from names (as in `C<EE<lt>I<name>E<gt>>`) like "eacute" or "sol" to the Unicode value that each stands for. For example, `C<$Name2character_number{'eacute'}>` is `201`, and `C<$Name2character_number{'eacute'}>` is `8364`. You get the correct Unicode value, regardless of the version of Perl you're using -- which differs from `C<%Name2character>`'s behavior under pre-5.7 Perls.

Note that this hash does not

include numerics (like "64" or "x981c").

```
=item $Latin1Code_to_fallback{I<integer>}
```

For numbers in the range 160 (0x00A0) to 255 (0x00FF), this maps from the character code for a Latin-1 character (like 233 for lowercase e-acute) to the US-ASCII character that best approximates it (like "e"). You may find this useful if you are rendering POD in a format that you think deals well only with US-ASCII characters.

```
=item $Latin1Char_to_fallback{I<character>}
```

Just as above, but maps from characters (like "\xE9", lowercase e-acute) to characters (like "e").

```
=item $Code2USASCII{I<integer>}
```

This maps from US-ASCII codes (like 32) to the corresponding character (like space, for 32). Only characters 32 to 126 are defined. This is meant for use by C<e2char(\$x)> when it senses that it's running on a non-ASCII platform (where chr(32) doesn't get you a space -- but \$Code2USASCII{32} will). It's documented here just in case you might find it useful.

```
=back
```

```
=head1 CAVEATS
```

On Perl versions before 5.7, Unicode characters with a value over 255 (like lambda or emdash) can't be conveyed. This module does work under such early Perl versions, but in the place of each such character, you get a "?". Latin-1 characters (characters 160-255) are unaffected.

Under EBCDIC platforms, C<e2char(\$n)> may not always be the same as C<chr(e2charnum(\$n))>, and ditto for C<\$Name2character{ \$name}> and C<chr(\$Name2character\_number{ \$name})>, because the strings are returned as native, and the numbers are returned as Unicode. However, for Perls starting with v5.8, C<e2char(\$n)> is the same as C<chr(utf8::unicode\_to\_native(e2charnum(\$n)))>, and ditto for C<\$Name2character{ \$name}> and C<chr(utf8::unicode\_to\_native(\$Name2character\_number{ \$name}))>.

```
=head1 SEE ALSO
```

L<Pod::Browser> - a pod web server based on L<Catalyst>.



L<Pod::Checker> - check pod documents for syntax errors.

L<Pod::Coverage> - check if the documentation for a module is comprehensive.

L<perlpod> - description of pod format (for people documenting with pod).

L<perlpodspec> - specification of pod format (for people processing it).

L<Text::Unidecode> - ASCII transliteration of Unicode text.

=head1 REPOSITORY

L<<https://github.com/neilbowers/Pod-Escapes>>

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Portions of the data tables in this module are derived from the entity declarations in the W3C XHTML specification.

Currently (October 2001), that's these three:

<http://www.w3.org/TR/xhtml1/DTD/xhtml1-lat1.ent>

<http://www.w3.org/TR/xhtml1/DTD/xhtml1-special.ent>

<http://www.w3.org/TR/xhtml1/DTD/xhtml1-symbol.ent>

=head1 AUTHOR

Sean M. Burke C<[sburke@cpan.org](mailto:sburke@cpan.org)>

Now being maintained by Neil Bowers E<lt>[neilb@cpan.org](mailto:neilb@cpan.org)E<gt>

=cut

#~~~~~

# What I used for reading the XHTML .ent files:

```
my(@norms, @good, @bad);
```

```
my $dir = 'c:/sgml/docbook/';
```

```

my %escapes;
foreach my $file (qw(
  xhtml-symbol.ent
  xhtml-lat1.ent
  xhtml-special.ent
)) {
  open(IN, "<$dir$file") or die "can't read-open $dir$file: $!";
  print "Reading $file...\n";
  while(<IN>) {
    if(m/<!ENTITY\s+(\S+)\s+"&#(?:[^\;]+);"/) {
      my($name, $value) = ($1,$2);
      next if $name eq 'quot' or $name eq 'apos' or $name eq 'gt';

      $value = hex $1 if $value =~ m/^[a-fA-F0-9]+$/s;
      print "ILLEGAL VALUE $value" unless $value =~ m/^\d+$/s;
      if($value > 255) {
        push @good , sprintf " %-10s , chr(%s),\n", "$name", $value;
        push @bad , sprintf " %-10s , \bad,\n", "$name", $value;
      } else {
        push @norms, sprintf " %-10s , chr(%s),\n", "$name", $value;
      }
    } elsif(m/<!ENT/) {
      print "# Skipping $_";
    }
  }

}
close(IN);
}

print @norms;
print "\n ( \$] . = 5.006001 ? (\n";
print @good;
print " ) : (\n";
print @bad;
print " )\n);\n";

```

\_\_END\_\_

#~~~~~

Found in path(s):

```

* /opt/ws_local/PERMITS_SQL/1009548111_1591901918.14/0/perl-Pod-Escapes-1.07-395.el8.src.rpm-cosi-
expand-archive-AcQE8bnL/Pod-Escapes-1.07.tar.gz-cosi-expand-archive-GKGiQnJB/Pod-Escapes-
1.07/lib/Pod/Escapes.pm

```

No license file was found, but licenses were detected in source scan.

---

abstract: unknown

author:

- unknown  
build\_requires:  
ExtUtils::MakeMaker: '0'  
configure\_requires:  
ExtUtils::MakeMaker: '0'  
dynamic\_config: 1  
generated\_by: 'ExtUtils::MakeMaker version 7.02, CPAN::Meta::Converter version 2.143240'  
license: perl  
meta-spec:  
url: <http://module-build.sourceforge.net/META-spec-v1.4.html>  
version: '1.4'  
name: Pod-Escapes  
no\_index:  
directory:  
- t  
- inc  
requires:  
Exporter: '0'  
perl: '5.006'  
strict: '0'  
vars: '0'  
warnings: '0'  
resources:  
repository: [git://github.com/neilbowers/Pod-Escapes.git](https://github.com/neilbowers/Pod-Escapes.git)  
version: '1.07'

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548111\_1591901918.14/0/perl-Pod-Escapes-1.07-395.el8.src.rpm-cosi-expand-archive-AcQE8bnL/Pod-Escapes-1.07.tar.gz-cosi-expand-archive-GKGiQNjB/Pod-Escapes-1.07/META.yml

# 1.438 distro 1.7.0

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## 1.439 javax-annotation-api 1.2

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Found in path(s):

\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-  
jar/org/snmp4j/security/AuthGeneric.java

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```
* /opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-  
jar/org/snmp4j/smi/AssignableFromString.java
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jar/org/snmp4j/TransportStateReference.java
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\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/event/AuthenticationFailureEvent.java

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* /opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-
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jar/org/snmp4j/tools/console/SnmpRequest.java
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* /opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-
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* /opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/security/Priv3DES.java
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\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/transport/ssh/SshTransportAdapter.java  
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jar/org/snmp4j/transport/tls/DefaultTlsTmSecurityCallback.java
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* /opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-
jar/org/snmp4j/event/CounterListener.java
```

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jar/org/snmp4j/DefaultTimeoutModel.java
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jar/org/snmp4j/security/SNMPv3SecurityModel.java

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jar/org/snmp4j/event/UsmUserListener.java  
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Found in path(s):

```
*/opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-
jar/org/snmp4j/test/MultiThreadedTrapReceiver.java
```

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```
/*_#####
_##
_## SNMP4J 2 - CounterSupport.java
_##
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_##
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```

Found in path(s):

\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/mp/CounterSupport.java  
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```
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_## SNMP4J 2 - Salt.java
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\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/security/Salt.java  
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Found in path(s):

\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/log/NoLogger.java  
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_##
_## SNMP4J 2 - UsmSecurityParameters.java
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```

Found in path(s):

\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/security/UsmSecurityParameters.java  
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/*_#####
_##
_## SNMP4J 2 - DefaultTcpTransportMapping.java
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Found in path(s):

```

*/opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-
jar/org/snmp4j/transport/DefaultTcpTransportMapping.java

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_## SNMP4J 2 - SnmpConstants.java
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```

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```

*/opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/mp/SnmpConstants.java

```

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```

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_##
_## SNMP4J 2 - ScopedPDU.java
_##

```

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Found in path(s):

\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/TimeoutModel.java

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_##
_## SNMP4J 2 - BERSerializable.java
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```

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```
* /opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-
jar/org/snmp4j/asn1/BERSerializable.java
```

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```

Found in path(s):

```
* /opt/cola/permits/1138554071_1614291144.99/0/snmp4j-2-6-0-sources-1-
jar/org/snmp4j/security/AuthHMAC384SHA512.java
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```
/*_#####
_##
```

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```

Found in path(s):

\* /opt/cola/permits/1138554071\_1614291144.99/0/snmp4j-2-6-0-sources-1-jar/org/snmp4j/MessageDispatcher.java

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## 1.442 python-pip 22.0.4

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#### A. HISTORY OF THE SOFTWARE

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for

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Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2.1	2.2	2002	PSF	yes
2.2.2	2.2.1	2002	PSF	yes
2.2.3	2.2.2	2003	PSF	yes
2.3	2.2.2	2002-2003	PSF	yes
2.3.1	2.3	2002-2003	PSF	yes
2.3.2	2.3.1	2002-2003	PSF	yes
2.3.3	2.3.2	2002-2003	PSF	yes
2.3.4	2.3.3	2004	PSF	yes
2.3.5	2.3.4	2005	PSF	yes
2.4	2.3	2004	PSF	yes
2.4.1	2.4	2005	PSF	yes
2.4.2	2.4.1	2005	PSF	yes
2.4.3	2.4.2	2006	PSF	yes
2.4.4	2.4.3	2006	PSF	yes
2.5	2.4	2006	PSF	yes
2.5.1	2.5	2007	PSF	yes
2.5.2	2.5.1	2008	PSF	yes
2.5.3	2.5.2	2008	PSF	yes
2.6	2.5	2008	PSF	yes
2.6.1	2.6	2008	PSF	yes
2.6.2	2.6.1	2009	PSF	yes
2.6.3	2.6.2	2009	PSF	yes
2.6.4	2.6.3	2009	PSF	yes
2.6.5	2.6.4	2010	PSF	yes
2.7	2.6	2010	PSF	yes

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(2) According to Richard Stallman, 1.6.1 is not GPL-compatible, because its license has a choice of law clause. According to CNRI, however, Stallman's lawyer has told CNRI's lawyer that 1.6.1 is "not incompatible" with the GPL.

Thanks to the many outside volunteers who have worked under Guido's direction to make these releases possible.

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This package contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#

This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree:

<http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#>

It contains the certificates in PEM format and therefore can be directly used with curl / libcurl / php\_curl, or with an Apache+mod\_ssl webserver for SSL client authentication.

Just configure this file as the SSLCACertificateFile.#

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as a successor of a language called ABC. Guido remains Python's  
principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for  
National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>)  
in Reston, Virginia where he released several versions of the  
software.

In May 2000, Guido and the Python core development team moved to  
BeOpen.com to form the BeOpen PythonLabs team. In October of the same  
year, the PythonLabs team moved to Digital Creations (now Zope  
Corporation, see <http://www.zope.com>). In 2001, the Python Software  
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1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes

2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2.1	2.2	2002	PSF	yes
2.2.2	2.2.1	2002	PSF	yes
2.2.3	2.2.2	2003	PSF	yes
2.3	2.2.2	2002-2003	PSF	yes
2.3.1	2.3	2002-2003	PSF	yes
2.3.2	2.3.1	2002-2003	PSF	yes
2.3.3	2.3.2	2002-2003	PSF	yes
2.3.4	2.3.3	2004	PSF	yes
2.3.5	2.3.4	2005	PSF	yes
2.4	2.3	2004	PSF	yes
2.4.1	2.4	2005	PSF	yes
2.4.2	2.4.1	2005	PSF	yes
2.4.3	2.4.2	2006	PSF	yes
2.4.4	2.4.3	2006	PSF	yes
2.5	2.4	2006	PSF	yes
2.5.1	2.5	2007	PSF	yes
2.5.2	2.5.1	2008	PSF	yes
2.5.3	2.5.2	2008	PSF	yes
2.6	2.5	2008	PSF	yes
2.6.1	2.6	2008	PSF	yes
2.6.2	2.6.1	2009	PSF	yes
2.6.3	2.6.2	2009	PSF	yes
2.6.4	2.6.3	2009	PSF	yes
2.6.5	2.6.4	2010	PSF	yes
3.0	2.6	2008	PSF	yes
3.0.1	3.0	2009	PSF	yes
3.1	3.0.1	2009	PSF	yes
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
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## 1.444 graphite 1.3.10 10.el8

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## 1.445 kerberos 1.18

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cmd/krb5/iproplib/iproplib.x
cmd/krb5/iproplib/iproplib_hdr.h
cmd/krb5/kadmin/server/iproplib_svc.c
cmd/krb5/kproplog/kproplog.c
cmd/krb5/slave/kpropd_rpc.c
lib/gss_mechs/mech_krb5/et/kdb5_err.c
lib/gss_mechs/mech_spnego/mech_gssapiP_spnego.h
lib/gss_mechs/mech_spnego/mech_spnego_mech.c
lib/krb5/kadm5/kadm_host_srv_names.c
lib/krb5/kdb/kdb_convert.c
lib/krb5/kdb/kdb_hdr.h
lib/krb5/kdb/kdb_log.c
lib/krb5/kdb/kdb_log.h
lib/libgss/g_accept_sec_context.c
```

lib/libgss/g\_acquire\_cred.c  
lib/libgss/g\_canon\_name.c  
lib/libgss/g\_compare\_name.c  
lib/libgss/g\_context\_time.c  
lib/libgss/g\_delete\_sec\_context.c  
lib/libgss/g\_dsp\_name.c  
lib/libgss/g\_dsp\_status.c  
lib/libgss/g\_dup\_name.c  
lib/libgss/g\_exp\_sec\_context.c  
lib/libgss/g\_export\_name.c  
lib/libgss/g\_glue.c  
lib/libgss/g\_imp\_name.c  
lib/libgss/g\_imp\_sec\_context.c  
lib/libgss/g\_init\_sec\_context.c  
lib/libgss/g\_initialize.c  
lib/libgss/g\_inquire\_context.c  
lib/libgss/g\_inquire\_cred.c  
lib/libgss/g\_inquire\_names.c  
lib/libgss/g\_process\_context.c  
lib/libgss/g\_rel\_buffer.c  
lib/libgss/g\_rel\_cred.c  
lib/libgss/g\_rel\_name.c  
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lib/libgss/g\_seal.c  
lib/libgss/g\_sign.c  
lib/libgss/g\_store\_cred.c  
lib/libgss/g\_unseal.c  
lib/libgss/g\_userok.c  
lib/libgss/g\_utils.c  
lib/libgss/g\_verify.c  
lib/libgss/gssd\_pname\_to\_uid.c  
uts/common/gssapi/include/gssapi\_err\_generic.h  
uts/common/gssapi/include/mechglueP.h

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lib/gssapi/mechglue/g\_accept\_sec\_context.c  
lib/gssapi/mechglue/g\_acquire\_cred.c  
lib/gssapi/mechglue/g\_canon\_name.c  
lib/gssapi/mechglue/g\_compare\_name.c  
lib/gssapi/mechglue/g\_context\_time.c  
lib/gssapi/mechglue/g\_delete\_sec\_context.c  
lib/gssapi/mechglue/g\_dsp\_name.c  
lib/gssapi/mechglue/g\_dsp\_status.c  
lib/gssapi/mechglue/g\_dup\_name.c  
lib/gssapi/mechglue/g\_exp\_sec\_context.c  
lib/gssapi/mechglue/g\_export\_name.c  
lib/gssapi/mechglue/g\_glue.c  
lib/gssapi/mechglue/g\_imp\_name.c

lib/gssapi/mechglue/g\_imp\_sec\_context.c  
lib/gssapi/mechglue/g\_init\_sec\_context.c  
lib/gssapi/mechglue/g\_initialize.c  
lib/gssapi/mechglue/g\_inquire\_context.c  
lib/gssapi/mechglue/g\_inquire\_cred.c  
lib/gssapi/mechglue/g\_inquire\_names.c  
lib/gssapi/mechglue/g\_process\_context.c  
lib/gssapi/mechglue/g\_rel\_buffer.c  
lib/gssapi/mechglue/g\_rel\_cred.c  
lib/gssapi/mechglue/g\_rel\_name.c  
lib/gssapi/mechglue/g\_rel\_oid\_set.c  
lib/gssapi/mechglue/g\_seal.c  
lib/gssapi/mechglue/g\_sign.c  
lib/gssapi/mechglue/g\_store\_cred.c  
lib/gssapi/mechglue/g\_unseal.c  
lib/gssapi/mechglue/g\_userok.c  
lib/gssapi/mechglue/g\_utils.c  
lib/gssapi/mechglue/g\_verify.c  
lib/gssapi/mechglue/gssd\_pname\_to\_uid.c  
lib/gssapi/mechglue/mglueP.h  
lib/gssapi/mechglue/oid\_ops.c  
lib/gssapi/spnego/gssapiP\_spnego.h  
lib/gssapi/spnego/spnego\_mech.c

and the initial implementation of incremental propagation, including the following new or changed files:

include/iprop\_hdr.h  
kadmin/server/ipropd\_svc.c  
lib/kdb/iprop.x  
lib/kdb/kdb\_convert.c  
lib/kdb/kdb\_log.c  
lib/kdb/kdb\_log.h  
lib/krb5/error\_tables/kdb5\_err.et  
kprop/kpropd\_rpc.c  
kprop/kproplog.c

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```
sub dump { [' . _esc( @{ $_[0] ) } . ' ] }
```

```
# JUNK:
```

```
sub _esc {  
  return " unless @_;  
  my @out;  
  foreach my $in (@_) {  
    push @out, "" . $in . "";  
    $out[-1] =~ s/([^- \:;\.!\>|<|"\|=\|?|\+|\[\]\{\}\_a-zA-Z0-9_\`~\!#\%^\&|\*(\))/  
      sprintf( (ord($1) < 256) ? "\\x%02X" : "\\x{%X}", ord($1))  
    /eg;  
  }  
  return join ' ', @out;  
}
```

```
__END__
```

```
=head1 NAME
```

```
Pod::Simple::PullParserToken -- tokens from Pod::Simple::PullParser
```

```
=head1 SYNOPSIS
```

Given a \$parser that's an object of class Pod::Simple::PullParser  
(or a subclass)...

```
while(my $token = $parser->get_token) {  
  $DEBUG and print STDERR "Token: ", $token->dump, "\n";  
  if($token->is_start) {  
    ...access $token->tagname, $token->attr, etc...  
  
  } elsif($token->is_text) {  
    ...access $token->text, $token->text_r, etc...  
  }  
}
```

```

    } elsif($token->is_end) {
        ...access $token->tagname...
    }
}

```

(Also see L<Pod::Simple::PullParser>)

=head1 DESCRIPTION

When you do `$parser->get_token` on a L<Pod::Simple::PullParser>, you should get an object of a subclass of `Pod::Simple::PullParserToken`.

Subclasses will add methods, and will also inherit these methods:

=over

=item `$token->type`

This returns the type of the token. This will be either the string "start", the string "text", or the string "end".

Once you know what the type of an object is, you then know what subclass it belongs to, and therefore what methods it supports.

Yes, you could probably do the same thing with code like `$token->isa('Pod::Simple::PullParserEndToken')`, but that's not so pretty as using just `$token->type`, or even the following shortcuts:

=item `$token->is_start`

This is a shortcut for `C<< $token->type() eq "start" >>`

=item `$token->is_text`

This is a shortcut for `C<< $token->type() eq "text" >>`

=item `$token->is_end`

This is a shortcut for `C<< $token->type() eq "end" >>`

=item `$token->dump`

This returns a handy stringified value of this object. This is useful for debugging, as in:

```

while(my $token = $parser->get_token) {

```

```
$DEBUG and print STDERR "Token: ", $token->dump, "\n";
```

```
...  
}
```

=back

=head1 SEE ALSO

My subclasses:

L<Pod::Simple::PullParserStartToken>,  
L<Pod::Simple::PullParserTextToken>, and  
L<Pod::Simple::PullParserEndToken>.

L<Pod::Simple::PullParser> and L<Pod::Simple>

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Pod::Simple was created by Sean M. Burke <[sburke@cpan.org](mailto:sburke@cpan.org)>. But don't bother him, he's retired.

Pod::Simple is maintained by:

=over

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3.35/lib/Pod/Simple/PullParserToken.pm
```

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=head1 NAME

Pod::Simple::Search - find POD documents in directory trees

=head1 SYNOPSIS

```
use Pod::Simple::Search;
my $name2path = Pod::Simple::Search->new->limit_glob('LWP::*')->survey;
print "Looky see what I found: ",
    join(' ', sort keys %$name2path), "\n";

print "LWPUA docs = ",
    Pod::Simple::Search->new->find('LWP::UserAgent') || "?",
    "\n";
```

=head1 DESCRIPTION

B<Pod::Simple::Search> is a class that you use for running searches for Pod files. An object of this class has several attributes (mostly options for controlling search options), and some methods for searching based on those attributes.

The way to use this class is to make a new object of this class, set any options, and then call one of the search options (probably C<survey> or C<find>). The sections below discuss the syntaxes for doing all that.

=head1 CONSTRUCTOR

This class provides the one constructor, called C<new>.

It takes no parameters:

```
use Pod::Simple::Search;
my $search = Pod::Simple::Search->new;
```

=head1 ACCESSORS

This class defines several methods for setting (and, occasionally, reading) the contents of an object. With two exceptions (discussed at the end of this section), these attributes are just for controlling the way searches are carried out.

Note that each of these return C<\$self> when you call them as C<< \$self->I<whatever(value)>>>. That's so that you can chain together set-attribute calls like this:

```
my $name2path =
  Pod::Simple::Search->new
  -> inc(0) -> verbose(1) -> callback(\&blab)
  -> survey(@there);
```

...which works exactly as if you'd done this:

```
my $search = Pod::Simple::Search->new;
$search->inc(0);
$search->verbose(1);
$search->callback(\&blab);
my $name2path = $search->survey(@there);
```

=over

=item \$search->inc( I<true-or-false> );

This attribute, if set to a true value, means that searches should implicitly add perl's I<@INC> paths. This automatically considers paths specified in the C<PERL5LIB> environment as this is prepended to I<@INC> by the Perl interpreter itself. This attribute's default value is B<TRUE>. If you want to search only specific directories, set \$self->inc(0) before calling \$inc->survey or \$inc->find.

=item \$search->verbose( I<nonnegative-number> );

This attribute, if set to a nonzero positive value, will make searches output (via C<warn>) notes about what they're doing as they do it.

This option may be useful for debugging a pod-related module.

This attribute's default value is zero, meaning that no C<warn> messages are produced. (Setting verbose to 1 turns on some messages, and setting

it to 2 turns on even more messages, i.e., makes the following search(es) even more verbose than 1 would make them.)

```
=item $search->limit_glob( I<some-glob-string> );
```

This option means that you want to limit the results just to items whose podnames match the given glob/wildcard expression. For example, you might limit your search to just "LWP:\*", to search only for modules starting with "LWP:\*" (but not including the module "LWP" itself); or you might limit your search to "LW\*" to see only modules whose (full) names begin with "LW"; or you might search for "\*Find\*" to search for all modules with "Find" somewhere in their full name. (You can also use "?" in a glob expression; so "DB?" will match "DBI" and "DBD".)

```
=item $search->callback( I<\&some_routine> );
```

This attribute means that every time this search sees a matching Pod file, it should call this callback routine. The routine is called with two parameters: the current file's filespec, and its pod name. (For example: C<("/etc/perljunk/File/Crunk.pm", "File::Crunk")> would be in C<@\_>.)

The callback routine's return value is not used for anything.

This attribute's default value is false, meaning that no callback is called.

```
=item $search->laborious( I<true-or-false> );
```

Unless you set this attribute to a true value, Pod::Search will apply Perl-specific heuristics to find the correct module PODs quickly. This attribute's default value is false. You won't normally need to set this to true.

Specifically: Turning on this option will disable the heuristics for seeing only files with Perl-like extensions, omitting subdirectories that are numeric but do I<not> match the current Perl interpreter's version ID, suppressing F<site\_perl> as a module hierarchy name, etc.

```
=item $search->recurse( I<true-or-false> );
```

Unless you set this attribute to a false value, Pod::Search will recurse into subdirectories of the search directories.

```
=item $search->shadows( I<true-or-false> );
```

Unless you set this attribute to a true value, Pod::Simple::Search will

consider only the first file of a given modulename as it looks thru the specified directories; that is, with this option off, if Pod::Simple::Search has seen a C<somepathdir/Foo/Bar.pm> already in this search, then it won't bother looking at a C<somelaterpathdir/Foo/Bar.pm> later on in that search, because that file is merely a "shadow". But if you turn on C<< \$self->shadows(1) >>, then these "shadow" files are inspected too, and are noted in the pathname2podname return hash.

This attribute's default value is false; and normally you won't need to turn it on.

```
=item $search->limit_re( I<some-regexp> );
```

Setting this attribute (to a value that's a regexp) means that you want to limit the results just to items whose podnames match the given regexp. Normally this option is not needed, and the more efficient C<limit\_glob> attribute is used instead.

```
=item $search->dir_prefix( I<some-string-value> );
```

Setting this attribute to a string value means that the searches should begin in the specified subdirectory name (like "Pod" or "File::Find", also expressible as "File/Find"). For example, the search option C<< \$search->limit\_glob("File::Find::R\*") >> is the same as the combination of the search options C<< \$search->limit\_re("^File::Find::R") -> dir\_prefix("File::Find") >>.

Normally you don't need to know about the C<dir\_prefix> option, but I include it in case it might prove useful for someone somewhere.

(Implementationally, searching with limit\_glob ends up setting limit\_re and usually dir\_prefix.)

```
=item $search->progress( I<some-progress-object> );
```

If you set a value for this attribute, the value is expected to be an object (probably of a class that you define) that has a C<reach> method and a C<done> method. This is meant for reporting progress during the search, if you don't want to use a simple callback.

Normally you don't need to know about the C<progress> option, but I include it in case it might prove useful for someone somewhere.

While a search is in progress, the progress object's C<reach> and

C<done> methods are called like this:

```
# Every time a file is being scanned for pod:
$progress->reach($count, "Scanning $file"); ++$count;
```

```
# And then at the end of the search:
$progress->done("Noted $count Pod files total");
```

Internally, we often set this to an object of class Pod::Simple::Progress. That class is probably undocumented, but you may wish to look at its source.

```
=item $name2path = $self->name2path;
```

This attribute is not a search parameter, but is used to report the result of C<survey> method, as discussed in the next section.

```
=item $path2name = $self->path2name;
```

This attribute is not a search parameter, but is used to report the result of C<survey> method, as discussed in the next section.

```
=back
```

```
=head1 MAIN SEARCH METHODS
```

Once you've actually set any options you want (if any), you can go ahead and use the following methods to search for Pod files in particular ways.

```
=head2 C<< $search->survey( @directories ) >>
```

The method C<survey> searches for POD documents in a given set of files and/or directories. This runs the search according to the various options set by the accessors above. (For example, if the C<inc> attribute is on, as it is by default, then the perl @INC directories are implicitly added to the list of directories (if any) that you specify.)

The return value of C<survey> is two hashes:

```
=over
```

```
=item C<name2path>
```

A hash that maps from each pod-name to the filespec (like "Stuff::Thing" => "/whatever/plib/Stuff/Thing.pm")



=item C<path2name>

A hash that maps from each Pod filespec to its pod-name (like  
"/whatever/plib/Stuff/Thing.pm" => "Stuff::Thing")

=back

Besides saving these hashes as the hashref attributes  
C<name2path> and C<path2name>, calling this function also returns  
these hashrefs. In list context, the return value of  
C<< \$search->survey >> is the list C<(\%name2path, \%path2name)>.  
In scalar context, the return value is C<\%name2path>.  
Or you can just call this in void context.

Regardless of calling context, calling C<survey> saves  
its results in its C<name2path> and C<path2name> attributes.

E.g., when searching in F<\$/HOME/perl5lib>, the file  
F<\$/HOME/perl5lib/MyModule.pm> would get the POD name I<MyModule>,  
whereas F<\$/HOME/perl5lib/Myclass/Subclass.pm> would be  
I<Myclass::Subclass>. The name information can be used for POD  
translators.

Only text files containing at least one valid POD command are found.

In verbose mode, a warning is printed if shadows are found (i.e., more  
than one POD file with the same POD name is found, e.g. F<CPAN.pm> in  
different directories). This usually indicates duplicate occurrences of  
modules in the I<@INC> search path, which is occasionally inadvertent  
(but is often simply a case of a user's path dir having a more recent  
version than the system's general path dirs in general.)

The options to this argument is a list of either directories that are  
searched recursively, or files. (Usually you wouldn't specify files,  
but just dirs.) Or you can just specify an empty-list, as in  
\$name2path; with the C<inc> option on, as it is by default.

The POD names of files are the plain basenames with any Perl-like  
extension (.pm, .pl, .pod) stripped, and path separators replaced by  
C<::>'s.

Calling Pod::Simple::Search->search(...) is short for  
Pod::Simple::Search->new->search(...). That is, a throwaway object  
with default attribute values is used.

=head2 C<< \$search->simplify\_name( \$str ) >>

The method `B<simplify_name>` is equivalent to `B<basename>`, but also strips Perl-like extensions (`.pm`, `.pl`, `.pod`) and extensions like `F<.bat>`, `F<.cmd>` on Win32 and OS/2, or `F<.com>` on VMS, respectively.

```
=head2 C<< $search->find( $pod ) >>
```

```
=head2 C<< $search->find( $pod, @search_dirs ) >>
```

Returns the location of a Pod file, given a Pod/module/script name (like `"Foo::Bar"` or `"perlvar"` or `"perldoc"`), and an idea of what files/directories to look in.

It searches according to the various options set by the accessors above. (For example, if the `C<inc>` attribute is on, as it is by default, then the perl `@INC` directories are implicitly added to the list of directories (if any) that you specify.)

This returns the full path of the first occurrence to the file. Package names (eg `'A::B'`) are automatically converted to directory names in the selected directory. Additionally, `'pm'`, `'pl'` and `'pod'` are automatically appended to the search as required. (So, for example, under Unix, `"A::B"` is converted to `"somedir/A/B.pm"`, `"somedir/A/B.pod"`, or `"somedir/A/B.pl"`, as appropriate.)

If no such Pod file is found, this method returns `undef`.

If any of the given search directories contains a `F<pod/>` subdirectory, then it is searched. (That's how we manage to find `F<perlfunc>`, for example, which is usually in `F<pod/perlfunc>` in most Perl dists.)

The `C<verbose>` and `C<inc>` attributes influence the behavior of this search; notably, `C<inc>`, if true, adds `@INC` and also `$Config::Config{'scriptdir'}` to the list of directories to search.

It is common to simply say `C<< $filename = Pod::Simple::Search->new->find("perlvar") >>` so that just the `@INC` (well, and `scriptdir`) directories are searched. (This happens because the `C<inc>` attribute is true by default.)

Calling `Pod::Simple::Search->find(...)` is short for `Pod::Simple::Search->new->find(...)`. That is, a throwaway object with default attribute values is used.

```
=head2 C<< $self->contains_pod( $file ) >>
```

Returns true if the supplied filename (not POD module) contains some Pod

documentation.

## =head1 SUPPORT

Questions or discussion about POD and Pod::Simple should be sent to the pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

This module is managed in an open GitHub repository, L<<https://github.com/perl-pod/pod-simple/>>. Feel free to fork and contribute, or to clone L<[git://github.com/perl-pod/pod-simple.git](https://github.com/perl-pod/pod-simple.git)> and send patches!

Patches against Pod::Simple are welcome. Please send bug reports to <bug-pod-simple@rt.cpan.org>.

## =head1 COPYRIGHT AND DISCLAIMERS

Copyright (c) 2002 Sean M. Burke.

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This program is distributed in the hope that it will be useful, but without any warranty; without even the implied warranty of merchantability or fitness for a particular purpose.

## =head1 AUTHOR

Pod::Simple was created by Sean M. Burke <sburke@cpan.org> with code borrowed from Marek Rouchal's L<Pod::Find>, which in turn heavily borrowed code from Nick Ing-Simmons' C<PodToHtml>.

But don't bother him, he's retired.

Pod::Simple is maintained by:

=over

=item \* Allison Randal C<allison@perl.org>

=item \* Hans Dieter Pearcey C<hdp@cpan.org>

=item \* David E. Wheeler C<dwheeler@cpan.org>

=back

=cut

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548100_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-  
archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-  
3.35/lib/Pod/Simple/Search.pm
```

No license file was found, but licenses were detected in source scan.

=head1 NAME

Pod::Simple::XMLOutputStream -- turn Pod into XML

=head1 SYNOPSIS

```
perl -MPod::Simple::XMLOutputStream -e \  
"exit Pod::Simple::XMLOutputStream->filter(shift)->any_errata_seen" \  
thingy.pod
```

=head1 DESCRIPTION

Pod::Simple::XMLOutputStream is a subclass of L<Pod::Simple> that parses Pod and turns it into XML.

Pod::Simple::XMLOutputStream inherits methods from L<Pod::Simple>.

=head1 SEE ALSO

L<Pod::Simple::DumpAsXML> is rather like this class; see its documentation for a discussion of the differences.

L<Pod::Simple>, L<Pod::Simple::DumpAsXML>, L<Pod::SAX>

L<Pod::Simple::Subclassing>

The older (and possibly obsolete) libraries L<Pod::PXML>, L<Pod::XML>

=head1 ABOUT EXTENDING POD

TODO: An example or two of =extend, then point to Pod::Simple::Subclassing

=head1 SEE ALSO

L<Pod::Simple>, L<Pod::Simple::Text>, L<Pod::Spell>

=head1 SUPPORT

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pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

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Patches against Pod::Simple are welcome. Please send bug reports to <bug-pod-simple@rt.cpan.org>.

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## =head1 AUTHOR

Pod::Simple was created by Sean M. Burke <[sburke@cpan.org](mailto:sburke@cpan.org)>. But don't bother him, he's retired.

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=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/lib/Pod/Simple/XMLOutputStream.pm

No license file was found, but licenses were detected in source scan.

## =head1 NAME

Pod::Simple::PullParserTextToken -- text-tokens from Pod::Simple::PullParser

=head1 SYNOPSIS

(See L<Pod::Simple::PullParser>)

=head1 DESCRIPTION

When you do `$parser->get_token` on a L<Pod::Simple::PullParser>, you might get an object of this class.

This is a subclass of L<Pod::Simple::PullParserToken> and inherits all its methods, and adds these methods:

=over

=item `$token->text`

This returns the text that this token holds. For example, parsing `CZ<><foo>` will return a C start-token, a text-token, and a C end-token. And if you want to get the "foo" out of the text-token, call `C<< $token->text >>`

=item `$token->text(I<somestring>)`

This changes the string that this token holds. You probably won't need to do this.

=item `$token->text_r()`

This returns a scalar reference to the string that this token holds. This can be useful if you don't want to memory-copy the potentially large text value (well, as large as a paragraph or a verbatim block) as calling `$token->text` would do.

Or, if you want to alter the value, you can even do things like this:

```
for ( ${ $token->text_r } ) { # Aliases it with $_ !!

    s/ The / the /g; # just for example

    if( 'A' eq chr(65) ) { # (if in an ASCII world)
        tr/\xA0/ /;
        tr/\xAD//d;
    }
}
```

...or however you want to alter the value...

(Note that starting with Perl v5.8, you can use, e.g.,

```
my $nbsp = chr utf8::unicode_to_native(0xA0);
s/$nbsp/ /g;
```

```
to handle the above regardless if it's an ASCII world or not)
}
```

=back

You're unlikely to ever need to construct an object of this class for yourself, but if you want to, call

```
C<<
Pod::Simple::PullParserTextToken->new( I<text> )
>>
```

=head1 SEE ALSO

L<Pod::Simple::PullParserToken>, L<Pod::Simple>, L<Pod::Simple::Subclassing>

=head1 SUPPORT

Questions or discussion about POD and Pod::Simple should be sent to the pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

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NAME

perlfaq3 - Programming Tools (\$Revision: 1.38 \$, \$Date: 1999/05/23 16:08:30 \$)

DESCRIPTION

This section of the FAQ answers questions related to programmer tools and programming support.

How do I do (anything)?

Have you looked at CPAN (see perlfaq2)? The chances are that someone has already written a module that can solve your problem. Have you read the appropriate man pages? Here's a brief index:

- Basics      perldata, perlvar, perlsyn, perlop, perlsub
- Execution   perlrun, perldebug
- Functions   perlfunc
- Objects     perlref, perlmod, perlobj, perltie
- Data Structures perlref, perllol, perldsc
- Modules     perlmod, perlmodlib, perlsub
- Regexes     perlre, perlfunc, perlop, perllocale
- Moving to perl5 perltrap, perl
- Linking w/C   perlxs, perlcall, perlguts, perlembed
- Various     <http://www.perl.com/CPAN/doc/FMTEYEWTK/index.html>  
(not a man-page but still useful)

A crude table of contents for the Perl man page set is found in perltoc.

How can I use Perl interactively?

The typical approach uses the Perl debugger, described in the perldebug(1) man page, on an ``empty" program, like this:

```
perl -de 42
```

Now just type in any legal Perl code, and it will be immediately evaluated. You can also examine the symbol table, get stack backtraces, check variable values, set breakpoints, and other operations typically found in symbolic debuggers.

Is there a Perl shell?

In general, no. The Shell.pm module (distributed with Perl) makes Perl try commands which aren't part of the Perl language as shell commands. perlsh from the source distribution is simplistic and uninteresting, but may still be



what you want.

How do I debug my Perl programs?

Have you tried use warnings or used -w? They enable warnings to detect dubious practices.

Have you tried use strict? It prevents you from using symbolic references, makes you predeclare any subroutines that you call as bare words, and (probably most importantly) forces you to predeclare your variables with my, our, or use vars.

Did you check the return values of each and every system call? The operating system (and thus Perl) tells you whether they worked, and if not why.

```
open(FH, "> /etc/cantwrite")
    or die "Couldn't write to /etc/cantwrite: $!\n";
```

Did you read perltrap? It's full of gotchas for old and new Perl programmers and even has sections for those of you who are upgrading from languages like awk and C.

Have you tried the Perl debugger, described in perldebug? You can step through your program and see what it's doing and thus work out why what it's doing isn't what it should be doing.

How do I profile my Perl programs?

You should get the Devel::DProf module from the standard distribution (or separately on CPAN) and also use Benchmark.pm from the standard distribution. The Benchmark module lets you time specific portions of your code, while Devel::DProf gives detailed breakdowns of where your code spends its time.

Here's a sample use of Benchmark:

```
use Benchmark;
@junk = `cat /etc/motd`;
$count = 10_000;
timethese($count, {
    'map' => sub { my @a = @junk;
                  map { s/a/b/ } @a;
                  return @a
                },
    'for' => sub { my @a = @junk;
                  local $_;
                  for (@a) { s/a/b/ };
                  return @a },
});
```

This is what it prints (on one machine--your results will be dependent on your hardware, operating system, and the load on your machine):

```
Benchmark: timing 10000 iterations of for, map...
for: 4 secs ( 3.97 usr 0.01 sys = 3.98 cpu)
map: 6 secs ( 4.97 usr 0.00 sys = 4.97 cpu)
```

Be aware that a good benchmark is very hard to write. It only tests the data you give it and proves little about the differing complexities of contrasting algorithms.

How do I cross-reference my Perl programs?

The B::Xref module, shipped with the new, alpha-release Perl compiler (not the general distribution prior to the 5.005 release), can be used to generate cross-reference reports for Perl programs.

```
perl -MO=Xref[OPTIONS] scriptname.plx
```

Is there a pretty-printer (formatter) for Perl?

There is no program that will reformat Perl as much as indent(1) does for C. The complex feedback between the scanner and the parser (this feedback is what confuses the vgrind and emacs programs) makes it challenging at best to write a stand-alone Perl parser.

Of course, if you simply follow the guidelines in perlstyle, you shouldn't need to reformat. The habit of formatting

your code as you write it will help prevent bugs. Your editor can and should help you with this. The perl-mode or newer cperl-mode for emacs can provide remarkable amounts of help with most (but not all) code, and even less programmable editors can provide significant assistance. Tom swears by the following settings in vi and its clones:

```
set ai sw=4
map! ^O {^M}^[O^T
```

Now put that in your .exrc file (replacing the caret characters with control characters) and away you go. In insert mode, ^T is for indenting, ^D is for unindenting, and ^O is for blockindenting-- as it were. If you haven't used the last one, you're missing a lot. A more complete example, with comments, can be found at <http://www.perl.com/CPAN-local/authors/id/TOMC/scripts/toms.exrc.gz>

If you are used to using the vgrind program for printing out nice code to a laser printer, you can take a stab at this using <http://www.perl.com/CPAN/doc/misc/tips/working.vgrind.entry>, but the results are not particularly satisfying for sophisticated code.

The a2ps at <http://www.infres.enst.fr/%7Edemaille/a2ps/> does lots of things related to generating nicely printed output of documents.

Is there a ctags for Perl?

There's a simple one at <http://www.perl.com/CPAN/authors/id/TOMC/scripts/ptags.gz> which may do the trick. And if not, it's easy to hack into what you want.

Is there an IDE or Windows Perl Editor?

Perl programs are just plain text, so any editor will do.

If you're on Unix, you already have an IDE--Unix itself. The UNIX philosophy is the philosophy of several small tools that each do one thing and do it well. It's like a carpenter's toolbox.

If you want a Windows IDE, check the following:

CodeMagicCD

<http://www.codemagiccd.com/>

Komodo

ActiveState's cross-platform, multi-language IDE has Perl support, including a regular expression debugger and remote debugging (<http://www.ActiveState.com/Products/Komodo/index.html>). (Visual Perl, a Visual Studio.NET plug-in is currently (early 2001) in beta (<http://www.ActiveState.com/Products/VisualPerl/index.html>)).

The Object System

([http://www.castlelink.co.uk/object\\_system/](http://www.castlelink.co.uk/object_system/)) is a Perl web applications development IDE.

PerlBuilder

(<http://www.solutionsoft.com/perl.htm>) is an integrated development environment for Windows that supports Perl development.

Perl code magic

(<http://www.petes-place.com/codemagic.html>).

visiPerl+

<http://helpconsulting.net/visiperl/>, from Help Consulting.

For editors: if you're on Unix you probably have vi or a vi clone already, and possibly an emacs too, so you may not need to download anything. In any emacs the cperl-mode (M-x cperl-mode) gives you perhaps the best available Perl editing mode in any editor.

For Windows editors: you can download an Emacs

GNU Emacs

<http://www.gnu.org/software/emacs/windows/ntemacs.html>

MicroEMACS

<http://members.nbc.com/uemacs/>

XEmacs

<http://www.xemacs.org/Download/index.html>

or a vi clone such as

Elvis

<ftp://ftp.cs.pdx.edu/pub/elvis/> <http://www.fh-wedel.de/elvis/>

Vile

<http://vile.cx/>

Vim

<http://www.vim.org/>

win32: <http://www.cs.vu.nl/%7Etmgil/vi.html>

For vi lovers in general, Windows or elsewhere: <http://www.thomer.com/thomer/vi/vi.html>.

nvi (<http://www.bostic.com/vi/>, available from CPAN in `src/misc/`) is yet another vi clone, unfortunately not available for Windows, but in UNIX platforms you might be interested in trying it out, firstly because strictly speaking it is not a vi clone, it is the real vi, or the new incarnation of it, and secondly because you can embed Perl inside it to use Perl as the scripting language. nvi is not alone in this, though: at least also vim and vile offer an embedded Perl.

The following are Win32 multilanguage editor/IDESs that support Perl:

Codewright

<http://www.starbase.com/>

MultiEdit

<http://www.MultiEdit.com/>

SlickEdit

<http://www.slickedit.com/>

There is also a `toyedit` Text widget based editor written in Perl that is distributed with the Tk module on CPAN. The `ptkdb` (<http://world.std.com/~aep/ptkdb/>) is a Perl/tk based debugger that acts as a development environment of sorts. Perl Composer (<http://perlcomposer.sourceforge.net/vperl.html>) is an IDE for Perl/Tk GUI creation.

In addition to an editor/IDE you might be interested in a more powerful shell environment for Win32. Your options include

Bash

from the Cygwin package (<http://sources.redhat.com/cygwin/>)

Ksh

from the MKS Toolkit (<http://www.mks.com/>), or the Bourne shell of the U/WIN environment (<http://www.research.att.com/sw/tools/uwin/>)

Tcsh

<ftp://ftp.astron.com/pub/tcsh/>, see also <http://www.primite.wisc.edu/software/csh-tcsh-book/>

Zsh

<ftp://ftp.blarg.net/users/amol/zsh/>, see also <http://www.zsh.org/>

MKS and U/WIN are commercial (U/WIN is free for educational and research purposes), Cygwin is covered by the GNU Public License (but that shouldn't matter for Perl use). The Cygwin, MKS, and U/WIN all contain (in addition to the shells) a comprehensive set of standard UNIX toolkit utilities.

If you're transferring text files between Unix and Windows using FTP be sure to transfer them in ASCII mode so the ends of lines are appropriately converted.

On Mac OS the MacPerl Application comes with a simple 32k text editor that behaves like a rudimentary IDE. In contrast to the MacPerl Application the MPW Perl tool can make use of the MPW Shell itself as an editor (with no 32k limit).

BEdit and BEdit Lite

are text editors for Mac OS that have a Perl sensitivity mode (<http://web.barebones.com/>).

Alpha

is an editor, written and extensible in Tcl, that nonetheless has built in support for several popular markup and programming languages including Perl and HTML (<http://alpha.olm.net/>).

Pepper and Pe are programming language sensitive text editors for Mac OS X and BeOS respectively

(<http://www.hekkelman.com/>).

Where can I get Perl macros for vi?

For a complete version of Tom Christiansen's vi configuration file, see

[http://www.perl.com/CPAN/authors/Tom\\_Christiansen/scripts/toms.exrc.gz](http://www.perl.com/CPAN/authors/Tom_Christiansen/scripts/toms.exrc.gz) , the standard benchmark file for vi emulators. The file runs best with nvi, the current version of vi out of Berkeley, which incidentally can be built with an embedded Perl interpreter--see <http://www.perl.com/CPAN/src/misc>.

Where can I get perl-mode for emacs?

Since Emacs version 19 patchlevel 22 or so, there have been both a perl-mode.el and support for the Perl debugger built in. These should come with the standard Emacs 19 distribution.

In the Perl source directory, you'll find a directory called "emacs", which contains a cperl-mode that color-codes keywords, provides context-sensitive help, and other nifty things.

Note that the perl-mode of emacs will have fits with "main'foo" (single quote), and mess up the indentation and highlighting. You are probably using "main::foo" in new Perl code anyway, so this shouldn't be an issue.

How can I use curses with Perl?

The Curses module from CPAN provides a dynamically loadable object module interface to a curses library. A small demo can be found at the directory [http://www.perl.com/CPAN/authors/Tom\\_Christiansen/scripts/rep](http://www.perl.com/CPAN/authors/Tom_Christiansen/scripts/rep); this program repeats a command and updates the screen as needed, rendering rep ps axu similar to top.

How can I use X or Tk with Perl?

Tk is a completely Perl-based, object-oriented interface to the Tk toolkit that doesn't force you to use Tcl just to get at Tk. Sx is an interface to the Athena Widget set. Both are available from CPAN. See the directory [http://www.perl.com/CPAN/modules/by-category/08\\_User\\_Interfaces/](http://www.perl.com/CPAN/modules/by-category/08_User_Interfaces/)

Invaluable for Perl/Tk programming are the Perl/Tk FAQ at <http://w4.lns.cornell.edu/%7Epvh/ptk/ptkTOC.html> , the Perl/Tk Reference Guide available at [http://www.perl.com/CPAN-local/authors/Stephen\\_O\\_Lidie/](http://www.perl.com/CPAN-local/authors/Stephen_O_Lidie/) , and the online manpages at <http://www-users.cs.umn.edu/%7Eamundson/perl/perlTk/toc.html> .

How can I generate simple menus without using CGI or Tk?

The <http://www.perl.com/CPAN/authors/id/SKUNZ/perlmenu.v4.0.tar.gz> module, which is curses-based, can help with this.

What is undump?

See the next question on ``How can I make my Perl program run faster?''

How can I make my Perl program run faster?

The best way to do this is to come up with a better algorithm. This can often make a dramatic difference. Jon Bentley's book ``Programming Pearls" (that's not a misspelling!) has some good tips on optimization, too. Advice on benchmarking boils down to: benchmark and profile to make sure you're optimizing the right part, look for better algorithms instead of microtuning your code, and when all else fails consider just buying faster hardware.

A different approach is to autoload seldom-used Perl code. See the AutoSplit and AutoLoader modules in the standard distribution for that. Or you could locate the bottleneck and think about writing just that part in C, the way we used to take bottlenecks in C code and write them in assembler. Similar to rewriting in C, modules that have critical sections can be written in C (for instance, the PDL module from CPAN).

In some cases, it may be worth it to use the backend compiler to produce byte code (saving compilation time) or compile into C, which will certainly save compilation time and sometimes a small amount (but not much) execution time. See the question about compiling your Perl programs for more on the compiler--the wins aren't as obvious as you'd hope.

If you're currently linking your perl executable to a shared libc.so, you can often gain a 10-25% performance benefit by rebuilding it to link with a static libc.a instead. This will make a bigger perl executable, but your Perl programs (and programmers) may thank you for it. See the INSTALL file in the source distribution for more information.

Unsubstantiated reports allege that Perl interpreters that use sfio outperform those that don't (for I/O intensive applications). To try this, see the INSTALL file in the source distribution, especially the ``Selecting File I/O mechanisms" section.

The undump program was an old attempt to speed up your Perl program by storing the already-compiled form to disk. This is no longer a viable option, as it only worked on a few architectures, and wasn't a good solution anyway.

How can I make my Perl program take less memory?

When it comes to time-space tradeoffs, Perl nearly always prefers to throw memory at a problem. Scalars in Perl use more memory than strings in C, arrays take more than that, and hashes use even more. While there's still a lot to be done, recent releases have been addressing these issues. For example, as of 5.004, duplicate hash keys are shared amongst all hashes using them, so require no reallocation.

In some cases, using substr() or vec() to simulate arrays can be highly beneficial. For example, an array of a thousand booleans will take at least 20,000 bytes of space, but it can be turned into one 125-byte bit vector--a considerable memory savings. The standard Tie::SubstrHash module can also help for certain types of data structure. If you're working with specialist data structures (matrices, for instance) modules that implement these in C may use less memory than equivalent Perl modules.

Another thing to try is learning whether your Perl was compiled with the system malloc or with Perl's builtin malloc. Whichever one it is, try using the other one and see whether this makes a difference. Information about malloc is in the INSTALL file in the source distribution. You can find out whether you are using perl's malloc by typing perl -V:usemymalloc.

Is it unsafe to return a pointer to local data?

No, Perl's garbage collection system takes care of this.

```
sub makeone {
    my @a = ( 1 .. 10 );
    return \@a;
}
for $i ( 1 .. 10 ) {
    push @many, makeone();
}
print $many[4][5], "\n";
print "@many\n";
```

How can I free an array or hash so my program shrinks?

You can't. On most operating systems, memory allocated to a program can never be returned to the system. That's why long-running programs sometimes re-exec themselves. Some operating systems (notably, FreeBSD and Linux) allegedly reclaim large chunks of memory that is no longer used, but it doesn't appear to happen with Perl (yet). The Mac appears to be the only platform that will reliably (albeit, slowly) return memory to the OS.

We've had reports that on Linux (Redhat 5.1) on Intel, undef \$scalar will return memory to the system, while on Solaris 2.6 it won't. In general, try it yourself and see.

However, judicious use of my() on your variables will help make sure that they go out of scope so that Perl can free up that space for use in other parts of your program. A global variable, of course, never goes out of scope, so you can't get its space automatically reclaimed, although undef()ing and/or delete()ing it will achieve the same effect. In general, memory allocation and de-allocation isn't something you can or should be worrying about much in Perl, but even this capability (preallocation of data types) is in the works.

How can I make my CGI script more efficient?

Beyond the normal measures described to make general Perl programs faster or smaller, a CGI program has additional issues. It may be run several times per second. Given that each time it runs it will need to be re-compiled and will often allocate a megabyte or more of system memory, this can be a killer. Compiling into C isn't going to help you because the process start-up overhead is where the bottleneck is.

There are two popular ways to avoid this overhead. One solution involves running the Apache HTTP server (available from <http://www.apache.org/>) with either of the mod\_perl or mod\_fastcgi plugin modules.

With mod\_perl and the Apache::Registry module (distributed with mod\_perl), httpd will run with an embedded Perl interpreter which pre-compiles your script and then executes it within the same address space without forking. The

Apache extension also gives Perl access to the internal server API, so modules written in Perl can do just about anything a module written in C can. For more on `mod_perl`, see <http://perl.apache.org/>  
With the `FCGI` module (from CPAN) and the `mod_fastcgi` module (available from <http://www.fastcgi.com/>) each of your Perl programs becomes a permanent CGI daemon process.

Both of these solutions can have far-reaching effects on your system and on the way you write your CGI programs, so investigate them with care.

See [http://www.perl.com/CPAN/modules/by-category/15\\_World\\_Wide\\_Web\\_HTML\\_HTTP\\_CGI/](http://www.perl.com/CPAN/modules/by-category/15_World_Wide_Web_HTML_HTTP_CGI/).

A non-free, commercial product, "The Velocity Engine for Perl", (<http://www.binevolve.com/> or <http://www.binevolve.com/velocigen/>) might also be worth looking at. It will allow you to increase the performance of your Perl programs, running programs up to 25 times faster than normal CGI Perl when running in persistent Perl mode or 4 to 5 times faster without any modification to your existing CGI programs. Fully functional evaluation copies are available from the web site.

How can I hide the source for my Perl program?

Delete it. :-) Seriously, there are a number of (mostly unsatisfactory) solutions with varying levels of "security". First of all, however, you can't take away read permission, because the source code has to be readable in order to be compiled and interpreted. (That doesn't mean that a CGI script's source is readable by people on the web, though--only by people with access to the filesystem.) So you have to leave the permissions at the socially friendly 0755 level.

Some people regard this as a security problem. If your program does insecure things and relies on people not knowing how to exploit those insecurities, it is not secure. It is often possible for someone to determine the insecure things and exploit them without viewing the source. Security through obscurity, the name for hiding your bugs instead of fixing them, is little security indeed.

You can try using encryption via source filters (`Filter::*` from CPAN), but any decent programmer will be able to decrypt it. You can try using the byte code compiler and interpreter described below, but the curious might still be able to de-compile it. You can try using the native-code compiler described below, but crackers might be able to disassemble it. These pose varying degrees of difficulty to people wanting to get at your code, but none can definitively conceal it (true of every language, not just Perl).

If you're concerned about people profiting from your code, then the bottom line is that nothing but a restrictive license will give you legal security. License your software and pepper it with threatening statements like "This is unpublished proprietary software of XYZ Corp. Your access to it does not give you permission to use it blah blah blah." We are not lawyers, of course, so you should see a lawyer if you want to be sure your license's wording will stand up in court.

How can I compile my Perl program into byte code or C?

Malcolm Beattie has written a multifunction backend compiler, available from CPAN, that can do both these things. It is included in the `perl5.005` release, but is still considered experimental. This means it's fun to play with if you're a programmer but not really for people looking for turn-key solutions.

Merely compiling into C does not in and of itself guarantee that your code will run very much faster. That's because except for lucky cases where a lot of native type inferencing is possible, the normal Perl run-time system is still present and so your program will take just as long to run and be just as big. Most programs save little more than compilation time, leaving execution no more than 10-30% faster. A few rare programs actually benefit significantly (even running several times faster), but this takes some tweaking of your code.

You'll probably be astonished to learn that the current version of the compiler generates a compiled form of your script whose executable is just as big as the original perl executable, and then some. That's because as currently written, all programs are prepared for a full `eval()` statement. You can tremendously reduce this cost by building a shared `libperl.so` library and linking against that. See the `INSTALL` podfile in the Perl source distribution for details. If you link your main perl binary with this, it will make it minuscule. For example, on one author's system, `/usr/bin/perl` is only 11k in size!

In general, the compiler will do nothing to make a Perl program smaller, faster, more portable, or more secure. In

fact, it can make your situation worse. The executable will be bigger, your VM system may take longer to load the whole thing, the binary is fragile and hard to fix, and compilation never stopped software piracy in the form of crackers, viruses, or bootleggers. The real advantage of the compiler is merely packaging, and once you see the size of what it makes (well, unless you use a shared libperl.so), you'll probably want a complete Perl install anyway.

How can I compile Perl into Java?

You can also integrate Java and Perl with the Perl Resource Kit from O'Reilly and Associates. See

<http://www.oreilly.com/catalog/prkunix/> .

Perl 5.6 comes with Java Perl Lingo, or JPL. JPL, still in development, allows Perl code to be called from Java. See [jpl/README](#) in the Perl source tree.

How can I get #!perl to work on [MS-DOS,NT,...]?

For OS/2 just use

```
extproc perl -S -your_switches
```

as the first line in \*.cmd file (-S due to a bug in cmd.exe's `extproc' handling). For DOS one should first invent a corresponding batch file and codify it in ALTERNATIVE\_SHEBANG (see the INSTALL file in the source distribution for more information).

The Win95/NT installation, when using the ActiveState port of Perl, will modify the Registry to associate the .pl extension with the perl interpreter. If you install another port, perhaps even building your own Win95/NT Perl from the standard sources by using a Windows port of gcc (e.g., with cygwin or mingw32), then you'll have to modify the Registry yourself. In addition to associating .pl with the interpreter, NT people can use: SET

PATHEXT=%PATHEXT%;PL to let them run the program install-linux.pl merely by typing install-linux.

Macintosh Perl programs will have the appropriate Creator and Type, so that double-clicking them will invoke the Perl application.

**IMPORTANT!:** Whatever you do, PLEASE don't get frustrated, and just throw the perl interpreter into your cgi-bin directory, in order to get your programs working for a web server. This is an EXTREMELY big security risk. Take the time to figure out how to do it correctly.

Can I write useful Perl programs on the command line?

Yes. Read [perlrun](#) for more information. Some examples follow. (These assume standard Unix shell quoting rules.)

```
# sum first and last fields
```

```
perl -lane 'print $F[0] + $F[-1]' *
```

```
# identify text files
```

```
perl -le 'for(@ARGV) {print if -f && -T _}' *
```

```
# remove (most) comments from C program
```

```
perl -0777 -pe 's{^\*.*?/*}{}gs' foo.c
```

```
# make file a month younger than today, defeating reaper daemons
```

```
perl -e '$X=24*60*60; utime(time(),time() + 30 * $X,@ARGV)' *
```

```
# find first unused uid
```

```
perl -le '$i++ while getpwuid($i); print $i'
```

```
# display reasonable manpath
```

```
echo $PATH | perl -nl -072 -e '
```

```
  s![^/+]*$!man!&&-d&&!$s{$_}++&&push@m,$_;&&END{print"@m"}'
```

OK, the last one was actually an Obfuscated Perl Contest entry. :-)

Why don't Perl one-liners work on my DOS/Mac/VMS system?

The problem is usually that the command interpreters on those systems have rather different ideas about quoting than the Unix shells under which the one-liners were created. On some systems, you may have to change single-quotes to double ones, which you must NOT do on Unix or Plan9 systems. You might also have to change a single % to a %%.

For example:

```
# Unix
```

```
perl -e 'print "Hello world\n"'
# DOS, etc.
perl -e "print \"Hello world\n\""
# Mac
print "Hello world\n"
(then Run "Myscript" or Shift-Command-R)
# VMS
perl -e "print ""Hello world\n"""
```

The problem is that none of these examples are reliable: they depend on the command interpreter. Under Unix, the first two often work. Under DOS, it's entirely possible that neither works. If 4DOS was the command shell, you'd probably have better luck like this:

```
perl -e "print <Ctrl-x>"Hello world\n<Ctrl-x>"
```

Under the Mac, it depends which environment you are using. The MacPerl shell, or MPW, is much like Unix shells in its support for several quoting variants, except that it makes free use of the Mac's non-ASCII characters as control characters.

Using qq(), q(), and qx(), instead of "double quotes", 'single quotes', and `backticks`, may make one-liners easier to write.

There is no general solution to all of this. It is a mess, pure and simple. Sucks to be away from Unix, huh? :-)

[Some of this answer was contributed by Kenneth Albanowski.]

Where can I learn about CGI or Web programming in Perl?

For modules, get the CGI or LWP modules from CPAN. For textbooks, see the two especially dedicated to web stuff in the question on books. For problems and questions related to the web, like ``Why do I get 500 Errors" or ``Why doesn't it run from the browser right when it runs fine on the command line", see these sources:

WWW Security FAQ

<http://www.w3.org/Security/Faq/>

Web FAQ

<http://www.boutell.com/faq/>

CGI FAQ

<http://www.webthing.com/tutorials/cgifaq.html>

HTTP Spec

<http://www.w3.org/pub/WWW/Protocols/HTTP/>

HTML Spec

<http://www.w3.org/TR/REC-html40/>

<http://www.w3.org/pub/WWW/MarkUp/>

CGI Spec

<http://www.w3.org/CGI/>

CGI Security FAQ

<http://www.go2net.com/people/paulp/cgi-security/safe-cgi.txt>

Where can I learn about object-oriented Perl programming?

A good place to start is perltoot, and you can use perlobj, perlboot, and perlbot for reference. Perltoot didn't come out until the 5.004 release; you can get a copy (in pod, html, or postscript) from

<http://www.perl.com/CPAN/doc/FMTEYEWTK/> .

Where can I learn about linking C with Perl? [h2xs, xsubpp]

If you want to call C from Perl, start with perlxsut, moving on to perlxs, xsubpp, and perlguits. If you want to call Perl from C, then read perlembed, perlcall, and perlguits. Don't forget that you can learn a lot from looking at how the authors of existing extension modules wrote their code and solved their problems.

I've read perlembed, perlguits, etc., but I can't embed perl in my C program; what am I doing wrong?

Download the ExtUtils::Embed kit from CPAN and run `make test'. If the tests pass, read the pods again and again



and again. If they fail, see `perlbug` and send a bug report with the output of `make test TEST_VERBOSE=1` along with `perl -V`.

When I tried to run my script, I got this message. What does it mean?

A complete list of Perl's error messages and warnings with explanatory text can be found in `perldiag`. You can also use the `splain` program (distributed with Perl) to explain the error messages:

```
perl program 2>diag.out
```

```
splain [-v] [-p] diag.out
```

or change your program to explain the messages for you:

```
use diagnostics;
```

or

```
use diagnostics -verbose;
```

What's MakeMaker?

This module (part of the standard Perl distribution) is designed to write a Makefile for an extension module from a Makefile.PL. For more information, see `ExtUtils::MakeMaker`.

AUTHOR AND COPYRIGHT

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When included as an integrated part of the Standard Distribution of Perl or of its documentation (printed or otherwise), this works is covered under Perl's Artistic License. For separate distributions of all or part of this FAQ outside of that, see `perlfaq`.

Irrespective of its distribution, all code examples here are in the public domain. You are permitted and encouraged to use this code and any derivatives thereof in your own programs for fun or for profit as you see fit. A simple comment in the code giving credit to the FAQ would be courteous but is not required.

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548100_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-  
archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/t/perlfaqo.txt
```

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=head1 NAME

Pod::Simple::PullParserStartToken -- start-tokens from Pod::Simple::PullParser

=head1 SYNOPSIS

(See [L<Pod::Simple::PullParser>](#))

=head1 DESCRIPTION

When you do `$parser->get_token` on a [L<Pod::Simple::PullParser>](#) object, you might get an object of this class.

This is a subclass of [L<Pod::Simple::PullParserToken>](#) and inherits all its methods, and adds these methods:

=over

=item `$token->tagname`

This returns the tagname for this start-token object.  
For example, parsing a "=head1 ..." line will give you  
a start-token with the tagname of "head1", token(s) for its  
content, and then an end-token with the tagname of "head1".

```
=item $token->tagname(I<somestring>)
```

This changes the tagname for this start-token object.  
You probably won't need  
to do this.

```
=item $token->tag(...)
```

A shortcut for \$token->tagname(...)

```
=item $token->is_tag(I<somestring>) or $token->is_tagname(I<somestring>)
```

These are shortcuts for C<< \$token->tag() eq I<somestring> >>

```
=item $token->attr(I<attrname>)
```

This returns the value of the I<attrname> attribute for this start-token  
object, or undef.

For example, parsing a LZ<><Foo/"Bar"> link will produce a start-token  
with a "to" attribute with the value "Foo", a "type" attribute with the  
value "pod", and a "section" attribute with the value "Bar".

```
=item $token->attr(I<attrname>, I<newvalue>)
```

This sets the I<attrname> attribute for this start-token object to  
I<newvalue>. You probably won't need to do this.

```
=item $token->attr_hash
```

This returns the hashref that is the attribute set for this start-token.  
This is useful if (for example) you want to ask what all the attributes  
are -- you can just do C<< keys %{\$token->attr\_hash} >>

```
=back
```

You're unlikely to ever need to construct an object of this class for  
yourself, but if you want to, call

```
C<<  
Pod::Simple::PullParserStartToken->new( I<tagname>, I<attrhash> )  
>>
```

=head1 SEE ALSO

L<Pod::Simple::PullParserToken>, L<Pod::Simple>, L<Pod::Simple::Subclassing>

=head1 SEE ALSO

L<Pod::Simple::PullParserToken>, L<Pod::Simple>, L<Pod::Simple::Subclassing>

=head1 SUPPORT

Questions or discussion about POD and Pod::Simple should be sent to the pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

This module is managed in an open GitHub repository, L<<https://github.com/perl-pod/pod-simple/>>. Feel free to fork and contribute, or to clone L<[git://github.com/perl-pod/pod-simple.git](https://github.com/perl-pod/pod-simple.git)> and send patches!

Patches against Pod::Simple are welcome. Please send bug reports to <[bug-pod-simple@rt.cpan.org](mailto:bug-pod-simple@rt.cpan.org)>.

=head1 COPYRIGHT AND DISCLAIMERS

Copyright (c) 2002 Sean M. Burke.

This library is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

This program is distributed in the hope that it will be useful, but without any warranty; without even the implied warranty of merchantability or fitness for a particular purpose.

=head1 AUTHOR

Pod::Simple was created by Sean M. Burke <[sburke@cpan.org](mailto:sburke@cpan.org)>. But don't bother him, he's retired.

Pod::Simple is maintained by:

=over

=item \* Allison Randal C<[allison@perl.org](mailto:allison@perl.org)>

=item \* Hans Dieter Pearcey C<[hdp@cpan.org](mailto:hdp@cpan.org)>

=item \* David E. Wheeler C<[dwheeler@cpan.org](mailto:dwheeler@cpan.org)>

=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/lib/Pod/Simple/PullParserStartToken.pm

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=head1 NAME

Pod::Simple - framework for parsing Pod

=head1 SYNOPSIS

TODO

=head1 DESCRIPTION

Pod::Simple is a Perl library for parsing text in the Pod ("plain old documentation") markup language that is typically used for writing documentation for Perl and for Perl modules. The Pod format is explained in L<perlpod>; the most common formatter is called C<perldoc>.

Be sure to read L</ENCODING> if your Pod contains non-ASCII characters.

Pod formatters can use Pod::Simple to parse Pod documents and render them into plain text, HTML, or any number of other formats. Typically, such formatters will be subclasses of Pod::Simple, and so they will inherit its methods, like C<parse\_file>.

If you're reading this document just because you have a Pod-processing subclass that you want to use, this document (plus the documentation for the subclass) is probably all you need to read.

If you're reading this document because you want to write a formatter subclass, continue reading it and then read L<Pod::Simple::Subclassing>, and then possibly even read L<perlpodspec> (some of which is for parser-writers, but much of which is notes to formatter-writers).

=head1 MAIN METHODS

=over

=item C<< \$parser = I<SomeClass>->new(); >>

This returns a new parser object, where I<C<SomeClass>> is a subclass of Pod::Simple.

```
=item C<< $parser->output_fh( *OUT ); >>
```

This sets the filehandle that C<\$parser>'s output will be written to. You can pass C<\*STDOUT> or C<\*STDERR>, otherwise you should probably do something like this:

```
my $outfile = "output.txt";
open TXTOUT, ">$outfile" or die "Can't write to $outfile: $!";
$parser->output_fh(*TXTOUT);
```

...before you call one of the C<< \$parser->parse\_I<whatever> >> methods.

```
=item C<< $parser->output_string( \somestring ); >>
```

This sets the string that C<\$parser>'s output will be sent to, instead of any filehandle.

```
=item C<< $parser->parse_file( I<$some_filename> ); >>
```

```
=item C<< $parser->parse_file( *INPUT_FH ); >>
```

This reads the Pod content of the file (or filehandle) that you specify, and processes it with that C<\$parser> object, according to however C<\$parser>'s class works, and according to whatever parser options you have set up for this C<\$parser> object.

```
=item C<< $parser->parse_string_document( I<$all_content> ); >>
```

This works just like C<parse\_file> except that it reads the Pod content not from a file, but from a string that you have already in memory.

```
=item C<< $parser->parse_lines( I<...@lines...>, undef ); >>
```

This processes the lines in C<@lines> (where each list item must be a defined value, and must contain exactly one line of content -- so no items like C<"foo\nbar"> are allowed). The final C<undef> is used to indicate the end of document being parsed.

The other C<parser\_I<whatever>> methods are meant to be called only once per C<\$parser> object; but C<parse\_lines> can be called as many times per C<\$parser> object as you want, as long as the last call (and only the last call) ends with an C<undef> value.

```
=item C<< $parser->content_seen >>
```

This returns true only if there has been any real content seen for this document. Returns false in cases where the document contains content, but does not make use of any Pod markup.

```
=item C<< I<SomeClass>->filter( I<$filename> ); >>
```

```
=item C<< I<SomeClass>->filter( I<*INPUT_FH> ); >>
```

```
=item C<< I<SomeClass>->filter( I<\$document_content> ); >>
```

This is a shortcut method for creating a new parser object, setting the output handle to STDOUT, and then processing the specified file (or filehandle, or in-memory document). This is handy for one-liners like this:

```
perl -MPod::Simple::Text -e "Pod::Simple::Text->filter('thingy.pod')"
```

```
=back
```

## =head1 SECONDARY METHODS

Some of these methods might be of interest to general users, as well as of interest to formatter-writers.

Note that the general pattern here is that the accessor-methods read the attribute's value with `C<< $value = $parser->I<attribute> >>` and set the attribute's value with `C<< $parser->I<attribute>(I<newvalue>) >>`. For each accessor, I typically only mention one syntax or another, based on which I think you are actually most likely to use.

```
=over
```

```
=item C<< $parser->parse_characters( I<SOMEVALUE> ) >>
```

The Pod parser normally expects to read octets and to convert those octets to characters based on the `C<=encoding>` declaration in the Pod source. Set this option to a true value to indicate that the Pod source is already a Perl character stream. This tells the parser to ignore any `C<=encoding>` command and to skip all the code paths involving decoding octets.

```
=item C<< $parser->no_whining( I<SOMEVALUE> ) >>
```

If you set this attribute to a true value, you will suppress the

parser's complaints about irregularities in the Pod coding. By default, this attribute's value is false, meaning that irregularities will be reported.

Note that turning this attribute to true won't suppress one or two kinds of complaints about rarely occurring unrecoverable errors.

```
=item C<< $parser->no_errata_section( I<SOMEVALUE> ) >>
```

If you set this attribute to a true value, you will stop the parser from generating a "POD ERRORS" section at the end of the document. By default, this attribute's value is false, meaning that an errata section will be generated, as necessary.

```
=item C<< $parser->complain_stderr( I<SOMEVALUE> ) >>
```

If you set this attribute to a true value, it will send reports of parsing errors to STDERR. By default, this attribute's value is false, meaning that no output is sent to STDERR.

Setting C<complain\_stderr> also sets C<no\_errata\_section>.

```
=item C<< $parser->source_filename >>
```

This returns the filename that this parser object was set to read from.

```
=item C<< $parser->doc_has_started >>
```

This returns true if C<\$parser> has read from a source, and has seen Pod content in it.

```
=item C<< $parser->source_dead >>
```

This returns true if C<\$parser> has read from a source, and come to the end of that source.

```
=item C<< $parser->strip_verbatim_indent( I<SOMEVALUE> ) >>
```

The perlpod spec for a Verbatim paragraph is "It should be reproduced exactly...", which means that the whitespace you've used to indent your verbatim blocks will be preserved in the output. This can be annoying for outputs such as HTML, where that whitespace will remain in front of every line. It's an unfortunate case where syntax is turned into semantics.

If the POD you're parsing adheres to a consistent indentation policy, you can have such indentation stripped from the beginning of every line of your verbatim blocks. This method tells Pod::Simple what to strip. For two-space indents, you'd use:

```
$parser->strip_verbatim_indent(' ');
```

For tab indents, you'd use a tab character:

```
$parser->strip_verbatim_indent("\t");
```

If the POD is inconsistent about the indentation of verbatim blocks, but you have figured out a heuristic to determine how much a particular verbatim block is indented, you can pass a code reference instead. The code reference will be executed with one argument, an array reference of all the lines in the verbatim block, and should return the value to be stripped from each line. For example, if you decide that you're fine to use the first line of the verbatim block to set the standard for indentation of the rest of the block, you can look at the first line and return the appropriate value, like so:

```
$new->strip_verbatim_indent(sub {  
    my $lines = shift;  
    (my $indent = $lines->[0]) =~ s/^\s.*//;  
    return $indent;  
});
```

If you'd rather treat each line individually, you can do that, too, by just transforming them in-place in the code reference and returning C<undef>. Say that you don't want I<any> lines indented. You can do something like this:

```
$new->strip_verbatim_indent(sub {  
    my $lines = shift;  
    sub { s/^\s+// for @{$lines} },  
    return undef;  
});
```

=back

=head1 TERTIARY METHODS

=over

=item C<< \$parser->abandon\_output\_fh() >>X<abandon\_output\_fh>

Cancel output to the file handle. Any POD read by the C<\$parser> is not effected.



=item C<< \$parser->abandon\_output\_string() >>X<abandon\_output\_string>

Cancel output to the output string. Any POD read by the C<\$parser> is not effected.

=item C<< \$parser->accept\_code( @codes ) >>X<accept\_code>

Alias for L<< accept\_codes >>.

=item C<< \$parser->accept\_codes( @codes ) >>X<accept\_codes>

Allows C<\$parser> to accept a list of L<perlpod/Formatting Codes>. This can be used to implement user-defined codes.

=item C<< \$parser->accept\_directive\_as\_data( @directives ) >>X<accept\_directive\_as\_data>

Allows C<\$parser> to accept a list of directives for data paragraphs. A directive is the label of a L<perlpod/Command Paragraph>. A data paragraph is one delimited by C<< =begin/=for/=end >> directives. This can be used to implement user-defined directives.

=item C<< \$parser->accept\_directive\_as\_processed( @directives ) >>X<accept\_directive\_as\_processed>

Allows C<\$parser> to accept a list of directives for processed paragraphs. A directive is the label of a L<perlpod/Command Paragraph>. A processed paragraph is also known as L<perlpod/Ordinary Paragraph>. This can be used to implement user-defined directives.

=item C<< \$parser->accept\_directive\_as\_verbatim( @directives ) >>X<accept\_directive\_as\_verbatim>

Allows C<\$parser> to accept a list of directives for L<perlpod/Verbatim Paragraph>. A directive is the label of a L<perlpod/Command Paragraph>. This can be used to implement user-defined directives.

=item C<< \$parser->accept\_target( @targets ) >>X<accept\_target>

Alias for L<< accept\_targets >>.

=item C<< \$parser->accept\_target\_as\_text( @targets ) >>X<accept\_target\_as\_text>

Alias for L<< accept\_targets\_as\_text >>.

=item C<< \$parser->accept\_targets( @targets ) >>X<accept\_targets>

Accepts targets for C<< =begin/=for/=end >> sections of the POD.

=item C<< \$parser->accept\_targets\_as\_text( @targets ) >>X<accept\_targets\_as\_text>

Accepts targets for C<< =begin/=for/=end >> sections that should be parsed as POD. For details, see L<< perlpodspec/About Data Paragraphs >>.

=item C<< \$parser->any\_errata\_seen() >>X<any\_errata\_seen>

Used to check if any errata was seen.

I<Example:>

```
die "too many errors\n" if $parser->any_errata_seen();
```

=item C<< \$parser->errata\_seen() >>X<errata\_seen>

Returns a hash reference of all errata seen, both whines and screams. The hash reference's keys are the line number and the value is an array reference of the errors for that line.

I<Example:>

```
if ( $parser->any_errata_seen() ) {  
    $logger->log( $parser->errata_seen() );  
}
```

=item C<< \$parser->detected\_encoding() >>X<detected\_encoding>

Return the encoding corresponding to C<< =encoding >>, but only if the encoding was recognized and handled.

=item C<< \$parser->encoding() >>X<encoding>

Return encoding of the document, even if the encoding is not correctly handled.

=item C<< \$parser->parse\_from\_file( \$source, \$to ) >>X<parse\_from\_file>

Parses from C<\$source> file to C<\$to> file. Similar to L<< Pod::Parser/parse\_from\_file >>.

=item C<< \$parser->scream( @error\_messages ) >>X<scream>

Log an error that can't be ignored.

=item C<< \$parser->unaccept\_code( @codes ) >>X<unaccept\_code>

Alias for L<< unaccept\_codes >>.

=item C<< \$parser->unaccept\_codes( @codes ) >>X<unaccept\_codes>

Removes C<< @codes >> as valid codes for the parse.

=item C<< \$parser->unaccept\_directive( @directives ) >>X<unaccept\_directive>

Alias for L<< unaccept\_directives >>.

=item C<< \$parser->unaccept\_directives( @directives ) >>X<unaccept\_directives>

Removes C<< @directives >> as valid directives for the parse.

=item C<< \$parser->unaccept\_target( @targets ) >>X<unaccept\_target>

Alias for L<< unaccept\_targets >>.

=item C<< \$parser->unaccept\_targets( @targets ) >>X<unaccept\_targets>

Removes C<< @targets >> as valid targets for the parse.

=item C<< \$parser->version\_report() >>X<version\_report>

Returns a string describing the version.

=item C<< \$parser->whine( @error\_messages ) >>X<whine>

Log an error unless C<< \$parser->no\_whining( TRUE ); >>.

=back

=head1 ENCODING

The Pod::Simple parser expects to read B<octets>. The parser will decode the octets into Perl's internal character string representation using the value of the C<=encoding> declaration in the POD source.

If the POD source does not include an C<=encoding> declaration, the parser will attempt to guess the encoding (selecting one of UTF-8 or CP 1252) by examining the first non-ASCII bytes and applying the heuristic described in L<perlpodspec>. (If the POD source contains only ASCII bytes, the encoding is assumed to be ASCII.)

If you set the C<parse\_characters> option to a true value the parser will expect characters rather than octets; will ignore any C<=encoding>; and will make no attempt to decode the input.

=head1 SEE ALSO

L<Pod::Simple::Subclassing>

L<perlpod|perlpod>

L<perlpodspec|perlpodspec>

L<Pod::Escapes|Pod::Escapes>

L<perldoc>

=head1 SUPPORT

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Patches against Pod::Simple are welcome. Please send bug reports to <bug-pod-simple@rt.cpan.org>.

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=head1 AUTHOR

Pod::Simple was created by Sean M. Burke <[sburke@cpan.org](mailto:sburke@cpan.org)>. But don't bother him, he's retired.

Pod::Simple is maintained by:

=over

=item \* Allison Randal C<[allison@perl.org](mailto:allison@perl.org)>

=item \* Hans Dieter Pearcey C<[hdp@cpan.org](mailto:hdp@cpan.org)>

=item \* David E. Wheeler C<[dwheeler@cpan.org](mailto:dwheeler@cpan.org)>

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Documentation has been contributed by:

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=item \* Gabor Szabo C<szabgab@gmail.com>

=item \* Shawn H Corey C<SHCOREY at cpan.org>

=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/lib/Pod/Simple.pod

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---

abstract: 'framework for parsing Pod'

author:

- 'Allison Randal <allison@perl.org>'

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.0401, CPAN::Meta::Converter version 2.150005'

license: perl

meta-spec:

url: <http://module-build.sourceforge.net/META-spec-v1.4.html>

version: '1.4'

name: Pod-Simple

no\_index:

directory:

- t

- inc

recommends:  
Encode: '2.78'  
requires:  
Carp: '0'  
Config: '0'  
Cwd: '0'  
File::Basename: '0'  
File::Find: '0'  
File::Spec: '0'  
Pod::Escapes: '1.04'  
Symbol: '0'  
Test: '1.25'  
Test::More: '0'  
Text::Wrap: '98.112902'  
integer: '0'  
overload: '0'  
strict: '0'  
resources:  
bugtracker: <https://github.com/perl-pod/pod-simple/issues>  
homepage: <http://search.cpan.org/dist/Pod-Simple/>  
license: <http://dev.perl.org/licenses/>  
repository: <git://github.com/perl-pod/pod-simple.git>  
version: '3.35'  
x\_serialization\_backend: 'CPAN::Meta::YAML version 0.012'

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/META.yml

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=head1 NAME

Pod::Simple::DumpAsText -- dump Pod-parsing events as text

=head1 SYNOPSIS

```
perl -MPod::Simple::DumpAsText -e \  
"exit Pod::Simple::DumpAsText->filter(shift)->any_errata_seen" \  
thingy.pod
```

=head1 DESCRIPTION

This class is for dumping, as text, the events gotten from parsing a Pod document. This class is of interest to people writing Pod formatters based on Pod::Simple. It is useful for seeing exactly what events you get out of some Pod that you feed in.

This is a subclass of L<Pod::Simple> and inherits all its methods.

=head1 SEE ALSO

L<Pod::Simple::DumpAsXML>

L<Pod::Simple>

=head1 SUPPORT

Questions or discussion about POD and Pod::Simple should be sent to the pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

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=head1 AUTHOR

Pod::Simple was created by Sean M. Burke <[sburke@cpan.org](mailto:sburke@cpan.org)>. But don't bother him, he's retired.

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=item \* David E. Wheeler C<[dwheeler@cpan.org](mailto:dwheeler@cpan.org)>

=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/lib/Pod/Simple/DumpAsText.pm

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=head1 SEE ALSO

L<Pod::Simple>, L<Pod::Simple::Text>, L<Pod::Spell>

=head1 SUPPORT

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=head1 ACKNOWLEDGEMENTS

Thanks to L<Hurricane Electric|<http://he.net/>> for permission to use its L<Linux man pages online|<http://man.he.net/>> site for man page links.

Thanks to L<[search.cpan.org](http://search.cpan.org/)|<http://search.cpan.org/>> for permission to use the site for Perl module links.

=head1 AUTHOR

Pod::Simple::XHTML was created by Allison Randal <[allison@perl.org](mailto:allison@perl.org)>.



Pod::Simple was created by Sean M. Burke <sburke@cpan.org>.  
But don't bother him, he's retired.

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=item \* David E. Wheeler C<dwheeler@cpan.org>

=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/lib/Pod/Simple/XHTML.pm

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=head1 NAME

Pod::Simple::HTMLBatch - convert several Pod files to several HTML files

=head1 SYNOPSIS

```
perl -MPod::Simple::HTMLBatch -e 'Pod::Simple::HTMLBatch::go' in out
```

=head1 DESCRIPTION

This module is used for running batch-conversions of a lot of HTML documents

This class is NOT a subclass of Pod::Simple::HTML (nor of bad old Pod::Html) -- although it uses Pod::Simple::HTML for doing the conversion of each document.

The normal use of this class is like so:

```
use Pod::Simple::HTMLBatch;
my $batchconv = Pod::Simple::HTMLBatch->new;
$batchconv->some_option( some_value );
$batchconv->some_other_option( some_other_value );
$batchconv->batch_convert( \@search_dirs, $output_dir );
```

=head2 FROM THE COMMAND LINE

Note that this class also provides  
(but does not export) the function `Pod::Simple::HTMLBatch::go`.  
This is basically just a shortcut for `C<<`  
`Pod::Simple::HTMLBatch->batch_convert(@ARGV) >>`.  
It's meant to be handy for calling from the command line.

However, the shortcut requires that you specify exactly two command-line arguments, `C<indirs>` and `C<outdir>`.

Example:

```
% mkdir out_html
% perl -MPod::Simple::HTMLBatch -e Pod::Simple::HTMLBatch::go @INC out_html
  (to convert the pod from Perl's @INC
   files under the directory ./out_html)
```

(Note that the command line there contains a literal `atsign-I-N-C`. This is handled as a special case by `batch_convert`, in order to save you having to enter the odd-looking `""` as the first command-line parameter when you mean "just use whatever's in `@INC`".)

Example:

```
% mkdir ../seekrut
% chmod og-rx ../seekrut
% perl -MPod::Simple::HTMLBatch -e Pod::Simple::HTMLBatch::go . ../seekrut
  (to convert the pod under the current dir into HTML
   files under the directory ../seekrut)
```

Example:

```
% perl -MPod::Simple::HTMLBatch -e Pod::Simple::HTMLBatch::go happydocs .
  (to convert all pod from happydocs into the current directory)
```

=head1 MAIN METHODS

=over

=item `$batchconv = Pod::Simple::HTMLBatch->new;`

This TODO

```
=item $batchconv->batch_convert( I<indirs>, I<outdir> );
```

this TODO

```
=item $batchconv->batch_convert( undef , ...);
```

```
=item $batchconv->batch_convert( q{ @INC}, ...);
```

These two values for I<indirs> specify that the normal Perl @INC

```
=item $batchconv->batch_convert( \@dirs , ...);
```

This specifies that the input directories are the items in the arrayref C<\@dirs>.

```
=item $batchconv->batch_convert( "somedir" , ...);
```

This specifies that the director "somedir" is the input. (This can be an absolute or relative path, it doesn't matter.)

A common value you might want would be just "." for the current directory:

```
    $batchconv->batch_convert( ".", ...);
```

```
=item $batchconv->batch_convert( 'somedir:someother:also' , ...);
```

This specifies that you want the dirs "somedir", "someother", and "also" scanned, just as if you'd passed the arrayref C<[qw( somedir someother also)]>. Note that a ":"-separator is normal under Unix, but Under MSWin, you'll need C<'somedir;someother;also'> instead, since the pathsep on MSWin is ";" instead of ":". (And I<that> is because ":" often comes up in paths, like C<"c:/perl/lib">.)

(Exactly what separator character should be used, is gotten from C<\$Config::Config{'path\_sep'}>, via the L<Config> module.)

```
=item $batchconv->batch_convert( ... , undef );
```

This specifies that you want the HTML output to go into the current directory.

(Note that a missing or undefined value means a different thing in the first slot than in the second. That's so that C<batch\_convert()> with no arguments (or undef arguments) means "go from @INC, into the current directory.)

```
=item $batchconv->batch_convert( ... , 'somedir' );
```

This specifies that you want the HTML output to go into the directory 'somedir'.

(This can be an absolute or relative path, it doesn't matter.)

```
=back
```

Note that you can also call `C<batch_convert>` as a class method, like so:

```
Pod::Simple::HTMLBatch->batch_convert( ... );
```

That is just short for this:

```
Pod::Simple::HTMLBatch->new->batch_convert(...);
```

That is, it runs a conversion with default options, for whatever inputdirs and output dir you specify.

## =head2 ACCESSOR METHODS

The following are all accessor methods -- that is, they don't do anything on their own, but just alter the contents of the conversion object, which comprises the options for this particular batch conversion.

We show the "put" form of the accessors below (i.e., the syntax you use for setting the accessor to a specific value). But you can also call each method with no parameters to get its current value. For example, `C<< $self->contents_file() >>` returns the current value of the `contents_file` attribute.

```
=over
```

```
=item $batchconv->verbose( I<nonnegative_integer> );
```

This controls how verbose to be during batch conversion, as far as notes to STDOUT (or whatever is `C<select>'d`) about how the conversion is going. If 0, no progress information is printed.

If 1 (the default value), some progress information is printed.

Higher values print more information.

```
=item $batchconv->index( I<true-or-false> );
```

This controls whether or not each HTML page is liable to have a little table of contents at the top (which we call an "index" for historical reasons). This is true by default.

```
=item $batchconv->contents_file( I<filename> );
```

If set, should be the name of a file (in the output directory) to write the HTML index to. The default value is "index.html". If you set this to a false value, no contents file will be written.

```
=item $batchconv->contents_page_start( I<HTML_string> );
```

This specifies what string should be put at the beginning of the contents page.

The default is a string more or less like this:

```
<html>
<head><title>Perl Documentation</title></head>
<body class='contentspage'>
<h1>Perl Documentation</h1>
```

```
=item $batchconv->contents_page_end( I<HTML_string> );
```

This specifies what string should be put at the end of the contents page.

The default is a string more or less like this:

```
<p class='contentsfooty'>Generated by
Pod::Simple::HTMLBatch v3.01 under Perl v5.008
<br >At Fri May 14 22:26:42 2004 GMT,
which is Fri May 14 14:26:42 2004 local time.</p>
```

```
=item $batchconv->add_css( $url );
```

TODO

```
=item $batchconv->add_javascript( $url );
```

TODO

```
=item $batchconv->css_flurry( I<true-or-false> );
```

If true (the default value), we autogenerate some CSS files in the output directory, and set our HTML files to use those.

TODO: continue

```
=item $batchconv->javascript_flurry( I<true-or-false> );
```

If true (the default value), we autogenerate a JavaScript in the output directory, and set our HTML files to use it. Currently, the JavaScript is used only to get the browser to remember what stylesheet it prefers.

TODO: continue

```
=item $batchconv->no_contents_links( I<true-or-false> );
```

TODO

```
=item $batchconv->html_render_class( I<classname> );
```

This sets what class is used for rendering the files.

The default is "Pod::Simple::HTML". If you set it to something else, it should probably be a subclass of Pod::Simple::HTML, and you should C<require> or C<use> that class so that's it's loaded before Pod::Simple::HTMLBatch tries loading it.

```
=item $batchconv->search_class( I<classname> );
```

This sets what class is used for searching for the files.

The default is "Pod::Simple::Search". If you set it to something else, it should probably be a subclass of Pod::Simple::Search, and you should C<require> or C<use> that class so that's it's loaded before Pod::Simple::HTMLBatch tries loading it.

```
=back
```

```
=head1 NOTES ON CUSTOMIZATION
```

TODO

call add\_css(\$someurl) to add stylesheet as alternate  
call add\_css(\$someurl,1) to add as primary stylesheet

call add\_javascript

subclass Pod::Simple::HTML and set \$batchconv->html\_render\_class to  
that classname

and maybe override

\$page->batch\_mode\_page\_object\_init(\$self, \$module, \$infile, \$outfile, \$depth)

or maybe override

```
$batchconv->batch_mode_page_object_init($page, $module, $infile, $outfile, $depth)
subclass Pod::Simple::Search and set $batchconv->search_class to
that classname
```

=head1 SEE ALSO

L<Pod::Simple>, L<Pod::Simple::HTMLBatch>, L<perlpod>, L<perlpodspec>

=head1 SUPPORT

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=over

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=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/lib/Pod/Simple/HTMLBatch.pm

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=head1 NAME

Pod::Simple::Checker -- check the Pod syntax of a document

=head1 SYNOPSIS

```
perl -MPod::Simple::Checker -e \  
"exit Pod::Simple::Checker->filter(shift)->any_errata_seen" \  
thingy.pod
```

=head1 DESCRIPTION

This class is for checking the syntactic validity of Pod.  
It works by basically acting like a simple-minded version of L<Pod::Simple::Text> that formats only the "Pod Errors" section (if Pod::Simple even generates one for the given document).

This is a subclass of L<Pod::Simple> and inherits all its methods.

=head1 SEE ALSO

L<Pod::Simple>, L<Pod::Simple::Text>, L<Pod::Checker>

=head1 SUPPORT

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=head1 NAME

Pod::Simple::PullParser -- a pull-parser interface to parsing Pod

=head1 SYNOPSIS

```
my $parser = SomePodProcessor->new;  
$parser->set_source( "whatever.pod" );  
$parser->run;
```

Or:

```
my $parser = SomePodProcessor->new;  
$parser->set_source( $some_filehandle_object );
```

```
$parser->run;
```

Or:

```
my $parser = SomePodProcessor->new;  
$parser->set_source( \ $document_source );  
$parser->run;
```

Or:

```
my $parser = SomePodProcessor->new;  
$parser->set_source( \@document_lines );  
$parser->run;
```

And elsewhere:

```
require 5;  
package SomePodProcessor;  
use strict;  
use base qw(Pod::Simple::PullParser);  
  
sub run {  
    my $self = shift;  
    Token:  
    while(my $token = $self->get_token) {  
        ...process each token...  
    }  
}
```

=head1 DESCRIPTION

This class is for using Pod::Simple to build a Pod processor -- but one that uses an interface based on a stream of token objects, instead of based on events.

This is a subclass of L<Pod::Simple> and inherits all its methods.

A subclass of Pod::Simple::PullParser should define a C<run> method that calls C<< \$token = \$parser->get\_token >> to pull tokens.

See the source for Pod::Simple::RTF for an example of a formatter that uses Pod::Simple::PullParser.

=head1 METHODS

=over

=item my \$token = \$parser->get\_token

This returns the next token object (which will be of a subclass of L<Pod::Simple::PullParserToken>), or undef if the parser-stream has hit the end of the document.

=item \$parser->unget\_token( \$token )

=item \$parser->unget\_token( \$token1, \$token2, ... )

This restores the token object(s) to the front of the parser stream.

=back

The source has to be set before you can parse anything. The lowest-level way is to call C<set\_source>:

=over

=item \$parser->set\_source( \$filename )

=item \$parser->set\_source( \$filehandle\_object )

=item \$parser->set\_source( \ \$document\_source )

=item \$parser->set\_source( \@document\_lines )

=back

Or you can call these methods, which Pod::Simple::PullParser has defined to work just like Pod::Simple's same-named methods:

=over

=item \$parser->parse\_file(...)

=item \$parser->parse\_string\_document(...)

=item \$parser->filter(...)

=item \$parser->parse\_from\_file(...)

=back

For those to work, the Pod-processing subclass of Pod::Simple::PullParser has to have defined a \$parser->run method -- so it is advised that all Pod::Simple::PullParser subclasses do so. See the Synopsis above, or the source for Pod::Simple::RTF.

Authors of formatter subclasses might find these methods useful to call on a parser object that you haven't started pulling tokens from yet:

```
=over
```

```
=item my $title_string = $parser->get_title
```

This tries to get the title string out of \$parser, by getting some tokens, and scanning them for the title, and then ungetting them so that you can process the token-stream from the beginning.

For example, suppose you have a document that starts out:

```
=head1 NAME
```

```
Hoo::Boy::Wowza -- Stuff B<wow> yeah!
```

\$parser->get\_title on that document will return "Hoo::Boy::Wowza -- Stuff wow yeah!". If the document starts with:

```
=head1 Name
```

```
Hoo::Boy::W00t -- Stuff B<w00t> yeah!
```

Then you'll need to pass the C<nocase> option in order to recognize "Name":

```
$parser->get_title(nocase => 1);
```

In cases where get\_title can't find the title, it will return empty-string ("").

```
=item my $title_string = $parser->get_short_title
```

This is just like get\_title, except that it returns just the modulename, if the title seems to be of the form "SomeModuleName -- description".

For example, suppose you have a document that starts out:

```
=head1 NAME
```

```
Hoo::Boy::Wowza -- Stuff B<wow> yeah!
```

then \$parser->get\_short\_title on that document will return "Hoo::Boy::Wowza".

But if the document starts out:

=head1 NAME

Hooboy, stuff B<wow> yeah!

then `$parser->get_short_title` on that document will return "Hooboy, stuff wow yeah!". If the document starts with:

=head1 Name

Hoo::Boy::W00t -- Stuff B<w00t> yeah!

Then you'll need to pass the `C<nocase>` option in order to recognize "Name":

```
$parser->get_short_title(nocase => 1);
```

If the title can't be found, then `get_short_title` returns empty-string ("").

=item \$author\_name = \$parser->get\_author

This works like `get_title` except that it returns the contents of the "=head1 AUTHOR\n\nParagraph...\n" section, assuming that that section isn't terribly long. To recognize a "=head1 Author\n\nParagraph\n" section, pass the `C<nocase>` option:

```
$parser->get_author(nocase => 1);
```

(This method tolerates "AUTHORS" instead of "AUTHOR" too.)

=item \$description\_name = \$parser->get\_description

This works like `get_title` except that it returns the contents of the "=head1 DESCRIPTION\n\nParagraph...\n" section, assuming that that section isn't terribly long. To recognize a "=head1 Description\n\nParagraph\n" section, pass the `C<nocase>` option:

```
$parser->get_description(nocase => 1);
```

=item \$version\_block = \$parser->get\_version

This works like `get_title` except that it returns the contents of the "=head1 VERSION\n\n[BIG BLOCK]\n" block. Note that this does NOT return the module's `C<$VERSION>!!` To recognize a "=head1 Version\n\n[BIG BLOCK]\n" section, pass the `C<nocase>` option:

```
$parser->get_version(nocase => 1);
```

=back

## =head1 NOTE

You don't actually I<have> to define a C<run> method. If you're writing a Pod-formatter class, you should define a C<run> just so that users can call C<parse\_file> etc, but you don't I<have> to.

And if you're not writing a formatter class, but are instead just writing a program that does something simple with a Pod::PullParser object (and not an object of a subclass), then there's no reason to bother subclassing to add a C<run> method.

## =head1 SEE ALSO

L<Pod::Simple>

L<Pod::Simple::PullParserToken> -- and its subclasses

L<Pod::Simple::PullParserStartToken>,

L<Pod::Simple::PullParserTextToken>, and

L<Pod::Simple::PullParserEndToken>.

L<HTML::TokeParser>, which inspired this.

## =head1 SUPPORT

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=back

=cut

JUNK:

```
sub _old_get_title { # some witchery in here
    my $self = $_[0];
    my $title;
    my @to_unget;

    while(1) {
        push @to_unget, $self->get_token;
        unless(defined $to_unget[-1]) { # whoops, short doc!
            pop @to_unget;
            last;
        }

        DEBUG and print STDERR "-Got token ", $to_unget[-1]->dump, "\n";

        (DEBUG and print STDERR "Too much in the buffer.\n"),
        last if @to_unget > 25; # sanity

        my $pattern = "";
        if( # $to_unget[-1]->type eq 'end'
            #and $to_unget[-1]->tagname eq 'Para'
            #and
            ($pattern = join("
",
                ($->type eq 'start') ? ("<" . $->tagname . ">")
                : ($->type eq 'end' ) ? ("</" . $->tagname . ">")
                : ($->type eq 'text' ) ? ($->text =~ m<^[A-Z]+>s ? $1 : 'X')
                : "BLORP"
            ) @to_unget
```

```

)) =~ m{<head1>NAME</head1><Para>(X|</?[BCIFLS]>)+</Para>}s
) {
# Whee, it fits the pattern
DEBUG and print STDERR "Seems to match =head1 NAME pattern.\n";
$title = "";
foreach my $t (reverse @to_unget) {
    last if $t->type eq 'start' and $t->tagname eq 'Para';
    $title = $t->text . $title if $t->type eq 'text';
}
undef $title if $title =~ m<^\s*$>; # make sure it's contentful!
last;

} elsif ($pattern =~ m{<head(\d)>(.)</head\d>}
and !( $1 eq '1' and $2 eq 'NAME' )
) {
# Well, it fits a fallback pattern
DEBUG and print STDERR "Seems to match NAMEless pattern.\n";
$title = "";
foreach my $t (reverse @to_unget) {
    last if $t->type eq 'start' and $t->tagname =~ m/^head\d$/s;
    $title = $t->text . $title if $t->type eq 'text';
}
undef $title if $title =~ m<^\s*$>; # make sure it's contentful!
last;

} else {
    DEBUG and $pattern and print STDERR "Leading pattern: $pattern\n";
}
}

# Put it all back:
$self->unget_token(@to_unget);

if(DEBUG) {
    if(defined $title) { print STDERR " Returning title <$title>\n" }
    else { print STDERR "Returning title <>\n" }
}

return " unless defined $title;
return $title;
}

```

Found in path(s):

```

* /opt/ws_local/PERMITS_SQL/1009548100_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-
archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-
3.35/lib/Pod/Simple/PullParser.pm

```

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=head1 NAME

Pod::Simple::DumpAsXML -- turn Pod into XML

=head1 SYNOPSIS

```
perl -MPod::Simple::DumpAsXML -e \  
"exit Pod::Simple::DumpAsXML->filter(shift)->any_errata_seen" \  
thingy.pod
```

=head1 DESCRIPTION

Pod::Simple::DumpAsXML is a subclass of L<Pod::Simple> that parses Pod and turns it into indented and wrapped XML. This class is of interest to people writing Pod formatters based on Pod::Simple.

Pod::Simple::DumpAsXML inherits methods from L<Pod::Simple>.

=head1 SEE ALSO

L<Pod::Simple::XMLOutputStream> is rather like this class. Pod::Simple::XMLOutputStream's output is space-padded in a way that's better for sending to an XML processor (that is, it has no ignorable whitespace). But Pod::Simple::DumpAsXML's output is much more human-readable, being (more-or-less) one token per line, with line-wrapping.

L<Pod::Simple::DumpAsText> is rather like this class, except that it doesn't dump with XML syntax. Try them and see which one you like best!

L<Pod::Simple>, L<Pod::Simple::DumpAsXML>

The older libraries L<Pod::PXML>, L<Pod::XML>, L<Pod::SAX>

=head1 SUPPORT

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## =head1 NAME

Pod::Simple::Text -- format Pod as plaintext

## =head1 SYNOPSIS

```
perl -MPod::Simple::Text -e \  
"exit Pod::Simple::Text->filter(shift)->any_errata_seen" \  
thingy.pod
```

## =head1 DESCRIPTION

This class is a formatter that takes Pod and renders it as wrapped plaintext.

Its wrapping is done by L<Text::Wrap>, so you can change C<\$Text::Wrap::columns> as you like.

This is a subclass of L<Pod::Simple> and inherits all its methods.

## =head1 SEE ALSO

L<Pod::Simple>, L<Pod::Simple::TextContent>, L<Pod::Text>

## =head1 SUPPORT

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=head1 NAME

Pod::Simple::PullParserEndToken -- end-tokens from Pod::Simple::PullParser

=head1 SYNOPSIS

(See L<Pod::Simple::PullParser>)

=head1 DESCRIPTION

When you do `$parser->get_token` on a L<Pod::Simple::PullParser>, you might get an object of this class.

This is a subclass of L<Pod::Simple::PullParserToken> and inherits all its methods, and adds these methods:

=over

=item `$token->tagname`

This returns the tagname for this end-token object.  
For example, parsing a "`=head1 ...`" line will give you a start-token with the tagname of "head1", token(s) for its content, and then an end-token with the tagname of "head1".

=item `$token->tagname(I<somestring>)`

This changes the tagname for this end-token object.  
You probably won't need to do this.

=item `$token->tag(...)`

A shortcut for `$token->tagname(...)`

=item \$token->is\_tag(I<somestring>) or \$token->is\_tagname(I<somestring>)

These are shortcuts for C<< \$token->tag() eq I<somestring> >>

=back

You're unlikely to ever need to construct an object of this class for yourself, but if you want to, call

```
C<<
Pod::Simple::PullParserEndToken->new( I<tagname> )
>>
```

=head1 SEE ALSO

L<Pod::Simple::PullParserToken>, L<Pod::Simple>, L<Pod::Simple::Subclassing>

=head1 SUPPORT

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# TODO: let it be an option whether a given subclass even wants little treelets?

\_\_END\_\_

=head1 NAME

Pod::Simple::LinkSection -- represent "section" attributes of L codes

=head1 SYNOPSIS

# a long story

=head1 DESCRIPTION

This class is not of interest to general users.

Pod::Simple uses this class for representing the value of the "section" attribute of "L" start-element events. Most applications can just use the normal stringification of objects of this class; they stringify to just the text content of the section, such as "foo" for C<< LZ<><Stuff/foo> >>, and "bar" for C<< LZ<><Stuff/bIZ<><ar>> >>.

However, anyone particularly interested in getting the full value of the treelet, can just traverse the content of the treelet @\$treelet\_object. To wit:

```
% perl -MData::Dumper -e
"use base qw(Pod::Simple::Methody);
sub start_L { print Dumper($_[1]{'section'}) }
__PACKAGE__->new->parse_string_document('=head1 L<Foo/bI<ar>baz>>')
"
```

Output:

```
$VAR1 = bless( [
    ",
    {}),
    'b',
    bless( [
        'T',
        {}),
        'ar'
    ], 'Pod::Simple::LinkSection' ),
    'baz'
], 'Pod::Simple::LinkSection');
```

But stringify it and you get just the text content:

```
% perl -MData::Dumper -e
"use base qw(Pod::Simple::Methody);
sub start_L { print Dumper(" . $_[1]{'section'}) }
__PACKAGE__->new->parse_string_document('=head1 L<Foo/bI<ar>baz>>')
"
```

Output:

```
$VAR1 = 'barbaz';
```

=head1 SEE ALSO

L<Pod::Simple>

=head1 SUPPORT

Questions or discussion about POD and Pod::Simple should be sent to the pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

This module is managed in an open GitHub repository, L<<https://github.com/perl-pod/pod-simple/>>. Feel free to fork and contribute, or to clone L<[git://github.com/perl-pod/pod-simple.git](https://github.com/perl-pod/pod-simple.git)> and send patches!

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=head1 AUTHOR

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Pod::Simple is maintained by:

=over

=item \* Allison Randal C<allison@perl.org>

=item \* Hans Dieter Pearcey C<hdp@cpan.org>

=item \* David E. Wheeler C<dwheeler@cpan.org>

=back

=cut

Found in path(s):

```
* /opt/ws_local/PERMITS_SQL/1009548100_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-  
archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-  
3.35/lib/Pod/Simple/LinkSection.pm
```

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=head1 NAME

Pod::Simple::SimpleTree -- parse Pod into a simple parse tree

=head1 SYNOPSIS

```
% cat ptest.pod
```

=head1 PIE

```
I like B<pie>!
```

```
% perl -MPod::Simple::SimpleTree -MData::Dumper -e \  
"print Dumper(Pod::Simple::SimpleTree->new->parse_file(shift)->root)" \  
\
```



ptest.pod

```
$VAR1 = [  
    'Document',  
    { 'start_line' => 1 },  
    [  
        'head1',  
        { 'start_line' => 1 },  
        'PIE'  
    ],  
    [  
        'Para',  
        { 'start_line' => 3 },  
        'I like ',  
        [  
            'B',  
            {},  
            'pie'  
        ],  
        '!'  
    ]  
];
```

#### =head1 DESCRIPTION

This class is of interest to people writing a Pod processor/formatter.

This class takes Pod and parses it, returning a parse tree made just of arrayrefs, and hashrefs, and strings.

This is a subclass of L<Pod::Simple> and inherits all its methods.

This class is inspired by XML::Parser's "Tree" parsing-style, although it doesn't use exactly the same LoL format.

#### =head1 METHODS

At the end of the parse, call C<< \$parser->root >> to get the tree's top node.

#### =head1 Tree Contents

Every element node in the parse tree is represented by an arrayref of the form: C<[ I<elementname>, \%attributes, I<...subnodes...> ]>.

See the example tree dump in the Synopsis, above.

Every text node in the tree is represented by a simple (non-ref) string scalar. So you can test C<ref(\$node)> to see whether you have

an element node or just a text node.

The top node in the tree is C<[ 'Document', \%attributes, I<...subnodes...> ]>

=head1 SEE ALSO

L<Pod::Simple>

L<perllo>

L<The "Tree" subsection in XML::Parser|XML::Parser/"Tree">

=head1 SUPPORT

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=head1 NAME

Pod::Simple::Debug -- put Pod::Simple into trace/debug mode

=head1 SYNOPSIS

use Pod::Simple::Debug (5); # or some integer

Or:

```
my $debuglevel;
use Pod::Simple::Debug (\\$debuglevel, 0);
...some stuff that uses Pod::Simple to do stuff, but which
you don't want debug output from...
```

```
$debug_level = 4;
...some stuff that uses Pod::Simple to do stuff, but which
you DO want debug output from...
```

```
$debug_level = 0;
```

=head1 DESCRIPTION

This is an internal module for controlling the debug level (a.k.a. trace level) of Pod::Simple. This is of interest only to Pod::Simple developers.

=head1 CAVEATS

Note that you should load this module I<before> loading Pod::Simple (or any Pod::Simple-based class). If you try loading Pod::Simple::Debug after &Pod::Simple::DEBUG is already defined, Pod::Simple::Debug will

throw a fatal error to the effect that  
"It's too late to call Pod::Simple::Debug".

Note that the C<use Pod::Simple::Debug (\\$x, I<somenum>)> mode will make Pod::Simple (et al) run rather slower, since &Pod::Simple::DEBUG won't be a constant sub anymore, and so Pod::Simple (et al) won't compile with constant-folding.

=head1 GUTS

Doing this:

```
use Pod::Simple::Debug (5); # or some integer
```

is basically equivalent to:

```
BEGIN { sub Pod::Simple::DEBUG () {5} } # or some integer  
use Pod::Simple ();
```

And this:

```
use Pod::Simple::Debug (\$debug_level,0); # or some integer
```

is basically equivalent to this:

```
my \$debug_level;  
BEGIN { \$debug_level = 0 }  
BEGIN { sub Pod::Simple::DEBUG () { \$debug_level }  
use Pod::Simple ();
```

=head1 SEE ALSO

L<Pod::Simple>

The article "Constants in Perl", in I<The Perl Journal> issue 21. See L<<http://interglacial.com/tpj/21/>>

=head1 SUPPORT

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=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/lib/Pod/Simple/Debug.pm

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## =head1 NAME

Pod::Simple::TextContent -- get the text content of Pod

## =head1 SYNOPSIS

TODO

```
perl -MPod::Simple::TextContent -e \
```

```
"exit Pod::Simple::TextContent->filter(shift)->any_errata_seen" \  
thingy.pod
```

=head1 DESCRIPTION

This class is that parses Pod and dumps just the text content. It is mainly meant for use by the Pod::Simple test suite, but you may find some other use for it.

This is a subclass of L<Pod::Simple> and inherits all its methods.

=head1 SEE ALSO

L<Pod::Simple>, L<Pod::Simple::Text>, L<Pod::Spell>

=head1 SUPPORT

Questions or discussion about POD and Pod::Simple should be sent to the pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

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=head1 NAME

Pod::Simple::RTF -- format Pod as RTF

=head1 SYNOPSIS

```
perl -MPod::Simple::RTF -e \  
"exit Pod::Simple::RTF->filter(shift)->any_errata_seen" \  
thingy.pod > thingy.rtf
```

=head1 DESCRIPTION

This class is a formatter that takes Pod and renders it as RTF, good for viewing/printing in MSWord, WordPad/write.exe, TextEdit, etc.

This is a subclass of L<Pod::Simple> and inherits all its methods.

=head1 FORMAT CONTROL ATTRIBUTES

You can set these attributes on the parser object before you call C<parse\_file> (or a similar method) on it:

=over

=item \$parser->head1\_halfpoint\_size( I<halfpoint\_integer> );

=item \$parser->head2\_halfpoint\_size( I<halfpoint\_integer> );

=item \$parser->head3\_halfpoint\_size( I<halfpoint\_integer> );

=item \$parser->head4\_halfpoint\_size( I<halfpoint\_integer> );

These methods set the size (in half-points, like 52 for 26-point) that these heading levels will appear as.

```
=item $parser->codeblock_halfpoint_size( I<halfpoint_integer> );
```

This method sets the size (in half-points, like 21 for 10.5-point) that codeblocks ("verbatim sections") will appear as.

```
=item $parser->header_halfpoint_size( I<halfpoint_integer> );
```

This method sets the size (in half-points, like 15 for 7.5-point) that the header on each page will appear in. The header is usually just "I<modulename> p. I<pagenumber>".

```
=item $parser->normal_halfpoint_size( I<halfpoint_integer> );
```

This method sets the size (in half-points, like 26 for 13-point) that normal paragraphic text will appear in.

```
=item $parser->no_proofing_exemptions( I<>true_or_false> );
```

Set this value to true if you don't want the formatter to try putting a hidden code on all Perl symbols (as best as it can notice them) that labels them as being not in English, and so not worth spellchecking.

```
=item $parser->doc_lang( I<microsoft_decimal_language_code> )
```

This sets the language code to tag this document as being in. By default, it is currently the value of the environment variable C<RTFDEFLANG>, or if that's not set, then the value 1033 (for US English).

Setting this appropriately is useful if you want to use the RTF to spellcheck, and/or if you want it to hyphenate right.

Here are some notable values:

- 1033 US English
- 2057 UK English
- 3081 Australia English
- 4105 Canada English
- 1034 Spain Spanish
- 2058 Mexico Spanish
- 1031 Germany German
- 1036 France French
- 3084 Canada French
- 1035 Finnish



1044 Norwegian (Bokmal)  
2068 Norwegian (Nynorsk)

=back

If you are particularly interested in customizing this module's output even more, see the source and/or write to me.

=head1 SEE ALSO

L<Pod::Simple>, L<RTF::Writer>, L<RTF::Cookbook>, L<RTF::Document>, L<RTF::Generator>

=head1 SUPPORT

Questions or discussion about POD and Pod::Simple should be sent to the pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

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=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/lib/Pod/Simple/RTF.pm

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Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/perl-Pod-Simple.spec

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=head1 NAME

Pod::Simple::Methody -- turn Pod::Simple events into method calls

=head1 SYNOPSIS

```
require 5;
use strict;
package SomePodFormatter;
use base qw(Pod::Simple::Methody);
```

```
sub handle_text {
    my($self, $text) = @_;
    ...
}
```

```
sub start_head1 {
    my($self, $attrs) = @_;
    ...
}
```

```
sub end_head1 {
    my($self) = @_;
    ...
}
```

...and start\_/end\_ methods for whatever other events you want to catch.

## =head1 DESCRIPTION

This class is of interest to people writing Pod formatters based on Pod::Simple.

This class (which is very small -- read the source) overrides Pod::Simple's `_handle_element_start`, `_handle_text`, and `_handle_element_end` methods so that parser events are turned into method calls. (Otherwise, this is a subclass of L<Pod::Simple> and inherits all its methods.)

You can use this class as the base class for a Pod formatter/processor.

## =head1 METHOD CALLING

When Pod::Simple sees a "`=head1 Hi there`", for example, it basically does this:

```
$parser->_handle_element_start( "head1", \%attributes );
$parser->_handle_text( "Hi there" );
$parser->_handle_element_end( "head1" );
```

But if you subclass Pod::Simple::Methody, it will instead do this when it sees a "`=head1 Hi there`":

```
$parser->start_head1( \%attributes ) if $parser->can('start_head1');
$parser->handle_text( "Hi there" ) if $parser->can('handle_text');
$parser->end_head1() if $parser->can('end_head1');
```

If Pod::Simple sends an event where the element name has a dash, period, or colon, the corresponding method name will have an underscore in its place. For example, "`foo.bar:baz`" becomes `start_foo_bar_baz` and `end_foo_bar_baz`.

See the source for Pod::Simple::Text for an example of using this class.

## =head1 SEE ALSO

L<Pod::Simple>, L<Pod::Simple::Subclassing>

## =head1 SUPPORT

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## =head1 NAME

Pod::Simple::HTML - convert Pod to HTML

## =head1 SYNOPSIS

```
perl -MPod::Simple::HTML -e Pod::Simple::HTML::go thingy.pod
```

## =head1 DESCRIPTION

This class is for making an HTML rendering of a Pod document.

This is a subclass of L<Pod::Simple::PullParser> and inherits all its methods (and options).

Note that if you want to do a batch conversion of a lot of Pod documents to HTML, you should see the module L<Pod::Simple::HTMLBatch>.

## =head1 CALLING FROM THE COMMAND LINE

### TODO

```
perl -MPod::Simple::HTML -e Pod::Simple::HTML::go Thing.pod Thing.html
```

## =head1 CALLING FROM PERL

### =head2 Minimal code

```
use Pod::Simple::HTML;
my $p = Pod::Simple::HTML->new;
$p->output_string(\my $html);
$p->parse_file('path/to/Module/Name.pm');
open my $out, '>', 'out.html' or die "Cannot open 'out.html': $!\n";
print $out $html;
```

### =head2 More detailed example

```
use Pod::Simple::HTML;
```

Set the content type:

```
$Pod::Simple::HTML::Content_decl = q{<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">};
```

```
my $p = Pod::Simple::HTML->new;
```

Include a single javascript source:

```
$p->html_javascript('http://abc.com/a.js');
```

Or insert multiple javascript source in the header  
(or for that matter include anything, though this is not recommended)

```
$p->html_javascript('
  <script type="text/javascript" src="http://abc.com/b.js"></script>
  <script type="text/javascript" src="http://abc.com/c.js"></script>');
```

Include a single css source in the header:

```
$p->html_css('/style.css');
```

or insert multiple css sources:

```
$p->html_css('
  <link rel="stylesheet" type="text/css" title="pod_stylesheet" href="http://remote.server.com/jquery.css">
  <link rel="stylesheet" type="text/css" title="pod_stylesheet" href="/style.css">');
```

Tell the parser where should the output go. In this case it will be placed in the \$html variable:

```
my $html;
$p->output_string(\$html);
```

Parse and process a file with pod in it:

```
$p->parse_file('path/to/Module/Name.pm');
```

=head1 METHODS

TODO

all (most?) accessorized methods

The following variables need to be set B<before> the call to the ->new constructor.

Set the string that is included before the opening <html> tag:

```
$Pod::Simple::HTML::Doctype_decl = qq{<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01
Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">\n};
```

Set the content-type in the HTML head: (defaults to ISO-8859-1)

```
$Pod::Simple::HTML::Content_decl = q{<meta http-equiv="Content-Type" content="text/html; charset=UTF-8"
>};
```

Set the value that will be embedded in the opening tags of F, C tags and verbatim text.

F maps to <em>, C maps to <code>, Verbatim text maps to <pre> (Computerese defaults to "")

```
$Pod::Simple::HTML::Computerese = ' class="some_class_name";
```

=head2 html\_css

=head2 html\_javascript

=head2 title\_prefix

=head2 title\_postfix

=head2 html\_header\_before\_title

This includes everything before the <title> opening tag including the Document type and including the opening <title> tag. The following call will set it to be a simple HTML file:

```
$p->html_header_before_title('<html><head><title>');
```

=head2 top\_anchor

By default Pod::Simple::HTML adds a dummy anchor at the top of the HTML. You can change it by calling

```
$p->top_anchor('<a name="zz" >');
```

=head2 html\_h\_level

Normally =head1 will become <h1>, =head2 will become <h2> etc.

Using the html\_h\_level method will change these levels setting the h level of =head1 tags:

```
$p->html_h_level(3);
```

Will make sure that =head1 will become <h3> and =head2 will become <h4> etc...

=head2 index

Set it to some true value if you want to have an index (in reality a table of contents) to be added at the top of the generated HTML.

```
$p->index(1);
```

=head2 html\_header\_after\_title

Includes the closing tag of </title> and through the rest of the head till the opening of the body

```
$p->html_header_after_title('</title>...</head><body id="my_id">');
```

```
=head2 html_footer
```

The very end of the document:

```
$p->html_footer( qq[\n<!-- end doc -->\n\n</body></html>\n] );
```

```
=head1 SUBCLASSING
```

Can use any of the methods described above but for further customization one needs to override some of the methods:

```
package My::Pod;
use strict;
use warnings;

use base 'Pod::Simple::HTML';

# needs to return a URL string such
# http://some.other.com/page.html
# #anchor_in_the_same_file
# /internal/ref.html
sub do_pod_link {
    # My::Pod object and Pod::Simple::PullParserStartToken object
    my ($self, $link) = @_ ;

    say $link->tagname;      # will be L for links
    say $link->attr('to');   #
    say $link->attr('type'); # will be 'pod' always
    say $link->attr('section');

    # Links local to our web site
    if ($link->tagname eq 'L' and $link->attr('type') eq 'pod') {
        my $to = $link->attr('to');
        if ($to =~ /^Padre::/) {
            $to =~ s{::}{/}g;
            return "/docs/Padre/$to.html";
        }
    }

    # all other links are generated by the parent class
    my $ret = $self->SUPER::do_pod_link($link);
    return $ret;
}

1;
```

Meanwhile in script.pl:



```
use My::Pod;

my $p = My::Pod->new;

my $html;
$p->output_string(\$html);
$p->parse_file('path/to/Module/Name.pm');
open my $out, '>', 'out.html' or die;
print $out $html;
```

## TODO

maybe override do\_beginning do\_end

=head1 SEE ALSO

L<Pod::Simple>, L<Pod::Simple::HTMLBatch>

TODO: a corpus of sample Pod input and HTML output? Or common idioms?

=head1 SUPPORT

Questions or discussion about POD and Pod::Simple should be sent to the pod-people@perl.org mail list. Send an empty email to pod-people-subscribe@perl.org to subscribe.

This module is managed in an open GitHub repository, L<<https://github.com/perl-pod/pod-simple/>>. Feel free to fork and contribute, or to clone L<[git://github.com/perl-pod/pod-simple.git](https://github.com/perl-pod/pod-simple.git)> and send patches!

Patches against Pod::Simple are welcome. Please send bug reports to <[bug-pod-simple@rt.cpan.org](mailto:bug-pod-simple@rt.cpan.org)>.

=head1 COPYRIGHT AND DISCLAIMERS

Copyright (c) 2002-2004 Sean M. Burke.

This library is free software; you can redistribute it and/or modify it under the same terms as Perl itself.

This program is distributed in the hope that it will be useful, but without any warranty; without even the implied warranty of merchantability or fitness for a particular purpose.

=head1 ACKNOWLEDGEMENTS

Thanks to L<Hurricane Electric|<http://he.net/>> for permission to use its  
L<Linux man pages online|<http://man.he.net/>> site for man page links.

Thanks to L<[search.cpan.org](http://search.cpan.org/)|<http://search.cpan.org/>> for permission to use the  
site for Perl module links.

=head1 AUTHOR

Pod::Simple was created by Sean M. Burke <[sburke@cpan.org](mailto:sburke@cpan.org)>.  
But don't bother him, he's retired.

Pod::Simple is maintained by:

=over

=item \* Allison Randal C<[allison@perl.org](mailto:allison@perl.org)>

=item \* Hans Dieter Pearcey C<[hdp@cpan.org](mailto:hdp@cpan.org)>

=item \* David E. Wheeler C<[dwheeler@cpan.org](mailto:dwheeler@cpan.org)>

=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-  
archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-  
3.35/lib/Pod/Simple/HTML.pm

No license file was found, but licenses were detected in source scan.

research purposes), Cygwin is covered by the GNU Public License (but  
statements like ``This is unpublished proprietary software of XYZ Corp.  
Your access to it does not give you permission to use it blah blah  
All rights reserved.

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-  
archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/t/perlfaq.pod

No license file was found, but licenses were detected in source scan.

=head1 Pod::Simple version 3.33

Pod::Simple is a Perl library for parsing text in the Pod ("plain old  
documentation") markup language that is typically used for writing  
documentation for Perl and for Perl modules. The Pod format is explained  
L<[perlpod](#)>; the most common formatter is called C<[perldoc](#)>.

Pod formatters can use Pod::Simple to parse Pod documents and render them into plain text, HTML, or any number of other formats.

## =head2 Installation

To install this module, type the following:

```
perl Makefile.PL
make
make test
make install
```

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=item \* David E. Wheeler C<dwheeler@cpan.org>

=item \* Marc Green C<marcgreen@cpan.org>

=back

=cut

Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548100\_1591379813.5/0/perl-Pod-Simple-3.35-395.el8.src.rpm-cosi-expand-archive-dyJZxwBE/Pod-Simple-3.35.tar.gz-cosi-expand-archive-HgAXY2Rt/Pod-Simple-3.35/README

# 1.447 systemd-shim 219-78.el7

## 1.447.1 Available under license :

No license file was found, but licenses were detected in source scan.

From ec79f8b26d793d2e2ee1705ca86437049e0153c6 Mon Sep 17 00:00:00 2001

From: ="UTF-8?q?Zbigniew=20J=C4=99drzejewski-Szmek?" <zbyszek@in.waw.pl>

Date: Fri, 13 Mar 2015 21:24:30 -0500

Subject: [PATCH] man: link to fd.o for dbus stuff

(cherry picked from commit 3b5cfcdb580f5b766ff7fb1a2839bd37d74a98de)

---

```
man/busctl.xml          | 2 +-
man/custom-html.xml     | 13 ++++++++++++
man/systemd-bus-proxyd.xml | 2 +-
man/systemd-bus-proxyd@.service.xml | 2 +-
man/systemd-machine-id-setup.xml | 2 +-
5 files changed, 17 insertions(+), 4 deletions(-)
```

```
diff --git a/man/busctl.xml b/man/busctl.xml
```

```
index cc1844b0a0..807fc78e8f 100644
```

```
--- a/man/busctl.xml
```

```
+++ b/man/busctl.xml
```

```
@@ -465,7 +465,7 @@ o "/org/freedesktop/systemd1/job/42684"</programlisting>
```

```
<title>See Also</title>
```

```
<para>
```

```
- <citerefentry><refentrytitle>dbus-daemon</refentrytitle><manvolnum>1</manvolnum></citerefentry>,>
```

```
+ <citerefentry project='dbus'><refentrytitle>dbus-
```

```
daemon</refentrytitle><manvolnum>1</manvolnum></citerefentry>,>
```

```
  <ulink url="http://freedesktop.org/wiki/Software/dbus">D-Bus</ulink>,>
```

```
  <ulink url="https://code.google.com/p/d-bus/">kdbus</ulink>,>
```

```
  <citerefentry><refentrytitle>sd-bus</refentrytitle><manvolnum>3</manvolnum></citerefentry>,>
```

```
diff --git a/man/custom-html.xml b/man/custom-html.xml
```

index 32299db710..706b95a1c4 100644

--- a/man/custom-html.xml

+++ b/man/custom-html.xml

@@ -91,6 +91,19 @@

<xsl:call-template name="inline.charseq"/>

</xsl:template>

+<xsl:template match="citrefentry[@project='dbus']">

+ <a>

+ <xsl:attribute name="href">

+ <xsl:text>http://dbus.freedesktop.org/doc/</xsl:text>

+ <xsl:value-of select="refentrytitle"/>

+ <xsl:text>.</xsl:text>

+ <xsl:value-of select="manvolnum"/>

+ <xsl:text>.html</xsl:text>

+ </xsl:attribute>

+ <xsl:call-template name="inline.charseq"/>

+ </a>

+</xsl:template>

+

<xsl:template match="refsect1/title|refsect1/info/title">

<!-- the ID is output in the block.object call for refsect1 -->

<h2>

diff --git a/man/systemd-bus-proxyd.xml b/man/systemd-bus-proxyd.xml

index 2c7764047b..e0efe99854 100644

--- a/man/systemd-bus-proxyd.xml

+++ b/man/systemd-bus-proxyd.xml

@@ -101,7 +101,7 @@ along with systemd; If not, see <http://www.gnu.org/licenses/>.

<title>See Also</title>

<para>

- <citrefentry><refentrytitle>dbus-daemon</refentrytitle><manvolnum>1</manvolnum></citrefentry>,

+ <citrefentry project='dbus'><refentrytitle>dbus-

daemon</refentrytitle><manvolnum>1</manvolnum></citrefentry>,

<ulink url="http://freedesktop.org/wiki/Software/dbus">D-Bus</ulink>,

<ulink url="https://code.google.com/p/d-bus/">kdbus</ulink>

</para>

diff --git a/man/systemd-bus-proxyd@.service.xml b/man/systemd-bus-proxyd@.service.xml

index 141b43f6d9..dc4f07ff1b 100644

--- a/man/systemd-bus-proxyd@.service.xml

+++ b/man/systemd-bus-proxyd@.service.xml

@@ -73,7 +73,7 @@

<para>

<citrefentry><refentrytitle>systemd-bus-proxyd</refentrytitle><manvolnum>8</manvolnum></citrefentry>,

- <citrefentry><refentrytitle>dbus-daemon</refentrytitle><manvolnum>1</manvolnum></citrefentry>,

+ <citrefentry project='dbus'><refentrytitle>dbus-

daemon</refentrytitle><manvolnum>1</manvolnum></citrefentry>,

<ulink url="http://freedesktop.org/wiki/Software/dbus">D-Bus</ulink>,</p></div>
<div><p><ulink url="https://code.google.com/p/d-bus/">kdbus</ulink></p></div>
<div><p></para></div>
<div><p>diff --git a/man/systemd-machine-id-setup.xml b/man/systemd-machine-id-setup.xml</p></div>
<div><p>index 22bad3e5f4..182717f524 100644</p></div>
<div><p>--- a/man/systemd-machine-id-setup.xml</p></div>
<div><p>+++ b/man/systemd-machine-id-setup.xml</p></div>
<div><p>@@ -122,7 +122,7 @@</p></div>
<div><p></para></div>
<div><p><citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</p></div>
<div><p><citerefentry><refentrytitle>machine-id</refentrytitle><manvolnum>5</manvolnum></citerefentry>,</p></div>
<div><p>- <citerefentry><refentrytitle>dbus-uuidgen</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</p></div>
<div><p>+ <citerefentry project='dbus'><refentrytitle>dbus-</p></div>
<div><p>uuidgen</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</p></div>
<div><p><citerefentry><refentrytitle>systemd-firstboot</refentrytitle><manvolnum>1</manvolnum></citerefentry></p></div>
<div><p></para></div>
<div><p></refsect1></p></div>
<div><p>Found in path(s):</p></div>
<div><p>\* /opt/cola/permits/1168560137\_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm.download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0103-man-link-to-fd.o-for-dbus-stuff.patch</p></div>
<div><p>No license file was found, but licenses were detected in source scan.</p></div>
<div><p>From 91cb89c1b79ef3c475d91319edb0c052cb9f2724 Mon Sep 17 00:00:00 2001</p></div>
<div><p>From: Lukas Nykryn <lnykryn@redhat.com></p></div>
<div><p>Date: Wed, 15 Apr 2015 13:52:02 +0200</p></div>
<div><p>Subject: [PATCH] Revert "journald: allow restarting journald without losing stream connections"</p></div>
<div><p>This reverts commit 13790add4bf648fed816361794d8277a75253410.</p></div>
<div><p>---</p></div>
<div><p>src/journal/journald-server.c | 26 +--</p></div>
<div><p>src/journal/journald-stream.c | 376 +++++-----</p></div>
<div><p>src/journal/journald-stream.h | 3 +-</p></div>
<div><p>units/systemd-journald.service.in | 1 -</p></div>
<div><p>4 files changed, 61 insertions(+), 345 deletions(-)</p></div>
<div><p>diff --git a/src/journal/journald-server.c b/src/journal/journald-server.c</p></div>
<div><p>index 7ee8174ea2..04839c950c 100644</p></div>
<div><p>--- a/src/journal/journald-server.c</p></div>
<div><p>+++ b/src/journal/journald-server.c</p></div>
<div><p>@@ -1455,7 +1455,6 @@ static int server\_open\_hostname(Server \*s) {</p></div>
<div><p>}</p></div>
<div><p>int server\_init(Server \*s) {</p></div>
<div><p>- \_cleanup\_fdset\_free\_ FDSet \*fds = NULL;</p></div>
<div><p>int n, r, fd;</p></div>
<div><p>Open Source Used In cisco-dna-spaces-connector30-iot-wireless 3.0 4642</p></div>

```

    assert(s);
@@ -1552,33 +1551,26 @@ int server_init(Server *s) {
        s->audit_fd = fd;

        } else {
+         log_warning("Unknown socket passed as file descriptor %d, ignoring.", fd);

-         if (!fds) {
-             fds = fdset_new();
-             if (!fds)
-                 return log_oom();
-         }
+         /* Let's close the fd, better be safe than
+         sorry. The fd might reference some resource
+         that we really want to release if we don't
+         make use of it. */

-         r = fdset_put(fds, fd);
-         if (r < 0)
-             return log_oom();
+         safe_close(fd);
        }
    }

-    r = server_open_stdout_socket(s, fds);
+    r = server_open_syslog_socket(s);
    if (r < 0)
        return r;

-    if (fdset_size(fds) > 0) {
-        log_warning("%u unknown file descriptors passed, closing.", fdset_size(fds));
-        fds = fdset_free(fds);
-    }
-
-    r = server_open_syslog_socket(s);
+    r = server_open_native_socket(s);
    if (r < 0)
        return r;

-    r = server_open_native_socket(s);
+    r = server_open_stdout_socket(s);
    if (r < 0)
        return r;

```

```
diff --git a/src/journal/journald-stream.c b/src/journal/journald-stream.c
```

```
index 942a857803..11b852d39d 100644
```

```
--- a/src/journal/journald-stream.c
```

```

+++ b/src/journal/journald-stream.c
@@ -28,11 +28,8 @@
#endif

#include "sd-event.h"
#include "sd-daemon.h"
#include "socket-util.h"
#include "selinux-util.h"
#include "mkdir.h"
#include "fileio.h"
#include "journald-server.h"
#include "journald-stream.h"
#include "journald-syslog.h"
@@ -72,153 +69,14 @@ struct StdoutStream {
    bool forward_to_kmsg:1;
    bool forward_to_console:1;

-   bool fdstore:1;
-
    char buffer[LINE_MAX+1];
    size_t length;

    sd_event_source *event_source;

-   char *state_file;
-
    LIST_FIELDS(StdoutStream, stdout_stream);
};

-void stdout_stream_free(StdoutStream *s) {
-   if (!s)
-       return;
-
-   if (s->server) {
-       assert(s->server->n_stdout_streams > 0);
-       s->server->n_stdout_streams--;
-       LIST_REMOVE(stdout_stream, s->server->stdout_streams, s);
-   }
-
-   if (s->event_source) {
-       sd_event_source_set_enabled(s->event_source, SD_EVENT_OFF);
-       s->event_source = sd_event_source_unref(s->event_source);
-   }
-
-   safe_close(s->fd);
-
-#ifndef HAVE_SELINUX
-   if (s->security_context)

```



```

-     freecon(s->security_context);
-#endif
-
-     free(s->identifier);
-     free(s->unit_id);
-     free(s->state_file);
-
-     free(s);
-}
-
-#DEFINE_TRIVIAL_CLEANUP_FUNC(StdoutStream*, stdout_stream_free);
-
-#static void stdout_stream_destroy(StdoutStream *s) {
-     if (!s)
-         return;
-
-     if (s->state_file)
-         unlink(s->state_file);
-
-     stdout_stream_free(s);
-}
-
-#static int stdout_stream_save(StdoutStream *s) {
-     _cleanup_free_ char *temp_path = NULL;
-     _cleanup_fclose_ FILE *f = NULL;
-     int r;
-
-     assert(s);
-
-     if (s->state != STDOUT_STREAM_RUNNING)
-         return 0;
-
-     if (!s->state_file) {
-         struct stat st;
-
-         r = fstat(s->fd, &st);
-         if (r < 0)
-             return log_warning_errno(errno, "Failed to stat connected stream: %m");
-
-         /* We use device and inode numbers as identifier for the stream */
-         if (asprintf(&s->state_file, "/run/systemd/journal/streams/%lu:%lu", (unsigned long) st.st_dev, (unsigned
long) st.st_ino) < 0)
-             return log_oom();
-     }
-
-     mkdir_p("/run/systemd/journal/streams", 0755);
-
-     r = fopen_temporary(s->state_file, &f, &temp_path);

```

```

-   if (r < 0)
-       goto finish;
-
-   fprintf(f,
-       "# This is private data. Do not parse\n"
-       "PRIORITY=%i\n"
-       "LEVEL_PREFIX=%i\n"
-       "FORWARD_TO_SYSLOG=%i\n"
-       "FORWARD_TO_KMSG=%i\n"
-       "FORWARD_TO_CONSOLE=%i\n",
-       s->priority,
-       s->level_prefix,
-       s->forward_to_syslog,
-       s->forward_to_kmsg,
-       s->forward_to_console);
-
-   if (!isempty(s->identifier)) {
-       _cleanup_free_ char *escaped;
-
-       escaped = cescape(s->identifier);
-       if (!escaped) {
-           r = -ENOMEM;
-           goto finish;
-       }
-
-       fprintf(f, "IDENTIFIER=%s\n", escaped);
-   }
-
-   if (!isempty(s->unit_id)) {
-       _cleanup_free_ char *escaped;
-
-       escaped = cescape(s->unit_id);
-       if (!escaped) {
-           r = -ENOMEM;
-           goto finish;
-       }
-
-       fprintf(f, "UNIT=%s\n", escaped);
-   }
-
-   r = fflush_and_check(f);
-   if (r < 0)
-       goto finish;
-
-   if (rename(temp_path, s->state_file) < 0) {
-       r = -errno;
-       goto finish;
-   }

```

```

-
- free(temp_path);
- temp_path = NULL;
-
- /* Store the connection fd in PID 1, so that we get it passed
-  * in again on next start */
- if (!s->fdstore) {
-     sd_pid_notify_with_fds(0, false, "FDSTORE=1", &s->fd, 1);
-     s->fdstore = true;
- }
-
-finish:
- if (temp_path)
-     unlink(temp_path);
-
- if (r < 0)
-     log_error_errno(r, "Failed to save stream data %s: %m", s->state_file);
-
- return r;
-}
-
static int stdout_stream_log(StdoutStream *s, const char *p) {
    struct iovec iovec[N_IOVEC_META_FIELDS + 5];
    int priority;
@@ -371,9 +229,6 @@ static int stdout_stream_line(StdoutStream *s, char *p) {

    s->forward_to_console = !!r;
    s->state = STDOUT_STREAM_RUNNING;
-
- /* Try to save the stream, so that journald can be restarted and we can recover */
- (void) stdout_stream_save(s);
    return 0;

    case STDOUT_STREAM_RUNNING:
@@ -468,63 +323,40 @@ static int stdout_stream_process(sd_event_source *es, int fd, uint32_t revents,
    return 1;

terminate:
- stdout_stream_destroy(s);
+ stdout_stream_free(s);
    return 0;
}

-static int stdout_stream_install(Server *s, int fd, StdoutStream **ret) {
-     _cleanup_(stdout_stream_freep) StdoutStream *stream = NULL;
-     int r;
-
-+void stdout_stream_free(StdoutStream *s) {

```

```

assert(s);
-   assert(fd >= 0);

-   stream = new0(StdoutStream, 1);
-   if (!stream)
-       return log_oom();
+   if (s->server) {
+       assert(s->server->n_stdout_streams > 0);
+       s->server->n_stdout_streams --;
+       LIST_REMOVE(stdout_stream, s->server->stdout_streams, s);
+   }

-   stream->fd = -1;
-   stream->priority = LOG_INFO;
+   if (s->event_source) {
+       sd_event_source_set_enabled(s->event_source, SD_EVENT_OFF);
+       s->event_source = sd_event_source_unref(s->event_source);
+   }

-   r = getpeercred(fd, &stream->ucred);
-   if (r < 0)
-       return log_error_errno(r, "Failed to determine peer credentials: %m");
+   safe_close(s->fd);

#ifdef HAVE_SELINUX
-   if (mac_selinux_use()) {
-       if (getpeercon(fd, &stream->security_context) < 0 && errno != ENOPROTOOPT)
-           log_error_errno(errno, "Failed to determine peer security context: %m");
-   }
+   if (s->security_context)
+       freecon(s->security_context);
#endif

-   (void) shutdown(fd, SHUT_WR);
-
-   r = sd_event_add_io(s->event, &stream->event_source, fd, EPOLLIN, stdout_stream_process, stream);
-   if (r < 0)
-       return log_error_errno(r, "Failed to add stream to event loop: %m");
-
-   r = sd_event_source_set_priority(stream->event_source, SD_EVENT_PRIORITY_NORMAL+5);
-   if (r < 0)
-       return log_error_errno(r, "Failed to adjust stdout event source priority: %m");
-
-   stream->fd = fd;
-
-   stream->server = s;
-   LIST_PREPEND(stdout_stream, s->stdout_streams, stream);
-   s->n_stdout_streams ++;

```

```

-
-   if (ret)
-       *ret = stream;
-
-   stream = NULL;
-
-   return 0;
+   free(s->identifier);
+   free(s->unit_id);
+   free(s);
}

static int stdout_stream_new(sd_event_source *es, int listen_fd, uint32_t revents, void *userdata) {
-   _cleanup_close_ int fd = -1;
    Server *s = userdata;
-   int r;
+   StdoutStream *stream;
+   int fd, r;

    assert(s);

@@ -544,163 +376,60 @@ static int stdout_stream_new(sd_event_source *es, int listen_fd, uint32_t revent

    if (s->n_stdout_streams >= STDOUT_STREAMS_MAX) {
        log_warning("Too many stdout streams, refusing connection.");
+       safe_close(fd);
        return 0;
    }

-   r = stdout_stream_install(s, fd, NULL);
-   if (r < 0)
-       return r;
-
-   fd = -1;
-   return 0;
-}
-
-static int stdout_stream_load(StdoutStream *stream, const char *fname) {
-   _cleanup_free_ char
-       *priority = NULL,
-       *level_prefix = NULL,
-       *forward_to_syslog = NULL,
-       *forward_to_kmsg = NULL,
-       *forward_to_console = NULL;
-   int r;

-   assert(stream);
-   assert(fname);

```

```

-
- if (!stream->state_file) {
-     stream->state_file = strappend("/run/systemd/journal/streams/", fname);
-     if (!stream->state_file)
-         return log_oom();
- }
-
- r = parse_env_file(stream->state_file, NEWLINE,
-     "PRIORITY", &priority,
-     "LEVEL_PREFIX", &level_prefix,
-     "FORWARD_TO_SYSLOG", &forward_to_syslog,
-     "FORWARD_TO_KMSG", &forward_to_kmsg,
-     "FORWARD_TO_CONSOLE", &forward_to_console,
-     "IDENTIFIER", &stream->identifier,
-     "UNIT", &stream->unit_id,
-     NULL);
- if (r < 0)
-     return log_error_errno(r, "Failed to read: %s", stream->state_file);
-
- if (priority) {
-     int p;
-
-     p = log_level_from_string(priority);
-     if (p >= 0)
-         stream->priority = p;
+ stream = new0(StdoutStream, 1);
+ if (!stream) {
+     safe_close(fd);
+     return log_oom();
+ }
-
- if (level_prefix) {
-     r = parse_boolean(level_prefix);
-     if (r >= 0)
-         stream->level_prefix = r;
- }
+ stream->fd = fd;
-
- if (forward_to_syslog) {
-     r = parse_boolean(forward_to_syslog);
-     if (r >= 0)
-         stream->forward_to_syslog = r;
+ r = getpeercred(fd, &stream->ucred);
+ if (r < 0) {
+     log_error_errno(errno, "Failed to determine peer credentials: %m");
+     goto fail;
+ }

```

```

-     if (forward_to_kmsg) {
-         r = parse_boolean(forward_to_kmsg);
-         if (r >= 0)
-             stream->forward_to_kmsg = r;
+ #ifdef HAVE_SELINUX
+     if (mac_selinux_use()) {
+         if (getpeercon(fd, &stream->security_context) < 0 && errno != ENOPROTOOPT)
+             log_error_errno(errno, "Failed to determine peer security context: %m");
+     }
+ #endif

-     if (forward_to_console) {
-         r = parse_boolean(forward_to_console);
-         if (r >= 0)
-             stream->forward_to_console = r;
+     if (shutdown(fd, SHUT_WR) < 0) {
+         log_error_errno(errno, "Failed to shutdown writing side of socket: %m");
+         goto fail;
+     }

-     return 0;
- }
-
- static int stdout_stream_restore(Server *s, const char *fname, int fd) {
-     StdoutStream *stream;
-     int r;
-
-     assert(s);
-     assert(fname);
-     assert(fd >= 0);
-
-     if (s->n_stdout_streams >= STDOUT_STREAMS_MAX) {
-         log_warning("Too many stdout streams, refusing restoring of stream.");
-         return -ENOBUFFS;
+     r = sd_event_add_io(s->event, &stream->event_source, fd, EPOLLIN, stdout_stream_process, stream);
+     if (r < 0) {
+         log_error_errno(r, "Failed to add stream to event loop: %m");
+         goto fail;
+     }

-     r = stdout_stream_install(s, fd, &stream);
-     if (r < 0)
-         return r;
-
-     stream->state = STDOUT_STREAM_RUNNING;
-     stream->fdstore = true;
-
-     /* Ignore all parsing errors */

```

```

- (void) stdout_stream_load(stream, fname);
-
- return 0;
-}
-
-static int server_restore_streams(Server *s, FDSet *fds) {
-    _cleanup_closedir_ DIR *d = NULL;
-    struct dirent *de;
-    int r;
-
-    d = opendir("/run/systemd/journal/streams");
-    if (!d) {
-        if (errno == ENOENT)
-            return 0;
-
-        return log_warning_errno(errno, "Failed to enumerate /run/systemd/journal/streams: %m");
+    r = sd_event_source_set_priority(stream->event_source, SD_EVENT_PRIORITY_NORMAL+5);
+    if (r < 0) {
+        log_error_errno(r, "Failed to adjust stdout event source priority: %m");
+        goto fail;
    }

-    FOREACH_DIRENT(de, d, goto fail) {
-        unsigned long st_dev, st_ino;
-        bool found = false;
-        Iterator i;
-        int fd;
-
-        if (sscanf(de->d_name, "%lu:%lu", &st_dev, &st_ino) != 2)
-            continue;
-
-        FDSET_FOREACH(fd, fds, i) {
-            struct stat st;
-
-            if (fstat(fd, &st) < 0)
-                return log_error_errno(errno, "Failed to stat %s: %m", de->d_name);
-
-            if (S_ISSOCK(st.st_mode) && st.st_dev == st_dev && st.st_ino == st_ino) {
-                found = true;
-                break;
-            }
-        }
-
-        if (!found) {
-            /* No file descriptor? Then let's delete the state file */
-            log_debug("Cannot restore stream file %s", de->d_name);
-            unlinkat(dirfd(d), de->d_name, 0);
-            continue;

```



```

-     }
-
-     fdset_remove(fds, fd);
-
-     r = stdout_stream_restore(s, de->d_name, fd);
-     if (r < 0)
-         safe_close(fd);
- }
+     stream->server = s;
+     LIST_PREPEND(stdout_stream, s->stdout_streams, stream);
+     s->n_stdout_streams ++;

return 0;

fail:
-     return log_error_errno(errno, "Failed to read streams directory: %m");
+     stdout_stream_free(stream);
+     return 0;
}

-int server_open_stdout_socket(Server *s, FDSet *fds) {
+int server_open_stdout_socket(Server *s) {
    int r;

    assert(s);
@@ -736,8 +465,5 @@ int server_open_stdout_socket(Server *s, FDSet *fds) {
    if (r < 0)
        return log_error_errno(r, "Failed to adjust priority of stdout server event source: %m");

-     /* Try to restore streams, but don't bother if this fails */
-     (void) server_restore_streams(s, fds);
-
    return 0;
}
diff --git a/src/journal/journald-stream.h b/src/journal/journald-stream.h
index 94bf955d78..8cad012967 100644
--- a/src/journal/journald-stream.h
+++ b/src/journal/journald-stream.h
@@ -21,9 +21,8 @@
    along with systemd; If not, see <http://www.gnu.org/licenses/>.
    */

-#include "fdset.h"
#include "journald-server.h"

-int server_open_stdout_socket(Server *s, FDSet *fds);
+int server_open_stdout_socket(Server *s);

```

```
void stdout_stream_free(StdoutStream *s);
diff --git a/units/systemd-journald.service.in b/units/systemd-journald.service.in
index a3540c65d2..87704bb9c1 100644
--- a/units/systemd-journald.service.in
+++ b/units/systemd-journald.service.in
@@ -23,7 +23,6 @@ NotifyAccess=all
StandardOutput=null
CapabilityBoundingSet=CAP_SYS_ADMIN CAP_DAC_OVERRIDE CAP_SYS_PTRACE CAP_SYSLOG
CAP_AUDIT_CONTROL CAP_AUDIT_READ CAP_CHOWN CAP_DAC_READ_SEARCH CAP_FOWNER
CAP_SETUID CAP_SETGID CAP_MAC_OVERRIDE
WatchdogSec=1min
-FileDescriptorStoreMax=1024
```

# Increase the default a bit in order to allow many simultaneous  
# services being run since we keep one fd open per service. Also, when

Found in path(s):

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78-el7.src.rpm.download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0125-Revert-journald-allow-restarting-journald-without-lo.patch
```

No license file was found, but licenses were detected in source scan.

From 272378080241106862a9cca2e4e84857fe1aaf5c Mon Sep 17 00:00:00 2001

From: Lennart Poettering <lennart@poettering.net>

Date: Thu, 8 Oct 2015 22:31:56 +0200

Subject: [PATCH] install: follow unit file symlinks in /usr, but not /etc when  
looking for [Install] data

Some distributions use alias unit files via symlinks in /usr to cover  
for legacy service names. With this change we'll allow "systemctl  
enable" on such aliases.

Previously, our rule was that symlinks are user configuration that  
"systemctl enable" + "systemctl disable" creates and removes, while unit  
files is where the instructions to do so are store. As a result of the  
rule we'd never read install information through symlinks, since that  
would mix enablement state with installation instructions.

Now, the new rule is that only symlinks inside of /etc are  
configuration. Unit files, and symlinks in /usr are now valid for  
installation instructions.

This patch is quite a rework of the whole install logic, and makes the  
following additional changes:

- Adds a complete test "test-instal-root" that tests the install logic  
pretty comprehensively.

- Never uses `canonicalize_file_name()`, because that's incompatible with operation relative to a specific root directory.
- `unit_file_get_state()` is reworked to return a proper error, and returns the state in a call-by-ref parameter. This cleans up confusion between the enum type and errno-like errors.
- The new logic puts a limit on how long to follow unit file symlinks: it will do so only for 64 steps at max.
- The `InstallContext` object's fields are renamed to `will_process` and `has_processed` (`will_install` and `has_installed`) since they are also used for deinstallation and all kinds of other operations.
- The root directory is always verified before use.
- `install.c` is reordered to place the exported functions together.
- Stricter rules are followed when traversing symlinks: the unit suffix must say identical, and it's not allowed to link between regular units and templated units.
- Various modernizations
- The "invalid" unit file state has been renamed to "bad", in order to avoid confusion between `UNIT_FILE_INVALID` and `_UNIT_FILE_STATE_INVALID`. Given that the state should normally not be seen and is not documented this should not be a problematic change. The new name is now documented however.

Fixes #1375, #1718, #1706

Cherry-picked from: 79413b673b45adc98dfeaec882bbdda2343cb2f9

Resolves: #1159308

---

Makefile.am	12 +-
man/systemctl.xml	14 +-
src/core/dbus-manager.c	6 +-
src/core/dbus-unit.c	4 +-
src/core/load-fragment.c	2 +-
src/core/manager.c	2 +-
src/core/snapshot.c	2 +-
src/core/unit.c	19 +-
src/dbus1-generator/dbus1-generator.c	2 +-
src/firstboot/firstboot.c	18 +-
src/shared/cgroup-util.c	6 +-
src/shared/install.c	1909 ++++++-----
src/shared/install.h	46 +-

```
src/shared/path-util.c      | 34 +
src/shared/path-util.h      | 27 +
src/shared/unit-name.c      | 32 +-
src/shared/unit-name.h      | 14 +-
src/shared/util.c           | 21 +
src/shared/util.h           | 1 +
src/systemctl/systemctl.c   | 6 +-
src/sysv-generator/sysv-generator.c | 10 +-
src/test/test-install-root.c | 663 ++++++++
src/test/test-install.c     | 71 +-
23 files changed, 1998 insertions(+), 923 deletions(-)
create mode 100644 src/test/test-install-root.c
```

```
diff --git a/Makefile.am b/Makefile.am
index 3af720bdae..3a09e0a62b 100644
--- a/Makefile.am
+++ b/Makefile.am
@@ -1427,7 +1427,8 @@ tests += \
 test-copy \
 test-cap-list \
 test-sigbus \
- test-verbs
+ test-verbs \
+ test-install-root

EXTRA_DIST += \
 test/a.service \
@@ -1721,6 +1722,15 @@ test_verbs_SOURCES = \
 test_verbs_LDADD = \
 libsystemd-shared.la
```

```
+test_install_root_SOURCES = \
+ src/test/test-install-root.c
+
+test_install_root_LDADD = \
+ libsystemd-units.la \
+ libsystemd-label.la \
+ libsystemd-internal.la \
+ libsystemd-shared.la
+
test_namespace_LDADD = \
 libsystemd-core.la
```

```
diff --git a/man/systemctl.xml b/man/systemctl.xml
index c6f5842786..2d0678d18d 100644
--- a/man/systemctl.xml
+++ b/man/systemctl.xml
@@ -905,10 +905,11 @@ kobject_uevent 1 systemd-udev-kernel.socket systemd-udev.service
```

<term><command>list-unit-files  
<optional><replaceable>PATTERN...</replaceable></optional></command></term>

- <listitem>
    - <para>List installed unit files. If one or more
    - <replaceable>PATTERN</replaceable>s are specified, only
    - units whose filename (just the last component of the path)
    - matches one of them are shown.</para>
  - + <listitem>
    - + <para>List installed unit files and their enablement state
    - + (as reported by <command>is-enabled</command>). If one or
    - + more <replaceable>PATTERN</replaceable>s are specified,
    - + only units whose filename (just the last component of the
    - + path) matches one of them are shown.</para>
- </listitem>  
</varlistentry>

@@ -1108,6 +1109,11 @@ kobject\_uevent 1 systemd-udev-kernel.socket systemd-udev.service

```
    <entry>Unit file is not enabled.</entry>
    <entry>1</entry>
  </row>
+   <row>
+     <entry><literal>bad</literal></entry>
+     <entry>Unit file is invalid or another error occurred. Note that <command>is-enabled</command> will
not actually return this state, but print an error message instead. However the unit file listing printed by
<command>list-unit-files</command> might show it.</entry>
+     <entry>&gt; 0</entry>
+   </row>
  </tbody>
</tgroup>
</table>
```

diff --git a/src/core/dbus-manager.c b/src/core/dbus-manager.c

index 1ec350e034..faa124d926 100644

--- a/src/core/dbus-manager.c

+++ b/src/core/dbus-manager.c

@@ -1530,9 +1530,9 @@ static int method\_get\_unit\_file\_state(sd\_bus \*bus, sd\_bus\_message \*message, void

```
    scope = m->running_as == SYSTEMD_SYSTEM ? UNIT_FILE_SYSTEM : UNIT_FILE_USER;
```

```
-    state = unit_file_get_state(scope, NULL, name);
-    if (state < 0)
-        return state;
+    r = unit_file_get_state(scope, NULL, name, &state);
+    if (r < 0)
+        return r;
```

```
    return sd_bus_reply_method_return(message, "s", unit_file_state_to_string(state));
```

```
}
```

diff --git a/src/core/dbus-unit.c b/src/core/dbus-unit.c

```

index 625d21ab8b..227915efc2 100644
--- a/src/core/dbus-unit.c
+++ b/src/core/dbus-unit.c
@@ -919,7 +919,7 @@ static int bus_unit_set_transient_property(
    if (r < 0)
        return r;

-    if (!unit_name_is_valid(s, TEMPLATE_INVALID) || !endswith(s, ".slice"))
+    if (!unit_name_is_valid(s, UNIT_NAME_PLAIN) || !endswith(s, ".slice"))
        return sd_bus_error_setf(error, SD_BUS_ERROR_INVALID_ARGS, "Invalid slice name %s", s);

    if (isempty(s) {
@@ -967,7 +967,7 @@ static int bus_unit_set_transient_property(
        return r;

        while ((r = sd_bus_message_read(message, "s", &other) > 0) {
-            if (!unit_name_is_valid(other, TEMPLATE_INVALID))
+            if (!unit_name_is_valid(other, UNIT_NAME_PLAIN|UNIT_NAME_INSTANCE))
                return sd_bus_error_setf(error, SD_BUS_ERROR_INVALID_ARGS, "Invalid unit name %s",
other);

            if (mode != UNIT_CHECK) {
diff --git a/src/core/load-fragment.c b/src/core/load-fragment.c
index ec4cf4eefa..70c09188a3 100644
--- a/src/core/load-fragment.c
+++ b/src/core/load-fragment.c
@@ -3409,7 +3409,7 @@ static int open_follow(char **filename, FILE **_f, Set *names, char **_final) {
    * unit name. */
    name = basename(*filename);

-    if (unit_name_is_valid(name, TEMPLATE_VALID)) {
+    if (unit_name_is_valid(name, UNIT_NAME_ANY)) {

        id = set_get(names, name);
        if (!id) {
diff --git a/src/core/manager.c b/src/core/manager.c
index 7483a96ec6..bde17ce0be 100644
--- a/src/core/manager.c
+++ b/src/core/manager.c
@@ -1328,7 +1328,7 @@ int manager_load_unit_prepare(

    t = unit_name_to_type(name);

-    if (t == _UNIT_TYPE_INVALID || !unit_name_is_valid(name, TEMPLATE_INVALID))
+    if (t == _UNIT_TYPE_INVALID || !unit_name_is_valid(name,
UNIT_NAME_PLAIN|UNIT_NAME_INSTANCE))
        return sd_bus_error_setf(e, SD_BUS_ERROR_INVALID_ARGS, "Unit name %s is not valid.", name);

```

```

        ret = manager_get_unit(m, name);
diff --git a/src/core/snapshot.c b/src/core/snapshot.c
index b1d8448771..f222ec232f 100644
--- a/src/core/snapshot.c
+++ b/src/core/snapshot.c
@@ -201,7 +201,7 @@ int snapshot_create(Manager *m, const char *name, bool cleanup, sd_bus_error *e,
        assert(_s);

        if (name) {
-            if (!unit_name_is_valid(name, TEMPLATE_INVALID))
+            if (!unit_name_is_valid(name, UNIT_NAME_PLAIN))
                return sd_bus_error_setf(e, SD_BUS_ERROR_INVALID_ARGS, "Unit name %s is not valid.",
name);

                if (unit_name_to_type(name) != UNIT_SNAPSHOT)
diff --git a/src/core/unit.c b/src/core/unit.c
index 4fb2fd3001..db5aa987ec 100644
--- a/src/core/unit.c
+++ b/src/core/unit.c
@@ -158,7 +158,7 @@ int unit_add_name(Unit *u, const char *text) {
        if (!s)
            return -ENOMEM;

-        if (!unit_name_is_valid(s, TEMPLATE_INVALID))
+        if (!unit_name_is_valid(s, UNIT_NAME_PLAIN|UNIT_NAME_INSTANCE))
            return -EINVAL;

        assert_se((t = unit_name_to_type(s)) >= 0);
@@ -3119,12 +3119,18 @@ int unit_following_set(Unit *u, Set **s) {
}

UnitFileState unit_get_unit_file_state(Unit *u) {
+    int r;
+
        assert(u);

-        if (u->unit_file_state < 0 && u->fragment_path)
-            u->unit_file_state = unit_file_get_state(
-                u->manager->running_as == SYSTEMD_SYSTEM ? UNIT_FILE_SYSTEM :
UNIT_FILE_USER,
-                NULL, basename(u->fragment_path));
+        if (u->unit_file_state < 0 && u->fragment_path) {
+            r = unit_file_get_state(u->manager->running_as == SYSTEMD_SYSTEM ? UNIT_FILE_SYSTEM :
UNIT_FILE_USER,
+                NULL,
+                basename(u->fragment_path),
+                &u->unit_file_state);
+            if (r < 0)

```

```

+         u->unit_file_state = UNIT_FILE_BAD;
+     }

    return u->unit_file_state;
}
@@ -3135,7 +3141,8 @@ int unit_get_unit_file_preset(Unit *u) {
    if (u->unit_file_preset < 0 && u->fragment_path)
        u->unit_file_preset = unit_file_query_preset(
            u->manager->running_as == SYSTEMD_SYSTEM ? UNIT_FILE_SYSTEM :
UNIT_FILE_USER,
-            NULL, basename(u->fragment_path));
+            NULL,
+            basename(u->fragment_path));

    return u->unit_file_preset;
}
diff --git a/src/dbus1-generator/dbus1-generator.c b/src/dbus1-generator/dbus1-generator.c
index 2e08af2df2..c909a4b1da 100644
--- a/src/dbus1-generator/dbus1-generator.c
+++ b/src/dbus1-generator/dbus1-generator.c
@@ -188,7 +188,7 @@ static int add_dbus(const char *path, const char *fname, const char *type) {
    }

    if (service) {
-        if (!unit_name_is_valid(service, TEMPLATE_INVALID)) {
+        if (!unit_name_is_valid(service, UNIT_NAME_PLAIN|UNIT_NAME_INSTANCE)) {
            log_warning("Unit name %s is not valid, ignoring.", service);
            return 0;
        }
}
diff --git a/src/firstboot/firstboot.c b/src/firstboot/firstboot.c
index a37ca170fb..b77c1d8879 100644
--- a/src/firstboot/firstboot.c
+++ b/src/firstboot/firstboot.c
@@ -50,8 +50,6 @@ static bool arg_copy_locale = false;
static bool arg_copy_timezone = false;
static bool arg_copy_root_password = false;

-#define prefix_roota(p) (arg_root ? (const char*) strjoina(arg_root, p) : (const char*) p)
-
static void clear_string(char *x) {

    if (!x)
@@ -85,13 +83,13 @@ static void print_welcome(void) {
    if (done)
        return;

-    os_release = prefix_roota("/etc/os-release");
+    os_release = prefix_roota(arg_root, "/etc/os-release");
}

```



```

r = parse_env_file(os_release, NEWLINE,
    "PRETTY_NAME", &pretty_name,
    NULL);
if (r == -ENOENT) {

-     os_release = prefix_roota("/usr/lib/os-release");
+     os_release = prefix_roota(arg_root, "/usr/lib/os-release");
    r = parse_env_file(os_release, NEWLINE,
        "PRETTY_NAME", &pretty_name,
        NULL);
@@ -249,7 +247,7 @@ static int process_locale(void) {
    unsigned i = 0;
    int r;

-     etc_localeconf = prefix_roota("/etc/locale.conf");
+     etc_localeconf = prefix_roota(arg_root, "/etc/locale.conf");
    if (faccessat(AT_FDCWD, etc_localeconf, F_OK, AT_SYMLINK_NOFOLLOW) >= 0)
        return 0;

@@ -323,7 +321,7 @@ static int process_timezone(void) {
    const char *etc_localtime, *e;
    int r;

-     etc_localtime = prefix_roota("/etc/localtime");
+     etc_localtime = prefix_roota(arg_root, "/etc/localtime");
    if (faccessat(AT_FDCWD, etc_localtime, F_OK, AT_SYMLINK_NOFOLLOW) >= 0)
        return 0;

@@ -402,7 +400,7 @@ static int process_hostname(void) {
    const char *etc_hostname;
    int r;

-     etc_hostname = prefix_roota("/etc/hostname");
+     etc_hostname = prefix_roota(arg_root, "/etc/hostname");
    if (faccessat(AT_FDCWD, etc_hostname, F_OK, AT_SYMLINK_NOFOLLOW) >= 0)
        return 0;

@@ -427,7 +425,7 @@ static int process_machine_id(void) {
    char id[SD_ID128_STRING_MAX];
    int r;

-     etc_machine_id = prefix_roota("/etc/machine-id");
+     etc_machine_id = prefix_roota(arg_root, "/etc/machine-id");
    if (faccessat(AT_FDCWD, etc_machine_id, F_OK, AT_SYMLINK_NOFOLLOW) >= 0)
        return 0;

@@ -453,7 +451,7 @@ static int prompt_root_password(void) {
    if (!arg_prompt_root_password)

```

```

        return 0;

-   etc_shadow = prefix_roota("/etc/shadow");
+   etc_shadow = prefix_roota(arg_root, "/etc/shadow");
    if (faccessat(AT_FDCWD, etc_shadow, F_OK, AT_SYMLINK_NOFOLLOW) >= 0)
        return 0;

@@ -542,7 +540,7 @@ static int process_root_password(void) {
    const char *etc_shadow;
    int r;

-   etc_shadow = prefix_roota("/etc/shadow");
+   etc_shadow = prefix_roota(arg_root, "/etc/shadow");
    if (faccessat(AT_FDCWD, etc_shadow, F_OK, AT_SYMLINK_NOFOLLOW) >= 0)
        return 0;

diff --git a/src/shared/cgroup-util.c b/src/shared/cgroup-util.c
index dfd8689b72..cf757d2b23 100644
--- a/src/shared/cgroup-util.c
+++ b/src/shared/cgroup-util.c
@@ -1147,7 +1147,7 @@ int cg_path_decode_unit(const char *cgroup, char **unit){
    c = strndupa(cgroup, e - cgroup);
    c = cg_unescape(c);

-   if (!unit_name_is_valid(c, TEMPLATE_INVALID))
+   if (!unit_name_is_valid(c, UNIT_NAME_PLAIN|UNIT_NAME_INSTANCE))
        return -EINVAL;

    s = strdup(c);
@@ -1536,7 +1536,7 @@ int cg_slice_to_path(const char *unit, char **ret) {
    assert(unit);
    assert(ret);

-   if (!unit_name_is_valid(unit, TEMPLATE_INVALID))
+   if (!unit_name_is_valid(unit, UNIT_NAME_PLAIN))
        return -EINVAL;

    if (!endswith(unit, ".slice"))
@@ -1553,7 +1553,7 @@ int cg_slice_to_path(const char *unit, char **ret) {

    strcpy(stpcpy(n, p, dash - p), ".slice");

-   if (!unit_name_is_valid(n, TEMPLATE_INVALID))
+   if (!unit_name_is_valid(n, UNIT_NAME_PLAIN))
        return -EINVAL;

    escaped = cg_escape(n);
diff --git a/src/shared/install.c b/src/shared/install.c

```

```

index aa197e91b9..5288bb4501 100644
--- a/src/shared/install.c
+++ b/src/shared/install.c
@@ -39,15 +39,24 @@
#include "specifier.h"
#include "install-printf.h"
#include "special.h"
+#include "fileio.h"
+
+#define UNIT_FILE_FOLLOW_SYMLINK_MAX 64
+
+typedef enum SearchFlags {
+    SEARCH_LOAD = 1,
+    SEARCH_FOLLOW_CONFIG_SYMLINKS = 2,
+} SearchFlags;

typedef struct {
-    OrderedHashMap *will_install;
-    OrderedHashMap *have_installed;
+    OrderedHashMap *will_process;
+    OrderedHashMap *have_processed;
} InstallContext;

static int in_search_path(const char *path, char **search) {
    _cleanup_free_ char *parent = NULL;
    int r;
+    char **i;

    assert(path);

@@ -55,7 +64,11 @@ static int in_search_path(const char *path, char **search) {
    if (r < 0)
        return r;

-    return strv_contains(search, parent);
+    STRV_FOREACH(i, search)
+        if (path_equal(parent, *i))
+            return true;
+
+    return false;
}

static int get_config_path(UnitFileScope scope, bool runtime, const char *root_dir, char **ret) {
@@ -66,6 +79,9 @@ static int get_config_path(UnitFileScope scope, bool runtime, const char *root_d
    assert(scope < _UNIT_FILE_SCOPE_MAX);
    assert(ret);

+    /* This determines where we shall create or remove our

```

```

+     * installation ("configuration") symlinks */
+
+     switch (scope) {
+
+         case UNIT_FILE_SYSTEM:
+@@ -113,6 +129,186 @@ static int get_config_path(UnitFileScope scope, bool runtime, const char *root_d
+         return 0;
+     }
+
+static bool is_config_path(UnitFileScope scope, const char *path) {
+     int r;
+
+     assert(scope >= 0);
+     assert(scope < _UNIT_FILE_SCOPE_MAX);
+     assert(path);
+
+     /* Checks whether the specified path is intended for
+     * configuration or is outside of it */
+
+     switch (scope) {
+
+     case UNIT_FILE_SYSTEM:
+     case UNIT_FILE_GLOBAL:
+         return path_startswith(path, "/etc") ||
+                path_startswith(path, SYSTEM_CONFIG_UNIT_PATH) ||
+                path_startswith(path, "/run");
+
+     case UNIT_FILE_USER: {
+         _cleanup_free_ char *p = NULL;
+
+         r = user_config_home(&p);
+         if (r < 0)
+             return r;
+         if (r > 0 && path_startswith(path, p))
+             return true;
+
+         free(p);
+         p = NULL;
+
+         r = user_runtime_dir(&p);
+         if (r < 0)
+             return r;
+         if (r > 0 && path_startswith(path, p))
+             return true;
+
+         return false;
+     }
+ }

```

```

+
+   default:
+       assert_not_reached("Bad scope");
+   }
+}
+
+
+static int verify_root_dir(UnitFileScope scope, const char **root_dir) {
+   int r;
+
+   assert(root_dir);
+
+   /* Verifies that the specified root directory to operate on
+    * makes sense. Reset it to NULL if it is the root directory
+    * or set to empty */
+
+   if (isempty(*root_dir) || path_equal(*root_dir, "/")) {
+       *root_dir = NULL;
+       return 0;
+   }
+
+   if (scope != UNIT_FILE_SYSTEM)
+       return -EINVAL;
+
+   r = is_dir(*root_dir, true);
+   if (r < 0)
+       return r;
+   if (r == 0)
+       return -ENOTDIR;
+
+   return 0;
+}
+
+int unit_file_changes_add(
+   UnitFileChange **changes,
+   unsigned *n_changes,
+   UnitFileChangeType type,
+   const char *path,
+   const char *source) {
+
+   UnitFileChange *c;
+   unsigned i;
+
+   assert(path);
+   assert(!changes == !n_changes);
+
+   if (!changes)
+       return 0;

```

```

+
+   c = realloc(*changes, (*n_changes + 1) * sizeof(UnitFileChange));
+   if (!c)
+       return -ENOMEM;
+
+   *changes = c;
+   i = *n_changes;
+
+   c[i].type = type;
+   c[i].path = strdup(path);
+   if (!c[i].path)
+       return -ENOMEM;
+
+   path_kill_slashes(c[i].path);
+
+   if (source) {
+       c[i].source = strdup(source);
+       if (!c[i].source) {
+           free(c[i].path);
+           return -ENOMEM;
+       }
+
+       path_kill_slashes(c[i].path);
+   } else
+       c[i].source = NULL;
+
+   *n_changes = i+1;
+   return 0;
+}
+
+void unit_file_changes_free(UnitFileChange *changes, unsigned n_changes) {
+   unsigned i;
+
+   assert(changes || n_changes == 0);
+
+   if (!changes)
+       return;
+
+   for (i = 0; i < n_changes; i++) {
+       free(changes[i].path);
+       free(changes[i].source);
+   }
+
+   free(changes);
+}
+
+static int create_symlink(
+   const char *old_path,

```

```

+     const char *new_path,
+     bool force,
+     UnitFileChange **changes,
+     unsigned *n_changes) {
+
+     _cleanup_free_ char *dest = NULL;
+     int r;
+
+     assert(old_path);
+     assert(new_path);
+
+     /* Actually create a symlink, and remember that we did. Is
+      * smart enough to check if there's already a valid symlink in
+      * place. */
+
+     mkdir_parents_label(new_path, 0755);
+
+     if (symlink(old_path, new_path) >= 0) {
+         unit_file_changes_add(changes, n_changes, UNIT_FILE_SYMLINK, new_path, old_path);
+         return 0;
+     }
+
+     if (errno != EEXIST)
+         return -errno;
+
+     r = readlink_malloc(new_path, &dest);
+     if (r < 0)
+         return r;
+
+     if (path_equal(dest, old_path))
+         return 0;
+
+     if (!force)
+         return -EEXIST;
+
+     r = symlink_atomic(old_path, new_path);
+     if (r < 0)
+         return r;
+
+     unit_file_changes_add(changes, n_changes, UNIT_FILE_UNLINK, new_path, NULL);
+     unit_file_changes_add(changes, n_changes, UNIT_FILE_SYMLINK, new_path, old_path);
+
+     return 0;
+ }
+
+ static int mark_symlink_for_removal(
+     Set **remove_symlinks_to,
+     const char *p) {

```

```

@@ -136,7 +332,7 @@ static int mark_symlink_for_removal(
    if (r < 0)
        return r == -EEXIST ? 0 : r;

-    return 0;
+    return 1;
}

static int remove_marked_symlinks_fd(
@@ -144,10 +340,9 @@ static int remove_marked_symlinks_fd(
    int fd,
    const char *path,
    const char *config_path,
-    bool *deleted,
+    bool *restart,
    UnitFileChange **changes,
-    unsigned *n_changes,
-    char** instance_whitelist) {
+    unsigned *n_changes) {

    _cleanup_closedir_ DIR *d = NULL;
    int r = 0;
@@ -156,7 +351,7 @@ static int remove_marked_symlinks_fd(
    assert(fd >= 0);
    assert(path);
    assert(config_path);
-    assert(deleted);
+    assert(restart);

    d = fdopendir(fd);
    if (!d) {
@@ -205,42 +400,23 @@ static int remove_marked_symlinks_fd(
    }

    /* This will close nfd, regardless whether it succeeds or not */
-    q = remove_marked_symlinks_fd(remove_symlinks_to, nfd, p, config_path, deleted, changes,
n_changes, instance_whitelist);
+    q = remove_marked_symlinks_fd(remove_symlinks_to, nfd, p, config_path, restart, changes,
n_changes);
    if (q < 0 && r == 0)
        r = q;

    } else if (de->d_type == DT_LNK) {
        _cleanup_free_ char *p = NULL, *dest = NULL;
-        int q;
        bool found;
+        int q;

```



```

-         if (!unit_name_is_valid(de->d_name, TEMPLATE_VALID))
+         if (!unit_name_is_valid(de->d_name, UNIT_NAME_ANY))
+             continue;

-         if (unit_name_is_instance(de->d_name) &&
-             instance_whitelist &&
-             !strv_contains(instance_whitelist, de->d_name)) {
-
-             _cleanup_free_ char *w;
-
-             /* OK, the file is not listed directly
-              * in the whitelist, so let's check if
-              * the template of it might be
-              * listed. */
-
-             w = unit_name_template(de->d_name);
-             if (!w)
-                 return -ENOMEM;
-
-             if (!strv_contains(instance_whitelist, w))
-                 continue;
-         }

-         p = path_make_absolute(de->d_name, path);
+         if (!p)
+             return -ENOMEM;

-         q = readlink_and_canonicalize(p, &dest);
+         q = readlink_malloc(p, &dest);
+         if (q < 0) {
+             if (q == -ENOENT)
+                 continue;
@@ -250,9 +426,15 @@ static int remove_marked_symlinks_fd(
+             continue;
+         }

+         /* We remove all links pointing to a file or
+          * path that is marked, as well as all files
+          * sharing the same name as a file that is
+          * marked. */

+         found =
-             set_get(remove_symlinks_to, dest) ||
-             set_get(remove_symlinks_to, basename(dest));
+             set_contains(remove_symlinks_to, dest) ||
+             set_contains(remove_symlinks_to, basename(dest)) ||
+             set_contains(remove_symlinks_to, de->d_name);

```

```

        if (!found)
            continue;
@@ -264,18 +446,15 @@ static int remove_marked_symlinks_fd(
    }

    path_kill_slashes(p);
-    rmdir_parents(p, config_path);
-    unit_file_changes_add(changes, n_changes, UNIT_FILE_UNLINK, p, NULL);
+    (void) rmdir_parents(p, config_path);

-    if (!set_get(remove_symlinks_to, p)) {
+    unit_file_changes_add(changes, n_changes, UNIT_FILE_UNLINK, p, NULL);

-        q = mark_symlink_for_removal(&remove_symlinks_to, p);
-        if (q < 0) {
-            if (r == 0)
-                r = q;
-        } else
-            *deleted = true;
-    }
+    q = mark_symlink_for_removal(&remove_symlinks_to, p);
+    if (q < 0)
+        return q;
+    if (q > 0)
+        *restart = true;
    }
}

```

```

@@ -286,12 +465,11 @@ static int remove_marked_symlinks(
    Set *remove_symlinks_to,
    const char *config_path,
    UnitFileChange **changes,
-    unsigned *n_changes,
-    char** instance_whitelist) {
+    unsigned *n_changes) {

```

```

    _cleanup_close_ int fd = -1;
    int r = 0;
-    bool deleted;
+    bool restart;

```

```

    assert(config_path);

```

```

@@ -304,7 +482,7 @@ static int remove_marked_symlinks(

```

```

    do {
        int q, cfd;
-        deleted = false;

```

```

+         restart = false;

        cfd = fcntl(fd, F_DUPFD_CLOEXEC, 3);
        if (cfd < 0) {
@@ -313,15 +491,16 @@ static int remove_marked_symlinks(
        }

        /* This takes possession of cfd and closes it */
-        q = remove_marked_symlinks_fd(remove_symlinks_to, cfd, config_path, config_path, &deleted,
changes, n_changes, instance_whitelist);
+        q = remove_marked_symlinks_fd(remove_symlinks_to, cfd, config_path, config_path, &restart,
changes, n_changes);
        if (r == 0)
            r = q;
-        } while (deleted);
+        } while (restart);

        return r;
    }

static int find_symlinks_fd(
+        const char *root_dir,
        const char *name,
        int fd,
        const char *path,
@@ -380,7 +559,7 @@ static int find_symlinks_fd(
    }

    /* This will close nfd, regardless whether it succeeds or not */
-        q = find_symlinks_fd(name, nfd, p, config_path, same_name_link);
+        q = find_symlinks_fd(root_dir, name, nfd, p, config_path, same_name_link);
    if (q > 0)
        return 1;
    if (r == 0)
@@ -397,7 +576,7 @@ static int find_symlinks_fd(
        return -ENOMEM;

        /* Acquire symlink destination */
-        q = readlink_and_canonicalize(p, &dest);
+        q = readlink_malloc(p, &dest);
    if (q < 0) {
        if (q == -ENOENT)
            continue;
@@ -407,6 +586,18 @@ static int find_symlinks_fd(
        continue;
@@ -407,6 +586,18 @@ static int find_symlinks_fd(
    }

+        /* Make absolute */

```

```

+         if (!path_is_absolute(dest)) {
+             char *x;
+
+             x = prefix_root(root_dir, dest);
+             if (!x)
+                 return -ENOMEM;
+
+             free(dest);
+             dest = x;
+         }
+
+         /* Check if the symlink itself matches what we
+          * are looking for */
+         if (path_is_absolute(name))
@@ -442,6 +633,7 @@ static int find_symlinks_fd(
    }

static int find_symlinks(
+     const char *root_dir,
+     const char *name,
+     const char *config_path,
+     bool *same_name_link) {
@@ -460,7 +652,7 @@ static int find_symlinks(
    }

    /* This takes possession of fd and closes it */
-    return find_symlinks_fd(name, fd, config_path, config_path, same_name_link);
+    return find_symlinks_fd(root_dir, name, fd, config_path, config_path, same_name_link);
}

static int find_symlinks_in_scope(
@@ -469,385 +661,104 @@ static int find_symlinks_in_scope(
    const char *name,
    UnitFileState *state) {

-    int r;
+     int r;

    _cleanup_free_ char *normal_path = NULL, *runtime_path = NULL;
    bool same_name_link_runtime = false, same_name_link = false;

+     int r;

    assert(scope >= 0);
    assert(scope < _UNIT_FILE_SCOPE_MAX);
    assert(name);

-    /* First look in runtime config path */
-    r = get_config_path(scope, true, root_dir, &normal_path);
+    /* First look in the normal config path */
+    r = get_config_path(scope, false, root_dir, &normal_path);

```

```

if (r < 0)
    return r;

-   r = find_symlinks(name, normal_path, &same_name_link_runtime);
+   r = find_symlinks(root_dir, name, normal_path, &same_name_link);
if (r < 0)
    return r;
-   else if (r > 0) {
-       *state = UNIT_FILE_ENABLED_RUNTIME;
+   if (r > 0) {
+       *state = UNIT_FILE_ENABLED;
    return r;
}

-   /* Then look in the normal config path */
-   r = get_config_path(scope, false, root_dir, &runtime_path);
+   /* Then look in runtime config path */
+   r = get_config_path(scope, true, root_dir, &runtime_path);
if (r < 0)
    return r;

-   r = find_symlinks(name, runtime_path, &same_name_link);
+   r = find_symlinks(root_dir, name, runtime_path, &same_name_link_runtime);
if (r < 0)
    return r;
-   else if (r > 0) {
-       *state = UNIT_FILE_ENABLED;
+   if (r > 0) {
+       *state = UNIT_FILE_ENABLED_RUNTIME;
    return r;
}

/* Hmm, we didn't find it, but maybe we found the same name
 * link? */
+   if (same_name_link) {
+       *state = UNIT_FILE_LINKED;
+       return 1;
+   }
if (same_name_link_runtime) {
    *state = UNIT_FILE_LINKED_RUNTIME;
    return 1;
-   } else if (same_name_link) {
-       *state = UNIT_FILE_LINKED;
-       return 1;
}

return 0;
}

```

```

-int unit_file_mask(
-     UnitFileScope scope,
-     bool runtime,
-     const char *root_dir,
-     char **files,
-     bool force,
-     UnitFileChange **changes,
-     unsigned *n_changes) {
-
-     char **i;
-     _cleanup_free_ char *prefix = NULL;
-     int r;
+static void install_info_free(InstallInfo *i) {
-
-     assert(scope >= 0);
-     assert(scope < _UNIT_FILE_SCOPE_MAX);
+     if (!i)
+         return;
-
-     r = get_config_path(scope, runtime, root_dir, &prefix);
-     if (r < 0)
-         return r;
+     free(i->name);
+     free(i->path);
+     strv_free(i->aliases);
+     strv_free(i->wanted_by);
+     strv_free(i->required_by);
+     strv_free(i->also);
+     free(i->default_instance);
+     free(i->symlink_target);
+     free(i);
+ }
-
-     STRV_FOREACH(i, files) {
-         _cleanup_free_ char *path = NULL;
+static OrderedHashmap* install_info_hashmap_free(OrderedHashmap *m) {
+     InstallInfo *i;
-
-         if (!unit_name_is_valid(*i, TEMPLATE_VALID)) {
-             if (r == 0)
-                 r = -EINVAL;
-             continue;
-         }
+     while ((i = ordered_hashmap_steal_first(m)))
+         install_info_free(i);
-
-         path = path_make_absolute(*i, prefix);

```

```

-         if (!path) {
-             r = -ENOMEM;
-             break;
-         }
+ ordered_hashmap_free(m);

-         if (symlink("/dev/null", path) >= 0) {
-             unit_file_changes_add(changes, n_changes, UNIT_FILE_SYMLINK, path, "/dev/null");
-             continue;
-         }
+ return NULL;
+ }

-         if (errno == EEXIST) {
+static void install_context_done(InstallContext *c) {
+     assert(c);

-             if (null_or_empty_path(path) > 0)
-                 continue;
+     c->will_process = install_info_hashmap_free(c->will_process);
+     c->have_processed = install_info_hashmap_free(c->have_processed);
+ }

-             if (force) {
-                 if (symlink_atomic("/dev/null", path) >= 0) {
-                     unit_file_changes_add(changes, n_changes, UNIT_FILE_UNLINK, path, NULL);
-                     unit_file_changes_add(changes, n_changes, UNIT_FILE_SYMLINK, path, "/dev/null");
-                     continue;
-                 }
-             }
+static InstallInfo *install_info_find(InstallContext *c, const char *name) {
+     InstallInfo *i;

-             if (r == 0)
-                 r = -EEXIST;
-             } else {
-                 if (r == 0)
-                     r = -errno;
-             }
-         }
+     i = ordered_hashmap_get(c->have_processed, name);
+     if (i)
+         return i;

-     return r;
- }
-
-int unit_file_unmask(

```

```

-     UnitFileScope scope,
-     bool runtime,
-     const char *root_dir,
-     char **files,
-     UnitFileChange **changes,
-     unsigned *n_changes) {
-
-
-     char **i, *config_path = NULL;
-     int r, q;
-     Set *remove_symlinks_to = NULL;
-
-     assert(scope >= 0);
-     assert(scope < _UNIT_FILE_SCOPE_MAX);
-
-     r = get_config_path(scope, runtime, root_dir, &config_path);
-     if (r < 0)
-         goto finish;
-
-     STRV_FOREACH(i, files) {
-         _cleanup_free_char *path = NULL;
-
-         if (!unit_name_is_valid(*i, TEMPLATE_VALID)) {
-             if (r == 0)
-                 r = -EINVAL;
-             continue;
-         }
-
-         path = path_make_absolute(*i, config_path);
-         if (!path) {
-             r = -ENOMEM;
-             break;
-         }
-
-         q = null_or_empty_path(path);
-         if (q > 0) {
-             if (unlink(path) < 0)
-                 q = -errno;
-             else {
-                 q = mark_symlink_for_removal(&remove_symlinks_to, path);
-                 unit_file_changes_add(changes, n_changes, UNIT_FILE_UNLINK, path, NULL);
-             }
-         }
-
-         if (q != -ENOENT && r == 0)
-             r = q;
-     }
-
- }

```



```

-finish:
-   q = remove_marked_symlinks(remove_symlinks_to, config_path, changes, n_changes, files);
-   if (r == 0)
-       r = q;
-
-   set_free_free(remove_symlinks_to);
-   free(config_path);
-
-   return r;
-}
-
-int unit_file_link(
-   UnitFileScope scope,
-   bool runtime,
-   const char *root_dir,
-   char **files,
-   bool force,
-   UnitFileChange **changes,
-   unsigned *n_changes) {
-
-   _cleanup_lookup_paths_free_ LookupPaths paths = {};
-   char **i;
-   _cleanup_free_ char *config_path = NULL;
-   int r, q;
-
-   assert(scope >= 0);
-   assert(scope < _UNIT_FILE_SCOPE_MAX);
-
-   r = lookup_paths_init_from_scope(&paths, scope, root_dir);
-   if (r < 0)
-       return r;
-
-   r = get_config_path(scope, runtime, root_dir, &config_path);
-   if (r < 0)
-       return r;
-
-   STRV_FOREACH(i, files) {
-       _cleanup_free_ char *path = NULL;
-       char *fn;
-       struct stat st;
-
-       fn = basename(*i);
-
-       if (!path_is_absolute(*i) ||
-           !unit_name_is_valid(fn, TEMPLATE_VALID)) {
-           if (r == 0)
-               r = -EINVAL;
-           continue;
-       }
-   }
-}

```

```

-     }
-
-     if (lstat(*i, &st) < 0) {
-         if (r == 0)
-             r = -errno;
-         continue;
-     }
-
-     if (!S_ISREG(st.st_mode)) {
-         r = -ENOENT;
-         continue;
-     }
-
-     q = in_search_path(*i, paths.unit_path);
-     if (q < 0)
-         return q;
-
-     if (q > 0)
-         continue;
-
-     path = path_make_absolute(fn, config_path);
-     if (!path)
-         return -ENOMEM;
-
-     if (symlink(*i, path) >= 0) {
-         unit_file_changes_add(changes, n_changes, UNIT_FILE_SYMLINK, path, *i);
-         continue;
-     }
-
-     if (errno == EEXIST) {
-         _cleanup_free_ char *dest = NULL;
-
-         q = readlink_and_make_absolute(path, &dest);
-         if (q < 0 && errno != ENOENT) {
-             if (r == 0)
-                 r = q;
-             continue;
-         }
-
-         if (q >= 0 && path_equal(dest, *i))
-             continue;
-
-         if (force) {
-             if (symlink_atomic(*i, path) >= 0) {
-                 unit_file_changes_add(changes, n_changes, UNIT_FILE_UNLINK, path, NULL);
-                 unit_file_changes_add(changes, n_changes, UNIT_FILE_SYMLINK, path, *i);
-                 continue;
-             }

```

```

-         }
-
-         if (r == 0)
-             r = -EEXIST;
-     } else {
-         if (r == 0)
-             r = -errno;
-     }
- }
-
- return r;
-}
-
-void unit_file_list_free(Hashmap *h) {
-    UnitFileList *i;
-
-    while ((i = hashmap_steal_first(h))) {
-        free(i->path);
-        free(i);
-    }
-
-    hashmap_free(h);
-}
-
-int unit_file_changes_add(
-    UnitFileChange **changes,
-    unsigned *n_changes,
-    UnitFileChangeType type,
-    const char *path,
-    const char *source) {
-
-    UnitFileChange *c;
-    unsigned i;
-
-    assert(path);
-    assert(!changes == !n_changes);
-
-    if (!changes)
-        return 0;
-
-    c = realloc(*changes, (*n_changes + 1) * sizeof(UnitFileChange));
-    if (!c)
-        return -ENOMEM;
-
-    *changes = c;
-    i = *n_changes;
-
-    c[i].type = type;

```

```

-   c[i].path = strdup(path);
-   if (!c[i].path)
-       return -ENOMEM;
-
-   path_kill_slashes(c[i].path);
-
-   if (source) {
-       c[i].source = strdup(source);
-       if (!c[i].source) {
-           free(c[i].path);
-           return -ENOMEM;
-       }
-
-       path_kill_slashes(c[i].path);
-   } else
-       c[i].source = NULL;
-
-   *n_changes = i+1;
-   return 0;
-}
-
-void unit_file_changes_free(UnitFileChange *changes, unsigned n_changes) {
-   unsigned i;
-
-   assert(changes || n_changes == 0);
-
-   if (!changes)
-       return;
-
-   for (i = 0; i < n_changes; i++) {
-       free(changes[i].path);
-       free(changes[i].source);
-   }
-
-   free(changes);
-}
-
-static void install_info_free(InstallInfo *i) {
-   assert(i);
-
-   free(i->name);
-   free(i->path);
-   strv_free(i->aliases);
-   strv_free(i->wanted_by);
-   strv_free(i->required_by);
-   strv_free(i->also);
-   free(i->default_instance);
-   free(i);

```

```

-}
-
-static void install_info_hashmap_free(OrderedHashmap *m) {
-    InstallInfo *i;
-
-    if (!m)
-        return;
-
-    while ((i = ordered_hashmap_steal_first(m)))
-        install_info_free(i);
-
-    ordered_hashmap_free(m);
-}
-
-static void install_context_done(InstallContext *c) {
-    assert(c);
-
-    install_info_hashmap_free(c->will_install);
-    install_info_hashmap_free(c->have_installed);
-
-    c->will_install = c->have_installed = NULL;
+    return ordered_hashmap_get(c->will_process, name);
}

static int install_info_add(
    InstallContext *c,
    const char *name,
-    const char *path) {
+    const char *path,
+    InstallInfo **ret) {
+
    InstallInfo *i = NULL;
    int r;

@@ -857,20 +768,24 @@ static int install_info_add(
    if (!name)
        name = basename(path);

-    if (!unit_name_is_valid(name, TEMPLATE_VALID))
+    if (!unit_name_is_valid(name, UNIT_NAME_ANY))
        return -EINVAL;

-    if (ordered_hashmap_get(c->have_installed, name) ||
-        ordered_hashmap_get(c->will_install, name))
+    i = install_info_find(c, name);
+    if (i) {
+        if (ret)
+            *ret = i;

```

```

        return 0;
+   }

-   r = ordered_hashmap_ensure_allocated(&c->will_install, &string_hash_ops);
+   r = ordered_hashmap_ensure_allocated(&c->will_process, &string_hash_ops);
    if (r < 0)
        return r;

    i = new0(InstallInfo, 1);
    if (!i)
        return -ENOMEM;
+   i->type = _UNIT_FILE_TYPE_INVALID;

    i->name = strdup(name);
    if (!i->name) {
@@ -886,10 +801,13 @@ static int install_info_add(
    }
}

-   r = ordered_hashmap_put(c->will_install, i->name, i);
+   r = ordered_hashmap_put(c->will_process, i->name, i);
    if (r < 0)
        goto fail;

+   if (ret)
+       *ret = i;
+
    return 0;

fail:
@@ -901,15 +819,16 @@ fail:

static int install_info_add_auto(
    InstallContext *c,
-   const char *name_or_path) {
+   const char *name_or_path,
+   InstallInfo **ret) {

    assert(c);
    assert(name_or_path);

    if (path_is_absolute(name_or_path))
-       return install_info_add(c, NULL, name_or_path);
+       return install_info_add(c, NULL, name_or_path, ret);
    else
-       return install_info_add(c, name_or_path, NULL);
+       return install_info_add(c, name_or_path, NULL, ret);
}

```

```

static int config_parse_also(
@@ -928,6 +847,7 @@ static int config_parse_also(
    const char *word, *state;
    InstallContext *c = data;
    InstallInfo *i = userdata;
+   int r;

    assert(filename);
    assert(lvalue);
@@ -935,19 +855,20 @@ static int config_parse_also(

    FOREACH_WORD_QUOTED(word, l, rvalue, state) {
        _cleanup_free_char *n;
-       int r;

        n = strdup(word, l);
        if (!n)
            return -ENOMEM;

-       r = install_info_add(c, n, NULL);
+       r = install_info_add(c, n, NULL, NULL);
        if (r < 0)
            return r;

-       r = strv_extend(&i->also, n);
+       r = strv_push(&i->also, n);
        if (r < 0)
            return r;

+       n = NULL;
    }
    if (!isempty(state))
        log_syntax(unit, LOG_ERR, filename, line, EINVAL,
@@ -1026,9 +947,7 @@ static int unit_file_load(
    InstallInfo *info,
    const char *path,
    const char *root_dir,
-   bool allow_symlink,
-   bool load,
-   bool *also) {
+   SearchFlags flags) {

    const ConfigTableItem items[] = {
        { "Install", "Alias",          config_parse_strv,          0, &info->aliases          },
@@ -1041,7 +960,9 @@ static int unit_file_load(
    };

```

```

_cleanup_fclose_ FILE *f = NULL;
- int fd, r;
+ _cleanup_close_ int fd = -1;
+ struct stat st;
+ int r;

assert(c);
assert(info);
@@ -1050,20 +971,43 @@ static int unit_file_load(
if (!isempty(root_dir))
    path = strjoina(root_dir, "/", path);

- if (!load) {
-     r = access(path, F_OK) ? -errno : 0;
-     return r;
+ if (!(flags & SEARCH_LOAD)) {
+     r = lstat(path, &st);
+     if (r < 0)
+         return -errno;
+
+     if (null_or_empty(&st))
+         info->type = UNIT_FILE_TYPE_MASKED;
+     else if (S_ISREG(st.st_mode))
+         info->type = UNIT_FILE_TYPE_REGULAR;
+     else if (S_ISLNK(st.st_mode))
+         return -ELOOP;
+     else if (S_ISDIR(st.st_mode))
+         return -EISDIR;
+     else
+         return -ENOTTY;
+
+     return 0;
    }

- fd = open(path, O_RDONLY|O_CLOEXEC|O_NOCTTY|(allow_symlink ? 0 : O_NOFOLLOW));
+ fd = open(path, O_RDONLY|O_CLOEXEC|O_NOCTTY|O_NOFOLLOW);
if (fd < 0)
    return -errno;
+ if (fstat(fd, &st) < 0)
+     return -errno;
+ if (null_or_empty(&st)) {
+     info->type = UNIT_FILE_MASKED;
+     return 0;
+ }
+ if (S_ISDIR(st.st_mode))
+     return -EISDIR;
+ if (!S_ISREG(st.st_mode))
+     return -ENOTTY;

```



```

    f = fdopen(fd, "re");
-   if (!f) {
-       safe_close(fd);
-       return -ENOMEM;
-   }
+   if (!f)
+       return -errno;
+   fd = -1;

    r = config_parse(NULL, path, f,
                    NULL,
@@ -1072,8 +1016,7 @@ static int unit_file_load(
    if (r < 0)
        return r;

-   if (also)
-       *also = !strv_isempty(info->also);
+   info->type = UNIT_FILE_TYPE_REGULAR;

    return
        (int) strv_length(info->aliases) +
@@ -1081,14 +1024,73 @@ static int unit_file_load(
        (int) strv_length(info->required_by);
}

+static int unit_file_load_or_readlink(
+    InstallContext *c,
+    InstallInfo *info,
+    const char *path,
+    const char *root_dir,
+    SearchFlags flags) {
+
+    _cleanup_free_ char *np = NULL;
+    int r;
+
+    r = unit_file_load(c, info, path, root_dir, flags);
+    if (r != -ELOOP)
+        return r;
+
+    /* This is a symlink, let's read it. */
+
+    r = readlink_and_make_absolute_root(root_dir, path, &np);
+    if (r < 0)
+        return r;
+
+    if (path_equal(np, "/dev/null"))
+        info->type = UNIT_FILE_TYPE_MASKED;

```

```

+   else {
+       const char *bn;
+       UnitType a, b;
+
+       bn = basename(np);
+
+       if (unit_name_is_valid(info->name, UNIT_NAME_PLAIN)) {
+
+           if (!unit_name_is_valid(bn, UNIT_NAME_PLAIN))
+               return -EINVAL;
+
+           } else if (unit_name_is_valid(info->name, UNIT_NAME_INSTANCE)) {
+
+               if (!unit_name_is_valid(bn, UNIT_NAME_INSTANCE|UNIT_NAME_TEMPLATE))
+                   return -EINVAL;
+
+           } else if (unit_name_is_valid(info->name, UNIT_NAME_TEMPLATE)) {
+
+               if (!unit_name_is_valid(bn, UNIT_NAME_TEMPLATE))
+                   return -EINVAL;
+
+           } else
+               return -EINVAL;
+
+           /* Enforce that the symlink destination does not
+            * change the unit file type. */
+
+           a = unit_name_to_type(info->name);
+           b = unit_name_to_type(bn);
+           if (a < 0 || b < 0 || a != b)
+               return -EINVAL;
+
+           info->type = UNIT_FILE_TYPE_SYMLINK;
+           info->symlink_target = np;
+           np = NULL;
+       }
+
+       return 0;
+   }
+
+   static int unit_file_search(
+       InstallContext *c,
+       InstallInfo *info,
+       const LookupPaths *paths,
+       const char *root_dir,
+       -   bool allow_symlink,
+       -   bool load,
+       -   bool *also) {
+       SearchFlags flags) {

```

```

char **p;
int r;
@@ -1097,8 +1099,12 @@ static int unit_file_search(
    assert(info);
    assert(paths);

+   /* Was this unit already loaded? */
+   if (info->type != _UNIT_FILE_TYPE_INVALID)
+       return 0;
+
    if (info->path)
-       return unit_file_load(c, info, info->path, root_dir, allow_symlink, load, also);
+       return unit_file_load_or_readlink(c, info, info->path, root_dir, flags);

    assert(info->name);

@@ -1109,14 +1115,15 @@ static int unit_file_search(
    if (!path)
        return -ENOMEM;

-       r = unit_file_load(c, info, path, root_dir, allow_symlink, load, also);
-       if (r >= 0) {
+       r = unit_file_load_or_readlink(c, info, path, root_dir, flags);
+       if (r < 0) {
+           if (r != -ENOENT)
+               return r;
+       } else {
            info->path = path;
            path = NULL;
            return r;
        }
-       if (r != -ENOENT && r != -ELOOP)
-           return r;
    }

    if (unit_name_is_instance(info->name)) {
@@ -1138,92 +1145,149 @@ static int unit_file_search(
    if (!path)
        return -ENOMEM;

-       r = unit_file_load(c, info, path, root_dir, allow_symlink, load, also);
-       if (r >= 0) {
+       r = unit_file_load_or_readlink(c, info, path, root_dir, flags);
+       if (r < 0) {
+           if (r != -ENOENT)
+               return r;
+       } else {

```

```

        info->path = path;
        path = NULL;
        return r;
    }
-     if (r != -ENOENT && r != -ELOOP)
-         return r;
    }
}

return -ENOENT;
}

-static int unit_file_can_install(
-     const LookupPaths *paths,
+static int install_info_follow(
+     InstallContext *c,
+     InstallInfo *i,
+     const char *root_dir,
-     const char *name,
-     bool allow_symlink,
-     bool *also) {
+     SearchFlags flags) {
+
+     assert(c);
+     assert(i);
+
+     if (i->type != UNIT_FILE_TYPE_SYMLINK)
+         return -EINVAL;
+     if (!i->symlink_target)
+         return -EINVAL;
+
+     /* If the basename doesn't match, the caller should add a
+      * complete new entry for this. */
+
+     if (!streq(basename(i->symlink_target), i->name))
+         return -EXDEV;
+
+     free(i->path);
+     i->path = i->symlink_target;
+     i->symlink_target = NULL;
+     i->type = _UNIT_FILE_TYPE_INVALID;
+
+     return unit_file_load_or_readlink(c, i, i->path, root_dir, flags);
+}
+
+static int install_info_traverse(
+     UnitFileScope scope,
+     InstallContext *c,

```

```

+     const char *root_dir,
+     const LookupPaths *paths,
+     InstallInfo *start,
+     SearchFlags flags,
+     InstallInfo **ret) {

-     _cleanup_(install_context_done) InstallContext c = {};
InstallInfo *i;
+     unsigned k = 0;
int r;

    assert(paths);
-     assert(name);
+     assert(start);
+     assert(c);

-     r = install_info_add_auto(&c, name);
+     r = unit_file_search(c, start, paths, root_dir, flags);
if (r < 0)
    return r;

-     assert_se(i = ordered_hashmap_first(c.will_install));
+     i = start;
+     while (i->type == UNIT_FILE_TYPE_SYMLINK) {
+         /* Follow the symlink */

-     r = unit_file_search(&c, i, paths, root_dir, allow_symlink, true, also);
+         if (++k > UNIT_FILE_FOLLOW_SYMLINK_MAX)
+             return -ELOOP;

-     if (r >= 0)
-         r =
-             (int) strv_length(i->aliases) +
-             (int) strv_length(i->wanted_by) +
-             (int) strv_length(i->required_by);
+         if (!(flags & SEARCH_FOLLOW_CONFIG_SYMLINKS) && is_config_path(scope, i->path))
+             return -ELOOP;

-     return r;
- }
+     r = install_info_follow(c, i, root_dir, flags);
+     if (r < 0) {
+         _cleanup_free_char *buffer = NULL;
+         const char *bn;

-static int create_symlink(
-     const char *old_path,
-     const char *new_path,

```

```

-     bool force,
-     UnitFileChange **changes,
-     unsigned *n_changes) {
+         if (r != -EXDEV)
+             return r;

-     _cleanup_free_ char *dest = NULL;
-     int r;
+         /* Target has a different name, create a new
+          * install info object for that, and continue
+          * with that. */

-     assert(old_path);
-     assert(new_path);
+         bn = basename(i->symlink_target);

-     mkdir_parents_label(new_path, 0755);
+         if (unit_name_is_valid(i->name, UNIT_NAME_INSTANCE) &&
+             unit_name_is_valid(bn, UNIT_NAME_TEMPLATE)) {

-     if (symlink(old_path, new_path) >= 0) {
-         unit_file_changes_add(changes, n_changes, UNIT_FILE_SYMLINK, new_path, old_path);
-         return 0;
+         _cleanup_free_ char *instance = NULL;
+
+         r = unit_name_to_instance(i->name, &instance);
+         if (r < 0)
+             return r;
+
+         buffer = unit_name_replace_instance(bn, instance);
+         if (!buffer)
+             return -ENOMEM;
+
+         bn = buffer;
+     }

+     r = install_info_add(c, bn, NULL, &i);
+     if (r < 0)
+         return r;
+
+     r = unit_file_search(c, i, paths, root_dir, flags);
+     if (r < 0)
+         return r;
+     }

+     /* Try again, with the new target we found. */
}

```

```

-   if (errno != EEXIST)
-       return -errno;
+   if (ret)
+       *ret = i;

-   r = readlink_and_make_absolute(new_path, &dest);
-   if (r < 0)
-       return r;
+   return 0;
+}
+
+static int install_info_discover(
+    UnitFileScope scope,
+    InstallContext *c,
+    const char *root_dir,
+    const LookupPaths *paths,
+    const char *name,
+    SearchFlags flags,
+    InstallInfo **ret) {

-   if (path_equal(dest, old_path))
-       return 0;
+   InstallInfo *i;
+   int r;

-   if (!force)
-       return -EEXIST;
+   assert(c);
+   assert(paths);
+   assert(name);

-   r = symlink_atomic(old_path, new_path);
+   r = install_info_add_auto(c, name, &i);
  if (r < 0)
      return r;

-   unit_file_changes_add(changes, n_changes, UNIT_FILE_UNLINK, new_path, NULL);
-   unit_file_changes_add(changes, n_changes, UNIT_FILE_SYMLINK, new_path, old_path);
-
-   return 0;
+   return install_info_traverse(scope, c, root_dir, paths, i, flags, ret);
}

static int install_info_symlink_alias(
@@ -1298,7 +1362,7 @@ static int install_info_symlink_wants(
    if (q < 0)
        return q;

```

```

-     if (!unit_name_is_valid(dst, TEMPLATE_VALID)) {
+     if (!unit_name_is_valid(dst, UNIT_NAME_ANY)) {
+         r = -EINVAL;
+         continue;
+     }
@@ -1358,6 +1422,9 @@ static int install_info_apply(
    assert(paths);
    assert(config_path);

+    if (i->type != UNIT_FILE_TYPE_REGULAR)
+        return 0;
+
    r = install_info_symlink_alias(i, config_path, force, changes, n_changes);

    q = install_info_symlink_wants(i, config_path, i->wanted_by, ".wants/", force, changes, n_changes);
@@ -1376,53 +1443,59 @@ static int install_info_apply(
}

static int install_context_apply(
+    UnitFileScope scope,
+    InstallContext *c,
+    const LookupPaths *paths,
+    const char *config_path,
+    const char *root_dir,
+    bool force,
+    SearchFlags flags,
+    UnitFileChange **changes,
+    unsigned *n_changes) {

    InstallInfo *i;
-    int r, q;
+    int r;

    assert(c);
    assert(paths);
    assert(config_path);

-    if (!ordered_hashmap_isempty(c->will_install)) {
-        r = ordered_hashmap_ensure_allocated(&c->have_installed, &string_hash_ops);
-        if (r < 0)
-            return r;
+    if (ordered_hashmap_isempty(c->will_process))
+        return 0;

-        r = ordered_hashmap_reserve(c->have_installed, ordered_hashmap_size(c->will_install));
-        if (r < 0)
-            return r;
-    }

```



```

+   r = ordered_hashmap_ensure_allocated(&c->have_processed, &string_hash_ops);
+   if (r < 0)
+       return r;

    r = 0;
-   while ((i = ordered_hashmap_first(c->will_install)) {
-       assert_se(ordered_hashmap_move_one(c->have_installed, c->will_install, i->name) == 0);
+   while ((i = ordered_hashmap_first(c->will_process)) {
+       int q;

-       q = unit_file_search(c, i, paths, root_dir, false, true, NULL);
-       if (q < 0) {
-           if (r >= 0)
-               r = q;
+       q = ordered_hashmap_move_one(c->have_processed, c->will_process, i->name);
+       if (q < 0)
+           return q;

+       r = install_info_traverse(scope, c, root_dir, paths, i, flags, NULL);
+       if (r < 0)
+           return r;
-       } else if (r >= 0)
-           r += q;
+
+       if (i->type != UNIT_FILE_TYPE_REGULAR)
+           continue;

        q = install_info_apply(i, paths, config_path, root_dir, force, changes, n_changes);
-       if (r >= 0 && q < 0)
-           r = q;
+       if (r >= 0) {
+           if (q < 0)
+               r = q;
+           else
+               r += q;
+       }
    }

    return r;
}

static int install_context_mark_for_removal(
+   UnitFileScope scope,
+   InstallContext *c,
+   const LookupPaths *paths,
+   Set **remove_symlinks_to,
@@ -1430,96 +1503,109 @@ static int install_context_mark_for_removal(
    const char *root_dir) {

```

```

InstallInfo *i;
-   int r, q;
+   int r;

assert(c);
assert(paths);
assert(config_path);

/* Marks all items for removal */
-
-   if (!ordered_hashmap_isempty(c->will_install)) {
-       r = ordered_hashmap_ensure_allocated(&c->have_installed, &string_hash_ops);
+   if (!ordered_hashmap_isempty(c->will_process)) {
+       r = ordered_hashmap_ensure_allocated(&c->have_processed, &string_hash_ops);
        if (r < 0)
            return r;

-       r = ordered_hashmap_reserve(c->have_installed, ordered_hashmap_size(c->will_install));
+       r = ordered_hashmap_reserve(c->have_processed, ordered_hashmap_size(c->will_process));
        if (r < 0)
            return r;
    }

r = 0;
-   while ((i = ordered_hashmap_first(c->will_install))) {
-       assert_se(ordered_hashmap_move_one(c->have_installed, c->will_install, i->name) == 0);
-
-       q = unit_file_search(c, i, paths, root_dir, false, true, NULL);
-       if (q == -ENOENT) {
-           /* do nothing */
-       } else if (q < 0) {
-           if (r >= 0)
-               r = q;
+   while ((i = ordered_hashmap_first(c->will_process))) {
+
+       r = ordered_hashmap_move_one(c->have_processed, c->will_process, i->name);
+       if (r < 0)
+           return r;

+       r = install_info_traverse(scope, c, root_dir, paths, i,
SEARCH_LOAD|SEARCH_FOLLOW_CONFIG_SYMLINKS, NULL);
+       if (r < 0)
            return r;
-       } else if (r >= 0)
            r += q;
-
-       if (unit_name_is_instance(i->name)) {

```

```

-         char *unit_file;
-
-         if (i->path) {
-             unit_file = basename(i->path);
-
-             if (unit_name_is_instance(unit_file))
-                 /* unit file named as instance exists, thus all symlinks
-                  * pointing to it will be removed */
-                 q = mark_symlink_for_removal(remove_symlinks_to, i->name);
-             else
-                 /* does not exist, thus we will mark for removal symlinks
-                  * to template unit file */
-                 q = mark_symlink_for_removal(remove_symlinks_to, unit_file);
-         } else {
-             /* If i->path is not set, it means that we didn't actually find
-              * the unit file. But we can still remove symlinks to the
-              * nonexistent template. */
-             unit_file = unit_name_template(i->name);
-             if (!unit_file)
-                 return log_oom();
-
-             q = mark_symlink_for_removal(remove_symlinks_to, unit_file);
-             free(unit_file);
-         }
-     } else
-         q = mark_symlink_for_removal(remove_symlinks_to, i->name);
-
-     if (r >= 0 && q < 0)
+     if (i->type != UNIT_FILE_TYPE_REGULAR)
+         continue;
+
+     r = mark_symlink_for_removal(remove_symlinks_to, i->name);
+     if (r < 0)
+         return r;
+ }
+
+ return 0;
+}
+
+int unit_file_mask(
+    UnitFileScope scope,
+    bool runtime,
+    const char *root_dir,
+    char **files,
+    bool force,
+    UnitFileChange **changes,
+    unsigned *n_changes) {
+

```

```

+   _cleanup_free_ char *prefix = NULL;
+   char **i;
+   int r;
+
+   assert(scope >= 0);
+   assert(scope < _UNIT_FILE_SCOPE_MAX);
+
+   r = verify_root_dir(scope, &root_dir);
+   if (r < 0)
+       return r;
+
+   r = get_config_path(scope, runtime, root_dir, &prefix);
+   if (r < 0)
+       return r;
+
+   STRV_FOREACH(i, files) {
+       _cleanup_free_ char *path = NULL;
+       int q;
+       if (!unit_name_is_valid(*i, UNIT_NAME_ANY)) {
+           if (r == 0)
+               r = -EINVAL;
+           continue;
+       }
+
+       path = path_make_absolute(*i, prefix);
+       if (!path)
+           return -ENOMEM;
+
+       q = create_symlink("/dev/null", path, force, changes, n_changes);
+       if (q < 0 && r >= 0)
+           r = q;
+   }
+
+   return r;
+ }

-int unit_file_add_dependency(
+int unit_file_unmask(
+     UnitFileScope scope,
+     bool runtime,
+     const char *root_dir,
+     char **files,
-     char *target,
-     UnitDependency dep,
-     bool force,
+     UnitFileChange **changes,
+     unsigned *n_changes) {

```

```

-   _cleanup_lookup_paths_free_ LookupPaths paths = {};
-   _cleanup_(install_context_done) InstallContext c = {};
+   _cleanup_set_free_free_ Set *remove_symlinks_to = NULL;
    _cleanup_free_char *config_path = NULL;
+   _cleanup_free_char **todo = NULL;
+   size_t n_todo = 0, n_allocated = 0;
    char **i;
-   int r;
-   InstallInfo *info;
+   int r, q;

    assert(scope >= 0);
    assert(scope < _UNIT_FILE_SCOPE_MAX);

-   r = lookup_paths_init_from_scope(&paths, scope, root_dir);
+   r = verify_root_dir(scope, &root_dir);
    if (r < 0)
        return r;

@@ -1528,57 +1614,222 @@ int unit_file_add_dependency(
    return r;

    STRV_FOREACH(i, files) {
-       UnitFileState state;
+       _cleanup_free_char *path = NULL;

-       state = unit_file_get_state(scope, root_dir, *i);
-       if (state < 0)
-           return log_error_errno(state, "Failed to get unit file state for %s: %m", *i);
+       if (!unit_name_is_valid(*i, UNIT_NAME_ANY))
+           return -EINVAL;

-       if (state == UNIT_FILE_MASKED || state == UNIT_FILE_MASKED_RUNTIME) {
-           log_error("Failed to enable unit: Unit %s is masked", *i);
-           return -ENOTSUP;
-       }
+       path = path_make_absolute(*i, config_path);
+       if (!path)
+           return -ENOMEM;

-       r = install_info_add_auto(&c, *i);
+       r = null_or_empty_path(path);
+       if (r == -ENOENT)
+           continue;
        if (r < 0)
            return r;
+       if (r == 0)
+           continue;

```

```

+
+     if (!GREEDY_REALLOC0(todo, n_allocated, n_todo + 2))
+         return -ENOMEM;
+
+     todo[n_todo++] = *i;
+ }
-
- if (!ordered_hashmap_isempty(c.will_install)) {
-     r = ordered_hashmap_ensure_allocated(&c.have_installed, &string_hash_ops);
-     if (r < 0)
-         return r;
+     strv_uniq(todo);
-
-     r = ordered_hashmap_reserve(c.have_installed, ordered_hashmap_size(c.will_install));
-     if (r < 0)
-         return r;
+     r = 0;
+     STRV_FOREACH(i, todo) {
+         _cleanup_free_ char *path = NULL;
+
+         path = path_make_absolute(*i, config_path);
+         if (!path)
+             return -ENOMEM;
+
+         if (unlink(path) < 0) {
+             if (errno != -ENOENT && r >= 0)
+                 r = -errno;
+             } else {
+                 q = mark_symlink_for_removal(&remove_symlinks_to, path);
+                 if (q < 0)
+                     return q;
+
+                 unit_file_changes_add(changes, n_changes, UNIT_FILE_UNLINK, path, NULL);
+             }
+         }
-
- while ((info = ordered_hashmap_first(c.will_install)) {
-     assert_se(ordered_hashmap_move_one(c.have_installed, c.will_install, info->name) == 0);
+     q = remove_marked_symlinks(remove_symlinks_to, config_path, changes, n_changes);
+     if (r >= 0)
+         r = q;
-
-     r = unit_file_search(&c, info, &paths, root_dir, false, false, NULL);
-     if (r < 0)
-         return r;
+     return r;
+ }

```

```

-     if (dep == UNIT_WANTS)
-         r = strv_extend(&info->wanted_by, target);
-     else if (dep == UNIT_REQUIRES)
-         r = strv_extend(&info->required_by, target);
-     else
-         r = -EINVAL;
+int unit_file_link(
+    UnitFileScope scope,
+    bool runtime,
+    const char *root_dir,
+    char **files,
+    bool force,
+    UnitFileChange **changes,
+    unsigned *n_changes) {
-
-     if (r < 0)
-         return r;
+    _cleanup_lookup_paths_free_ LookupPaths paths = {};
+    _cleanup_free_ char *config_path = NULL;
+    _cleanup_free_ char **todo = NULL;
+    size_t n_todo = 0, n_allocated = 0;
+    char **i;
+    int r,q;
-
-     r = install_info_apply(info, &paths, config_path, root_dir, force, changes, n_changes);
-     if (r < 0)
-         return r;
+    assert(scope >= 0);
+    assert(scope < _UNIT_FILE_SCOPE_MAX);
+
+    r = verify_root_dir(scope, &root_dir);
+    if (r < 0)
+        return r;
+
+    r = lookup_paths_init_from_scope(&paths, scope, root_dir);
+    if (r < 0)
+        return r;
+
+    r = get_config_path(scope, runtime, root_dir, &config_path);
+    if (r < 0)
+        return r;
+
+    STRV_FOREACH(i, files) {
+        _cleanup_free_ char *full = NULL;
+        struct stat st;
+        char *fn;
+
+        if (!path_is_absolute(*i))

```

```

+         return -EINVAL;
+
+     fn = basename(*i);
+     if (!unit_name_is_valid(fn, UNIT_NAME_ANY))
+         return -EINVAL;
+
+     full = prefix_root(root_dir, *i);
+     if (!full)
+         return -ENOMEM;
+
+     if (lstat(full, &st) < 0)
+         return -errno;
+     if (S_ISLNK(st.st_mode))
+         return -ELOOP;
+     if (S_ISDIR(st.st_mode))
+         return -EISDIR;
+     if (!S_ISREG(st.st_mode))
+         return -ENOTTY;
+
+     q = in_search_path(*i, paths.unit_path);
+     if (q < 0)
+         return q;
+     if (q > 0)
+         continue;
+
+     if (!GREEDY_REALLOC0(todo, n_allocated, n_todo + 2))
+         return -ENOMEM;
+
+     todo[n_todo++] = *i;
+ }
- return 0;
+     strv_uniq(todo);
+
+     r = 0;
+     STRV_FOREACH(i, todo) {
+         _cleanup_free_ char *path = NULL;
+
+         path = path_make_absolute(basename(*i), config_path);
+         if (!path)
+             return -ENOMEM;
+
+         q = create_symlink(*i, path, force, changes, n_changes);
+         if (q < 0 && r >= 0)
+             r = q;
+     }
+
+     return r;

```



```

+}
+
+int unit_file_add_dependency(
+    UnitFileScope scope,
+    bool runtime,
+    const char *root_dir,
+    char **files,
+    const char *target,
+    UnitDependency dep,
+    bool force,
+    UnitFileChange **changes,
+    unsigned *n_changes) {
+
+    _cleanup_lookup_paths_free_ LookupPaths paths = {};
+    _cleanup_(install_context_done) InstallContext c = {};
+    _cleanup_free_char *config_path = NULL;
+    InstallInfo *i, *target_info;
+    char **f;
+    int r;
+
+    assert(scope >= 0);
+    assert(scope < _UNIT_FILE_SCOPE_MAX);
+    assert(target);
+
+    if (!IN_SET(dep, UNIT_WANTS, UNIT_REQUIRES))
+        return -EINVAL;
+
+    if (!unit_name_is_valid(target, UNIT_NAME_ANY))
+        return -EINVAL;
+
+    r = verify_root_dir(scope, &root_dir);
+    if (r < 0)
+        return r;
+
+    r = lookup_paths_init_from_scope(&paths, scope, root_dir);
+    if (r < 0)
+        return r;
+
+    r = get_config_path(scope, runtime, root_dir, &config_path);
+    if (r < 0)
+        return r;
+
+    r = install_info_discover(scope, &c, root_dir, &paths, target, SEARCH_FOLLOW_CONFIG_SYMLINKS,
+    &target_info);
+    if (r < 0)
+        return r;
+    if (target_info->type == UNIT_FILE_TYPE_MASKED)
+        return -ESHUTDOWN;

```

```

+
+   assert(target_info->type == UNIT_FILE_TYPE_REGULAR);
+
+   STRV_FOREACH(f, files) {
+       char ***l;
+
+       r = install_info_discover(scope, &c, root_dir, &paths, *f, SEARCH_FOLLOW_CONFIG_SYMLINKS,
&i);
+
+       if (r < 0)
+           return r;
+       if (i->type == UNIT_FILE_TYPE_MASKED)
+           return -ESHUTDOWN;
+
+       assert(i->type == UNIT_FILE_TYPE_REGULAR);
+
+       /* We didn't actually load anything from the unit
+        * file, but instead just add in our new symlink to
+        * create. */
+
+       if (dep == UNIT_WANTS)
+           l = &i->wanted_by;
+       else
+           l = &i->required_by;
+
+       strv_free(*l);
+       *l = strv_new(target_info->name, NULL);
+       if (!*l)
+           return -ENOMEM;
+   }
+
+   return install_context_apply(scope, &c, &paths, config_path, root_dir, force,
SEARCH_FOLLOW_CONFIG_SYMLINKS, changes, n_changes);
+
+
+
+int unit_file_enable(
+    UnitFileScope scope,
+    bool runtime,
+@@ -1590,13 +1841,18 @@ int unit_file_enable(
+
+    _cleanup_lookup_paths_free_ LookupPaths paths = {};
+    _cleanup_(install_context_done) InstallContext c = {};
+
+    char **i;
+    _cleanup_free_ char *config_path = NULL;
+
+    InstallInfo *i;
+    char **f;
+
+    int r;

```

```

assert(scope >= 0);
assert(scope < _UNIT_FILE_SCOPE_MAX);

+   r = verify_root_dir(scope, &root_dir);
+   if (r < 0)
+       return r;
+
+   r = lookup_paths_init_from_scope(&paths, scope, root_dir);
+   if (r < 0)
+       return r;
@@ -1605,21 +1861,14 @@ int unit_file_enable(
+   if (r < 0)
+       return r;

-   STRV_FOREACH(i, files) {
-       UnitFileState state;
-
-       /* We only want to know if this unit is masked, so we ignore
-        * errors from unit_file_get_state, deferring other checks.
-        * This allows templated units to be enabled on the fly. */
-       state = unit_file_get_state(scope, root_dir, *i);
-       if (state == UNIT_FILE_MASKED || state == UNIT_FILE_MASKED_RUNTIME) {
-           log_error("Failed to enable unit: Unit %s is masked", *i);
-           return -ENOTSUP;
-       }
-
-       r = install_info_add_auto(&c, *i);
+   STRV_FOREACH(f, files) {
+       r = install_info_discover(scope, &c, root_dir, &paths, *f, SEARCH_LOAD, &i);
+       if (r < 0)
+           return r;
+
+       if (i->type == UNIT_FILE_TYPE_MASKED)
+           return -ESHUTDOWN;
+
+       assert(i->type == UNIT_FILE_TYPE_REGULAR);
    }

    /* This will return the number of symlink rules that were
@@ -1627,7 +1876,7 @@ int unit_file_enable(
    useful to determine whether the passed files had any
    installation data at all. */

-   return install_context_apply(&c, &paths, config_path, root_dir, force, changes, n_changes);
+   return install_context_apply(scope, &c, &paths, config_path, root_dir, force, SEARCH_LOAD, changes,
n_changes);
}

int unit_file_disable(

```

```

@@ -1640,14 +1889,18 @@ int unit_file_disable(

    _cleanup_lookup_paths_free_ LookupPaths paths = {};
    _cleanup_(install_context_done) InstallContext c = {};
-   char **i;
    _cleanup_free_ char *config_path = NULL;
    _cleanup_set_free_free_ Set *remove_symlinks_to = NULL;
-   int r, q;
+   char **i;
+   int r;

    assert(scope >= 0);
    assert(scope < _UNIT_FILE_SCOPE_MAX);

+   r = verify_root_dir(scope, &root_dir);
+   if (r < 0)
+       return r;
+
    r = lookup_paths_init_from_scope(&paths, scope, root_dir);
    if (r < 0)
        return r;
@@ -1657,18 +1910,19 @@ int unit_file_disable(
    return r;

    STRV_FOREACH(i, files) {
-       r = install_info_add_auto(&c, *i);
+       if (!unit_name_is_valid(*i, UNIT_NAME_ANY))
+           return -EINVAL;
+
+       r = install_info_add(&c, *i, NULL, NULL);
        if (r < 0)
            return r;
    }

-   r = install_context_mark_for_removal(&c, &paths, &remove_symlinks_to, config_path, root_dir);
-
-   q = remove_marked_symlinks(remove_symlinks_to, config_path, changes, n_changes, files);
-   if (r >= 0)
-       r = q;
+   r = install_context_mark_for_removal(scope, &c, &paths, &remove_symlinks_to, config_path, root_dir);
+   if (r < 0)
+       return r;

-   return r;
+   return remove_marked_symlinks(remove_symlinks_to, config_path, changes, n_changes);
}

int unit_file_reenable(

```

```

@@ -1679,21 +1933,30 @@ int unit_file_reenable(
    bool force,
    UnitFileChange **changes,
    unsigned *n_changes) {
+
+   char **n;
    int r;
+   size_t l, i;
+
+   /* First, we invoke the disable command with only the basename... */
+   l = strv_length(files);
+   n = newa(char*, l+1);
+   for (i = 0; i < l; i++)
+       n[i] = basename(files[i]);
+   n[i] = NULL;

-   r = unit_file_disable(scope, runtime, root_dir, files,
-       changes, n_changes);
+   r = unit_file_disable(scope, runtime, root_dir, n, changes, n_changes);
    if (r < 0)
        return r;

-   return unit_file_enable(scope, runtime, root_dir, files, force,
-       changes, n_changes);
+   /* But the enable command with the full name */
+   return unit_file_enable(scope, runtime, root_dir, files, force, changes, n_changes);
}

int unit_file_set_default(
    UnitFileScope scope,
    const char *root_dir,
-   const char *file,
+   const char *name,
    bool force,
    UnitFileChange **changes,
    unsigned *n_changes) {
@@ -1701,42 +1964,40 @@ int unit_file_set_default(
    _cleanup_lookup_paths_free_ LookupPaths paths = {};
    _cleanup_(install_context_done) InstallContext c = {};
    _cleanup_free_ char *config_path = NULL;
-   char *path;
+   InstallInfo *i;
+   const char *path;
    int r;
-   InstallInfo *i = NULL;

    assert(scope >= 0);
    assert(scope < _UNIT_FILE_SCOPE_MAX);

```

```

-   assert(file);
+   assert(name);

-   if (unit_name_to_type(file) != UNIT_TARGET)
+   if (unit_name_to_type(name) != UNIT_TARGET)
+       return -EINVAL;
+   if (streq(name, SPECIAL_DEFAULT_TARGET))
+       return -EINVAL;

-   r = lookup_paths_init_from_scope(&paths, scope, root_dir);
+   r = verify_root_dir(scope, &root_dir);
if (r < 0)
    return r;

-   r = get_config_path(scope, false, root_dir, &config_path);
+   r = lookup_paths_init_from_scope(&paths, scope, root_dir);
if (r < 0)
    return r;

-   r = install_info_add_auto(&c, file);
+   r = get_config_path(scope, false, root_dir, &config_path);
if (r < 0)
    return r;

-   assert_se(i = ordered_hashmap_first(c.will_install));
-
-   r = unit_file_search(&c, i, &paths, root_dir, false, true, NULL);
+   r = install_info_discover(scope, &c, root_dir, &paths, name, 0, &i);
if (r < 0)
    return r;
+   if (i->type == UNIT_FILE_TYPE_MASKED)
+       return -ESHUTDOWN;

    path = strjoina(config_path, "/" SPECIAL_DEFAULT_TARGET);

-   r = create_symlink(i->path, path, force, changes, n_changes);
-   if (r < 0)
-       return r;
-
-   return 0;
+   return create_symlink(i->path, path, force, changes, n_changes);
}

int unit_file_get_default(
@@ -1745,127 +2006,100 @@ int unit_file_get_default(
    char **name) {

    _cleanup_lookup_paths_free_ LookupPaths paths = {};

```

```

-   char **p;
+   _cleanup_(install_context_done) InstallContext c = {};
+   InstallInfo *i;
+   char *n;
int r;

assert(scope >= 0);
assert(scope < _UNIT_FILE_SCOPE_MAX);
assert(name);

-   r = lookup_paths_init_from_scope(&paths, scope, root_dir);
+   r = verify_root_dir(scope, &root_dir);
if (r < 0)
    return r;

-   STRV_FOREACH(p, paths.unit_path) {
-       _cleanup_free_ char *path = NULL, *tmp = NULL;
-       char *n;
-
-       path = path_join(root_dir, *p, SPECIAL_DEFAULT_TARGET);
-       if (!path)
-           return -ENOMEM;
-
-       r = readlink_malloc(path, &tmp);
-       if (r == -ENOENT)
-           continue;
-       else if (r == -EINVAL)
-           /* not a symlink */
-           n = strdup(SPECIAL_DEFAULT_TARGET);
-       else if (r < 0)
-           return r;
-       else
-           n = strdup(basename(tmp));
+   r = lookup_paths_init_from_scope(&paths, scope, root_dir);
+   if (r < 0)
+       return r;

-       if (!n)
-           return -ENOMEM;
+   r = install_info_discover(scope, &c, root_dir, &paths, SPECIAL_DEFAULT_TARGET,
SEARCH_FOLLOW_CONFIG_SYMLINKS, &i);
+   if (r < 0)
+       return r;
+   if (i->type == UNIT_FILE_TYPE_MASKED)
+       return -ESHUTDOWN;

-       *name = n;
-       return 0;

```

```

-     }
+     n = strdup(i->name);
+     if (!n)
+         return -ENOMEM;

-     return -ENOENT;
+     *name = n;
+     return 0;
}

UnitFileState unit_file_lookup_state(
    UnitFileScope scope,
    const char *root_dir,
    const LookupPaths *paths,
-     const char *name) {
-
-     UnitFileState state = _UNIT_FILE_STATE_INVALID;
-     char **i;
-     _cleanup_free_ char *path = NULL;
+     const char *name,
+     UnitFileState *ret) {
+     _cleanup_(install_context_done) InstallContext c = {};
+     InstallInfo *i;
+     UnitFileState state;
    int r;

    assert(paths);
+     assert(name);

-     if (!unit_name_is_valid(name, TEMPLATE_VALID))
+     if (!unit_name_is_valid(name, UNIT_NAME_ANY))
        return -EINVAL;

-     STRV_FOREACH(i, paths->unit_path) {
-         struct stat st;
-         char *partial;
-         bool also = false;
-
-         free(path);
-         path = path_join(root_dir, *i, name);
-         if (!path)
-             return -ENOMEM;
+         r = verify_root_dir(scope, &root_dir);
+         if (r < 0)
+             return r;

-         if (root_dir)
-             partial = path + strlen(root_dir);

```



```

-     else
-         partial = path;
+     r = install_info_discover(scope, &c, root_dir, paths, name,
SEARCH_LOAD|SEARCH_FOLLOW_CONFIG_SYMLINKS, &i);
+     if (r < 0)
+         return r;

-     /*
-     * Search for a unit file in our default paths, to
-     * be sure, that there are no broken symlinks.
-     */
-     if (lstat(path, &st) < 0) {
-         r = -errno;
-         if (errno != ENOENT)
-             return r;
+     /* Shortcut things, if the caller just wants to know if this unit exists. */
+     if (!ret)
+         return 0;

-         if (!unit_name_is_instance(name))
-             continue;
-     } else {
-         if (!S_ISREG(st.st_mode) && !S_ISLNK(st.st_mode))
-             return -ENOENT;
+     switch (i->type) {

-         r = null_or_empty_path(path);
-         if (r < 0 && r != -ENOENT)
-             return r;
-         else if (r > 0) {
-             state = path_startswith(*i, "/run") ?
UNIT_FILE_MASKED_RUNTIME : UNIT_FILE_MASKED;
-             return state;
-         }
-     }
+     case UNIT_FILE_TYPE_MASKED:
+         state = path_startswith(i->path, "/run") ? UNIT_FILE_MASKED_RUNTIME : UNIT_FILE_MASKED;
+         break;

-         r = find_symlinks_in_scope(scope, root_dir, name, &state);
+     case UNIT_FILE_TYPE_REGULAR:
+         r = find_symlinks_in_scope(scope, root_dir, i->name, &state);
+         if (r < 0)
+             return r;
-         else if (r > 0)
-             return state;
-
-         r = unit_file_can_install(paths, root_dir, partial, true, &also);

```

```

-     if (r < 0 && errno != ENOENT)
-         return r;
-     else if (r > 0)
-         return UNIT_FILE_DISABLED;
-     else if (r == 0) {
-         if (also)
-             return UNIT_FILE_INDIRECT;
-         return UNIT_FILE_STATIC;
+     if (r == 0) {
+         if (UNIT_FILE_INSTALL_INFO_HAS_RULES(i))
+             state = UNIT_FILE_DISABLED;
+         else if (UNIT_FILE_INSTALL_INFO_HAS_ALSO(i))
+             state = UNIT_FILE_INDIRECT;
+         else
+             state = UNIT_FILE_STATIC;
    }
+
+     break;
+
+ default:
+     assert_not_reached("Unexpect unit file type.");
    }

-     return r < 0 ? r : state;
+     *ret = state;
+     return 0;
    }

```

```

-UnitFileState unit_file_get_state(
+int unit_file_get_state(
    UnitFileScope scope,
    const char *root_dir,
-    const char *name) {
+    const char *name,
+    UnitFileState *ret) {

    _cleanup_lookup_paths_free_ LookupPaths paths = {};
    int r;

@@ -1874,14 +2108,15 @@ UnitFileState unit_file_get_state(
    assert(scope < _UNIT_FILE_SCOPE_MAX);
    assert(name);

-     if (root_dir && scope != UNIT_FILE_SYSTEM)
-         return -EINVAL;
+     r = verify_root_dir(scope, &root_dir);
+     if (r < 0)
+         return r;

```

```

r = lookup_paths_init_from_scope(&paths, scope, root_dir);
if (r < 0)
    return r;

-   return unit_file_lookup_state(scope, root_dir, &paths, name);
+   return unit_file_lookup_state(scope, root_dir, &paths, name, ret);
}

int unit_file_query_preset(UnitFileScope scope, const char *root_dir, const char *name) {
@@ -1893,6 +2128,13 @@ int unit_file_query_preset(UnitFileScope scope, const char *root_dir, const char
    assert(scope < _UNIT_FILE_SCOPE_MAX);
    assert(name);

+   r = verify_root_dir(scope, &root_dir);
+   if (r < 0)
+       return r;
+
+   if (!unit_name_is_valid(name, UNIT_NAME_ANY))
+       return -EINVAL;
+
    if (scope == UNIT_FILE_SYSTEM)
        r = conf_files_list(&files, ".preset", root_dir,
                           "/etc/systemd/system-preset",
@@ -1909,13 +2151,14 @@ int unit_file_query_preset(UnitFileScope scope, const char *root_dir, const char
                           "/usr/lib/systemd/user-preset",
                           NULL);
    else
-       return 1;
+       return 1; /* Default is "enable" */

    if (r < 0)
        return r;

    STRV_FOREACH(p, files) {
        _cleanup_fclose_ FILE *f;
+       char line[LINE_MAX];

        f = fopen(*p, "re");
        if (!f) {
@@ -1925,39 +2168,38 @@ int unit_file_query_preset(UnitFileScope scope, const char *root_dir, const char
            return -errno;
        }

-       for (;;) {
-           char line[LINE_MAX], *l;
-
-           if (!fgets(line, sizeof(line), f))
-               break;

```

```

+     FOREACH_LINE(line, f, return -errno) {
+         const char *parameter;
+         char *l;

        l = strstr(line);
-         if (!*l)
-             continue;

-         if (strchr(COMMENTS "\n", *l))
+         if (isempty(l))
+             continue;
+         if (strchr(COMMENTS, *l))
            continue;

-         if (first_word(l, "enable")) {
-             l += 6;
-             l += strspn(l, WHITESPACE);
-
-             if (fnmatch(l, name, FNM_NOESCAPE) == 0) {
+         parameter = first_word(l, "enable");
+         if (parameter) {
+             if (fnmatch(parameter, name, FNM_NOESCAPE) == 0) {
                log_debug("Preset file says enable %s.", name);
                return 1;
            }

-         } else if (first_word(l, "disable")) {
-             l += 7;
-             l += strspn(l, WHITESPACE);
+         continue;
+     }

-             if (fnmatch(l, name, FNM_NOESCAPE) == 0) {
+         parameter = first_word(l, "disable");
+         if (parameter) {
+             if (fnmatch(parameter, name, FNM_NOESCAPE) == 0) {
                log_debug("Preset file says disable %s.", name);
                return 0;
            }

-         } else
-             log_debug("Couldn't parse line '%s'", l);
+         continue;
+     }

+     log_debug("Couldn't parse line '%s'", l);
    }
}

```

```

@@ -1966,6 +2208,86 @@ int unit_file_query_preset(UnitFileScope scope, const char *root_dir, const char
    return 1;
}

+static int execute_preset(
+    UnitFileScope scope,
+    InstallContext *plus,
+    InstallContext *minus,
+    const LookupPaths *paths,
+    const char *config_path,
+    const char *root_dir,
+    char **files,
+    UnitFilePresetMode mode,
+    bool force,
+    UnitFileChange **changes,
+    unsigned *n_changes) {
+
+    int r;
+
+    assert(plus);
+    assert(minus);
+    assert(paths);
+    assert(config_path);
+
+    if (mode != UNIT_FILE_PRESET_ENABLE_ONLY) {
+        _cleanup_set_free_free_Set *remove_symlinks_to = NULL;
+
+        r = install_context_mark_for_removal(scope, minus, paths, &remove_symlinks_to, config_path,
root_dir);
+        if (r < 0)
+            return r;
+
+        r = remove_marked_symlinks(remove_symlinks_to, config_path, changes, n_changes);
+    } else
+        r = 0;
+
+    if (mode != UNIT_FILE_PRESET_DISABLE_ONLY) {
+        int q;
+
+        /* Returns number of symlinks that where supposed to be installed. */
+        q = install_context_apply(scope, plus, paths, config_path, root_dir, force, SEARCH_LOAD, changes,
n_changes);
+        if (r >= 0) {
+            if (q < 0)
+                r = q;
+            else
+                r += q;

```

```

+     }
+ }
+
+ return r;
+}
+
+static int preset_prepare_one(
+    UnitFileScope scope,
+    InstallContext *plus,
+    InstallContext *minus,
+    LookupPaths *paths,
+    const char *root_dir,
+    UnitFilePresetMode mode,
+    const char *name) {
+
+    InstallInfo *i;
+    int r;
+
+    if (install_info_find(plus, name) ||
+        install_info_find(minus, name))
+        return 0;
+
+    r = unit_file_query_preset(scope, root_dir, name);
+    if (r < 0)
+        return r;
+
+    if (r > 0) {
+        r = install_info_discover(scope, plus, root_dir, paths, name,
SEARCH_LOAD|SEARCH_FOLLOW_CONFIG_SYMLINKS, &i);
+        if (r < 0)
+            return r;
+
+        if (i->type == UNIT_FILE_TYPE_MASKED)
+            return -ESHUTDOWN;
+    } else
+        r = install_info_discover(scope, minus, root_dir, paths, name,
SEARCH_FOLLOW_CONFIG_SYMLINKS, &i);
+
+    return r;
+}
+
+int unit_file_preset(
+    UnitFileScope scope,
+    bool runtime,
@@ -1980,12 +2302,16 @@ int unit_file_preset(
+    _cleanup_lookup_paths_free_ LookupPaths paths = {};
+    _cleanup_free_ char *config_path = NULL;
+    char **i;

```

```

-   int r, q;
+   int r;

assert(scope >= 0);
assert(scope < _UNIT_FILE_SCOPE_MAX);
assert(mode < _UNIT_FILE_PRESET_MAX);

+   r = verify_root_dir(scope, &root_dir);
+   if (r < 0)
+       return r;
+
r = lookup_paths_init_from_scope(&paths, scope, root_dir);
if (r < 0)
    return r;
@@ -1995,44 +2321,15 @@ int unit_file_preset(
    return r;

STRV_FOREACH(i, files) {
-
-   if (!unit_name_is_valid(*i, TEMPLATE_VALID))
+   if (!unit_name_is_valid(*i, UNIT_NAME_ANY))
        return -EINVAL;

-   r = unit_file_query_preset(scope, root_dir, *i);
-   if (r < 0)
-       return r;
-
-   if (r && mode != UNIT_FILE_PRESET_DISABLE_ONLY)
-       r = install_info_add_auto(&plus, *i);
-   else if (!r && mode != UNIT_FILE_PRESET_ENABLE_ONLY)
-       r = install_info_add_auto(&minus, *i);
-   else
-       r = 0;
+   r = preset_prepare_one(scope, &plus, &minus, &paths, root_dir, mode, *i);
+   if (r < 0)
+       return r;
}

-   r = 0;
-
-   if (mode != UNIT_FILE_PRESET_ENABLE_ONLY) {
-       _cleanup_set_free_free_Set *remove_symlinks_to = NULL;
-
-       r = install_context_mark_for_removal(&minus, &paths, &remove_symlinks_to, config_path, root_dir);
-
-       q = remove_marked_symlinks(remove_symlinks_to, config_path, changes, n_changes, files);
-       if (r == 0)
-           r = q;

```

```

-     }
-
-     if (mode != UNIT_FILE_PRESET_DISABLE_ONLY) {
-         /* Returns number of symlinks that were supposed to be installed. */
-         q = install_context_apply(&plus, &paths, config_path, root_dir, force, changes, n_changes);
-         if (r == 0)
-             r = q;
-     }
-
-     return r;
+     return execute_preset(scope, &plus, &minus, &paths, config_path, root_dir, files, mode, force, changes,
n_changes);
}

```

```

int unit_file_preset_all(
@@ -2048,12 +2345,16 @@ int unit_file_preset_all(
    _cleanup_lookup_paths_free_ LookupPaths paths = {};
    _cleanup_free_char *config_path = NULL;
    char **i;
-    int r, q;
+    int r;

```

```

    assert(scope >= 0);
    assert(scope < _UNIT_FILE_SCOPE_MAX);
    assert(mode < _UNIT_FILE_PRESET_MAX);

+    r = verify_root_dir(scope, &root_dir);
+    if (r < 0)
+        return r;
+
    r = lookup_paths_init_from_scope(&paths, scope, root_dir);
    if (r < 0)
        return r;

```

```

@@ -2092,48 +2393,21 @@ int unit_file_preset_all(
    if (hidden_file(de->d_name))
        continue;

-    if (!unit_name_is_valid(de->d_name, TEMPLATE_VALID))
+    if (!unit_name_is_valid(de->d_name, UNIT_NAME_ANY))
        continue;

    dirent_ensure_type(d, de);

-    if (de->d_type != DT_REG)
+    if (!IN_SET(de->d_type, DT_LNK, DT_REG))
        continue;

-    r = unit_file_query_preset(scope, root_dir, de->d_name);

```



```

-         if (r < 0)
-             return r;
-
-         if (r && mode != UNIT_FILE_PRESET_DISABLE_ONLY)
-             r = install_info_add_auto(&plus, de->d_name);
-         else if (!r && mode != UNIT_FILE_PRESET_ENABLE_ONLY)
-             r = install_info_add_auto(&minus, de->d_name);
-         else
-             r = 0;
+         r = preset_prepare_one(scope, &plus, &minus, &paths, root_dir, mode, de->d_name);
        if (r < 0)
            return r;
    }
}

- r = 0;
-
- if (mode != UNIT_FILE_PRESET_ENABLE_ONLY) {
-     _cleanup_set_free_free_ Set *remove_symlinks_to = NULL;
-
-     r = install_context_mark_for_removal(&minus, &paths, &remove_symlinks_to, config_path, root_dir);
-
-     q = remove_marked_symlinks(remove_symlinks_to, config_path, changes, n_changes, NULL);
-     if (r == 0)
-         r = q;
- }
-
- if (mode != UNIT_FILE_PRESET_DISABLE_ONLY) {
-     q = install_context_apply(&plus, &paths, config_path, root_dir, force, changes, n_changes);
-     if (r == 0)
-         r = q;
- }
-
- return r;
+ return execute_preset(scope, &plus, &minus, &paths, config_path, root_dir, NULL, mode, force, changes,
n_changes);
}

static void unit_file_list_free_one(UnitFileList *f) {
@@ -2144,6 +2418,17 @@ static void unit_file_list_free_one(UnitFileList *f) {
    free(f);
}

+Hashmap* unit_file_list_free(Hashmap *h) {
+    UnitFileList *i;
+
+    while ((i = hashmap_steal_first(h)))
+        unit_file_list_free_one(i);
}

```

```

+
+   hashmap_free(h);
+
+   return NULL;
+}
+
DEFINE_TRIVIAL_CLEANUP_FUNC(UnitFileList*, unit_file_list_free_one);

int unit_file_get_list(
@@ -2159,14 +2444,9 @@ int unit_file_get_list(
    assert(scope < _UNIT_FILE_SCOPE_MAX);
    assert(h);

-   if (root_dir && scope != UNIT_FILE_SYSTEM)
-       return -EINVAL;
-
-   if (root_dir) {
-       r = access(root_dir, F_OK);
-       if (r < 0)
-           return -errno;
-   }
+   r = verify_root_dir(scope, &root_dir);
+   if (r < 0)
+       return r;

    r = lookup_paths_init_from_scope(&paths, scope, root_dir);
    if (r < 0)
@@ -2191,7 +2471,6 @@ int unit_file_get_list(
    for (;;) {
        _cleanup_(unit_file_list_free_onep) UnitFileList *f = NULL;
        struct dirent *de;
-       _cleanup_free_ char *path = NULL;

        errno = 0;
        de = readdir(d);
@@ -2204,7 +2483,7 @@ int unit_file_get_list(
        if (hidden_file(de->d_name))
            continue;

-       if (!unit_name_is_valid(de->d_name, TEMPLATE_VALID))
+       if (!unit_name_is_valid(de->d_name, UNIT_NAME_ANY))
            continue;

        if (hashmap_get(h, de->d_name))
@@ -2223,44 +2502,14 @@ int unit_file_get_list(
        if (!f->path)
            return -ENOMEM;

```

```

-         r = null_or_empty_path(f->path);
-         if (r < 0 && r != -ENOENT)
-             return r;
-         else if (r > 0) {
-             f->state =
-                 path_startswith(*i, "/run") ?
-                 UNIT_FILE_MASKED_RUNTIME : UNIT_FILE_MASKED;
-             goto found;
-         }
-
-         r = find_symlinks_in_scope(scope, root_dir, de->d_name, &f->state);
+         r = unit_file_lookup_state(scope, root_dir, &paths, basename(f->path), &f->state);
if (r < 0)
-         return r;
-         else if (r > 0) {
-             f->state = UNIT_FILE_ENABLED;
-             goto found;
-         }
-
-         path = path_make_absolute(de->d_name, *i);
-         if (!path)
-             return -ENOMEM;
+         f->state = UNIT_FILE_BAD;

-         r = unit_file_can_install(&paths, root_dir, path, true, NULL);
-         if (r == -EINVAL || /* Invalid setting? */
-             r == -EBADMSG || /* Invalid format? */
-             r == -ENOENT /* Included file not found? */)
-             f->state = UNIT_FILE_INVALID;
-         else if (r < 0)
-             return r;
-         else if (r > 0)
-             f->state = UNIT_FILE_DISABLED;
-         else
-             f->state = UNIT_FILE_STATIC;
-
-         found:
-             r = hashmap_put(h, basename(f->path), f);
-             if (r < 0)
+                 return r;
+
+         f = NULL; /* prevent cleanup */
        }
    }
}

@@ -2278,7 +2527,7 @@ static const char* const unit_file_state_table[_UNIT_FILE_STATE_MAX] = {
    [UNIT_FILE_STATIC] = "static",
    [UNIT_FILE_DISABLED] = "disabled",
    [UNIT_FILE_INDIRECT] = "indirect",

```

```

-   [UNIT_FILE_INVALID] = "invalid",
+   [UNIT_FILE_BAD] = "bad",
};

DEFINE_STRING_TABLE_LOOKUP(unit_file_state, UnitFileState);
diff --git a/src/shared/install.h b/src/shared/install.h
index d729e6ed15..87a40b67c1 100644
--- a/src/shared/install.h
+++ b/src/shared/install.h
@@ -24,6 +24,7 @@
#include "hashmap.h"
#include "unit-name.h"
#include "path-lookup.h"
+#include "strv.h"

typedef enum UnitFileScope {
    UNIT_FILE_SYSTEM,
@@ -43,7 +44,7 @@ typedef enum UnitFileState {
    UNIT_FILE_STATIC,
    UNIT_FILE_DISABLED,
    UNIT_FILE_INDIRECT,
-   UNIT_FILE_INVALID,
+   UNIT_FILE_BAD,
    _UNIT_FILE_STATE_MAX,
    _UNIT_FILE_STATE_INVALID = -1
} UnitFileState;
@@ -74,6 +75,14 @@ typedef struct UnitFileList {
    UnitFileState state;
} UnitFileList;

+typedef enum UnitFileType {
+   UNIT_FILE_TYPE_REGULAR,
+   UNIT_FILE_TYPE_SYMLINK,
+   UNIT_FILE_TYPE_MASKED,
+   _UNIT_FILE_TYPE_MAX,
+   _UNIT_FILE_TYPE_INVALID = -1,
+} UnitFileType;
+
+typedef struct {
+   char *name;
+   char *path;
@@ -85,8 +94,26 @@ typedef struct {
    char **also;

    char *default_instance;
+
+   UnitFileType type;
+
+

```

```

+   char *symlink_target;
} InstallInfo;

+static inline bool UNIT_FILE_INSTALL_INFO_HAS_RULES(InstallInfo *i) {
+   assert(i);
+
+   return !strv_isempty(i->aliases) ||
+          !strv_isempty(i->wanted_by) ||
+          !strv_isempty(i->required_by);
+}
+
+static inline bool UNIT_FILE_INSTALL_INFO_HAS_ALSO(InstallInfo *i) {
+   assert(i);
+
+   return !strv_isempty(i->also);
+}
+
int unit_file_enable(UnitFileScope scope, bool runtime, const char *root_dir, char **files, bool force,
UnitFileChange **changes, unsigned *n_changes);
int unit_file_disable(UnitFileScope scope, bool runtime, const char *root_dir, char **files, UnitFileChange
**changes, unsigned *n_changes);
int unit_file_reenable(UnitFileScope scope, bool runtime, const char *root_dir, char **files, bool force,
UnitFileChange **changes, unsigned *n_changes);
@@ -97,21 +124,14 @@ int unit_file_mask(UnitFileScope scope, bool runtime, const char *root_dir, char
int unit_file_unmask(UnitFileScope scope, bool runtime, const char *root_dir, char **files, UnitFileChange
**changes, unsigned *n_changes);
int unit_file_set_default(UnitFileScope scope, const char *root_dir, const char *file, bool force, UnitFileChange
**changes, unsigned *n_changes);
int unit_file_get_default(UnitFileScope scope, const char *root_dir, char **name);
-int unit_file_add_dependency(UnitFileScope scope, bool runtime, const char *root_dir, char **files, char *target,
UnitDependency dep, bool force, UnitFileChange **changes, unsigned *n_changes);
-
-UnitFileState unit_file_lookup_state(
-   UnitFileScope scope,
-   const char *root_dir,
-   const LookupPaths *paths,
-   const char *name);
-UnitFileState unit_file_get_state(
-   UnitFileScope scope,
-   const char *root_dir,
-   const char *filename);
+int unit_file_add_dependency(UnitFileScope scope, bool runtime, const char *root_dir, char **files, const char
*target, UnitDependency dep, bool force, UnitFileChange **changes, unsigned *n_changes);
+
+int unit_file_lookup_state(UnitFileScope scope, const char *root_dir, const LookupPaths *paths, const char *name,
UnitFileState *ret);
+int unit_file_get_state(UnitFileScope scope, const char *root_dir, const char *filename, UnitFileState *ret);

```

```

int unit_file_get_list(UnitFileScope scope, const char *root_dir, Hashmap *h);
+Hashmap* unit_file_list_free(Hashmap *h);

-void unit_file_list_free(Hashmap *h);
int unit_file_changes_add(UnitFileChange **changes, unsigned *n_changes, UnitFileChangeType type, const char
*path, const char *source);
void unit_file_changes_free(UnitFileChange *changes, unsigned n_changes);

diff --git a/src/shared/path-util.c b/src/shared/path-util.c
index d5510bf56f..1181ffb9d4 100644
--- a/src/shared/path-util.c
+++ b/src/shared/path-util.c
@@ -704,37 +704,37 @@ int fsck_exists(const char *fstype) {

    return 0;
}
+
+char *prefix_root(const char *root, const char *path) {
+    char *n, *p;
+    size_t l;
+
+    /* If root is passed, prefixes path with it. Otherwise returns
+    * it as is. */
+
+    assert(path);
+
+    /* First, drop duplicate prefixing slashes from the path */
+    while (path[0] == '/' && path[1] == '/')
+        path++;
+
+    if (isempty(root) || path_equal(root, ""))
+        return strdup(path);
+
+    l = strlen(root) + 1 + strlen(path) + 1;
+
+    n = new(char, l);
+    if (!n)
+        return NULL;
+
+    p = stpcpy(n, root);
+
+    while (p > n && p[-1] == '/')
+        p--;
+
+    if (path[0] != '/')
+        *(p++) = '/';
+
+    strcpy(p, path);

```

```

+     return n;
+ }
diff --git a/src/shared/path-util.h b/src/shared/path-util.h
index ca81b49cbf..71bb740e98 100644
--- a/src/shared/path-util.h
+++ b/src/shared/path-util.h
@@ -63,6 +63,33 @@ bool paths_check_timestamp(const char* const* paths, usec_t *paths_ts_usec, bool

```

```
int fsck_exists(const char *fstype);
```

```
+char *prefix_root(const char *root, const char *path);
```

```
+
```

```
/* Similar to prefix_root(), but returns an alloca() buffer, or
 * possibly a const pointer into the path parameter */
```

```

#define prefix_roota(root, path) \
+   ({ \
+       const char* _path = (path), *_root = (root), *_ret; \
+       char *_p, *_n; \
+       size_t _l; \
+       while (_path[0] == '/' && _path[1] == '/') \
+           _path ++; \
+       if (isempty(_root) || path_equal(_root, "/")) \
+           _ret = _path; \
+       else { \
+           _l = strlen(_root) + 1 + strlen(_path) + 1; \
+           _n = alloca(_l); \
+           _p = stpcpy(_n, _root); \
+           while (_p > _n && _p[-1] == '/') \
+               _p--; \
+           if (_path[0] != '/') \
+               *(_p++) = '/'; \
+           strcpy(_p, _path); \
+           _ret = _n; \
+       } \
+       _ret; \
+   })

```

```

/* Iterates through the path prefixes of the specified path, going up
 * the tree, to root. Also returns "" (and not "/"!) for the root
 * directory. Excludes the specified directory itself */

```

```
diff --git a/src/shared/unit-name.c b/src/shared/unit-name.c
```

```
index f728af4a81..b7827d14bb 100644
```

```
--- a/src/shared/unit-name.c
```

```
+++ b/src/shared/unit-name.c
```

```
@@ -63,16 +63,13 @@ static const char* const unit_load_state_table[_UNIT_LOAD_STATE_MAX] = {
```

```
DEFINE_STRING_TABLE_LOOKUP(unit_load_state, UnitLoadState);
```

```

-bool unit_name_is_valid(const char *n, enum template_valid template_ok) {
+bool unit_name_is_valid(const char *n, UnitNameFlags flags) {
    const char *e, *i, *at;

-    /* Valid formats:
-     *
-     *     string@instance.suffix
-     *     string.suffix
-     */
+    assert((flags & ~(UNIT_NAME_PLAIN|UNIT_NAME_INSTANCE|UNIT_NAME_TEMPLATE)) == 0);

-    assert(IN_SET(template_ok, TEMPLATE_VALID, TEMPLATE_INVALID));
+    if (_unlikely_(flags == 0))
+        return false;

    if (isempty(n))
        return false;
@@ -96,15 +93,22 @@ bool unit_name_is_valid(const char *n, enum template_valid template_ok) {
        return false;
    }

-    if (at) {
-        if (at == n)
-            return false;
+    if (at == n)
+        return false;

-        if (template_ok != TEMPLATE_VALID && at+1 == e)
-            return false;
-    }
+    if (flags & UNIT_NAME_PLAIN)
+        if (!at)
+            return true;

+    if (flags & UNIT_NAME_INSTANCE)
+        if (at && e > at + 1)
+            return true;

+    if (flags & UNIT_NAME_TEMPLATE)
+        if (at && e == at + 1)
+            return true;

-    return true;
+    return false;
}

bool unit_instance_is_valid(const char *i) {
diff --git a/src/shared/unit-name.h b/src/shared/unit-name.h

```



```

index 6f139cc4c4..4364860623 100644
--- a/src/shared/unit-name.h
+++ b/src/shared/unit-name.h
@@ -107,6 +107,13 @@ enum UnitDependency {
    _UNIT_DEPENDENCY_INVALID = -1
};

+typedef enum UnitNameFlags {
+    UNIT_NAME_PLAIN = 1,    /* Allow foo.service */
+    UNIT_NAME_INSTANCE = 2, /* Allow foo@bar.service */
+    UNIT_NAME_TEMPLATE = 4, /* Allow foo@.service */
+    UNIT_NAME_ANY = UNIT_NAME_PLAIN|UNIT_NAME_INSTANCE|UNIT_NAME_TEMPLATE,
+} UnitNameFlags;
+
const char *unit_type_to_string(UnitType i) _const_;
UnitType unit_type_from_string(const char *s) _pure_;

@@ -117,12 +124,7 @@ int unit_name_to_instance(const char *n, char **instance);
char* unit_name_to_prefix(const char *n);
char* unit_name_to_prefix_and_instance(const char *n);

-enum template_valid {
-    TEMPLATE_INVALID,
-    TEMPLATE_VALID,
-};
-
-bool unit_name_is_valid(const char *n, enum template_valid template_ok) _pure_;
+bool unit_name_is_valid(const char *n, UnitNameFlags flags) _pure_;
bool unit_prefix_is_valid(const char *p) _pure_;
bool unit_instance_is_valid(const char *i) _pure_;

diff --git a/src/shared/util.c b/src/shared/util.c
index a24aa7f93a..036677eb46 100644
--- a/src/shared/util.c
+++ b/src/shared/util.c
@@ -1094,6 +1094,27 @@ int readlink_and_canonicalize(const char *p, char **r) {
    return 0;
}

+
+int readlink_and_make_absolute_root(const char *root, const char *path, char **ret) {
+    _cleanup_free_ char *target = NULL, *t = NULL;
+    const char *full;
+    int r;
+
+    full = prefix_roota(root, path);
+    r = readlink_malloc(full, &target);
+    if (r < 0)

```

```

+         return r;
+
+     t = file_in_same_dir(path, target);
+     if (!t)
+         return -ENOMEM;
+
+     *ret = t;
+     t = NULL;
+
+     return 0;
+ }
+

```

```

int reset_all_signal_handlers(void) {
    int sig, r = 0;

```

```

diff --git a/src/shared/util.h b/src/shared/util.h

```

```

index b4a4a491f9..a441e44ff9 100644

```

```

--- a/src/shared/util.h

```

```

+++ b/src/shared/util.h

```

```

@@ -281,6 +281,7 @@ int readlink_malloc(const char *p, char **r);

```

```

int readlink_value(const char *p, char **ret);

```

```

int readlink_and_make_absolute(const char *p, char **r);

```

```

int readlink_and_canonicalize(const char *p, char **r);

```

```

+int readlink_and_make_absolute_root(const char *root, const char *path, char **ret);

```

```

int reset_all_signal_handlers(void);

```

```

int reset_signal_mask(void);

```

```

diff --git a/src/systemctl/systemctl.c b/src/systemctl/systemctl.c

```

```

index bf5bb398b7..95ddf3be76 100644

```

```

--- a/src/systemctl/systemctl.c

```

```

+++ b/src/systemctl/systemctl.c

```

```

@@ -1304,7 +1304,7 @@ static void output_unit_file_list(const UnitFileList *units, unsigned c) {

```

```

    if (u->state == UNIT_FILE_MASKED ||

```

```

        u->state == UNIT_FILE_MASKED_RUNTIME ||

```

```

        u->state == UNIT_FILE_DISABLED ||

```

```

-        u->state == UNIT_FILE_INVALID) {

```

```

+        u->state == UNIT_FILE_BAD) {

```

```

    on = ansi_highlight_red();

```

```

    off = ansi_highlight_off();

```

```

} else if (u->state == UNIT_FILE_ENABLED) {

```

```

@@ -5637,8 +5637,8 @@ static int unit_is_enabled(sd_bus *bus, char **args) {

```

```

    STRV_FOREACH(name, names) {

```

```

        UnitFileState state;

```

```

-        state = unit_file_get_state(arg_scope, arg_root, *name);

```

```

-        if (state < 0)

```

```

+        r = unit_file_get_state(arg_scope, arg_root, *name, &state);

```

```

+        if (r < 0)

```

```

return log_error_errno(state, "Failed to get unit file state for %s: %m", *name);

if (state == UNIT_FILE_ENABLED ||
diff --git a/src/sysv-generator/sysv-generator.c b/src/sysv-generator/sysv-generator.c
index d60e75a06b..7e0e7fc283 100644
--- a/src/sysv-generator/sysv-generator.c
+++ b/src/sysv-generator/sysv-generator.c
@@ -712,6 +712,7 @@ static int fix_order(SysvStub *s, Hashmap *all_services) {

static int enumerate_sysv(const LookupPaths *lp, Hashmap *all_services) {
    char **path;
+    int r;

    STRV_FOREACH(path, lp->sysvinit_path) {
        _cleanup_closedir_ DIR *d = NULL;
@@ -728,7 +729,6 @@ static int enumerate_sysv(const LookupPaths *lp, Hashmap *all_services) {
        _cleanup_free_ char *fpath = NULL, *name = NULL;
        _cleanup_free_ SysvStub *service = NULL;
        struct stat st;
-        int r;

        if (hidden_file(de->d_name))
            continue;
@@ -755,8 +755,12 @@ static int enumerate_sysv(const LookupPaths *lp, Hashmap *all_services) {
        if (!fpath)
            return log_oom();

-        if (unit_file_lookup_state(UNIT_FILE_SYSTEM, NULL, lp, name) >= 0) {
-            log_debug("Native unit for %s already exists, skipping", name);
+        r = unit_file_lookup_state(UNIT_FILE_SYSTEM, NULL, lp, name, NULL);
+        if (r < 0 && r != -ENOENT) {
+            log_debug_errno(r, "Failed to detect whether %s exists, skipping: %m", name);
+            continue;
+        } else if (r >= 0) {
+            log_debug("Native unit for %s already exists, skipping.", name);
            continue;
        }
    }

diff --git a/src/test/test-install-root.c b/src/test/test-install-root.c
new file mode 100644
index 0000000000..89d91d3d64
--- /dev/null
+++ b/src/test/test-install-root.c
@@ -0,0 +1,663 @@
+/*-*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*-*/
+
+/**
+ * This file is part of systemd.

```

```

+
+ Copyright 2011 Lennart Poettering
+
+ systemd is free software; you can redistribute it and/or modify it
+ under the terms of the GNU Lesser General Public License as published by
+ the Free Software Foundation; either version 2.1 of the License, or
+ (at your option) any later version.
+
+ systemd is distributed in the hope that it will be useful, but
+ WITHOUT ANY WARRANTY; without even the implied warranty of
+ MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License
+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+***/
+
+#include "fileio.h"
+#include "install.h"
+#include "mkdir.h"
+#include "util.h"
+
+static void test_basic_mask_and_enable(const char *root) {
+    const char *p;
+    UnitFileState state;
+    UnitFileChange *changes = NULL;
+    unsigned n_changes = 0;
+
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "a.service", NULL) == -ENOENT);
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "b.service", NULL) == -ENOENT);
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "c.service", NULL) == -ENOENT);
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "d.service", NULL) == -ENOENT);
+
+    p = strjoina(root, "/usr/lib/systemd/system/a.service");
+    assert_se(write_string_file(p,
+                               "[Install]\n"
+                               "WantedBy=multi-user.target\n") >= 0);
+
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "a.service", NULL) >= 0);
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "a.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+    p = strjoina(root, "/usr/lib/systemd/system/b.service");
+    assert_se(symlink("a.service", p) >= 0);
+
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "b.service", NULL) >= 0);
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "b.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);

```

```

+
+   p = strjoina(root, "/usr/lib/systemd/system/c.service");
+   assert_se(symlink("/usr/lib/systemd/system/a.service", p) >= 0);
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "c.service", NULL) >= 0);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "c.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+   p = strjoina(root, "/usr/lib/systemd/system/d.service");
+   assert_se(symlink("c.service", p) >= 0);
+
+   /* This one is interesting, as d follows a relative, then an absolute symlink */
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "d.service", NULL) >= 0);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "d.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_mask(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("a.service"), false, &changes,
&n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/dev/null"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/a.service");
+   assert_se(streq(changes[0].path, p));
+
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "a.service", &state) >= 0 && state ==
UNIT_FILE_MASKED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "b.service", &state) >= 0 && state ==
UNIT_FILE_MASKED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "c.service", &state) >= 0 && state ==
UNIT_FILE_MASKED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "d.service", &state) >= 0 && state ==
UNIT_FILE_MASKED);
+
+   /* Enabling a masked unit should fail! */
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("a.service"), false, &changes,
&n_changes) == -ESHUTDOWN);
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_unmask(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("a.service"), &changes,
&n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_UNLINK);
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/a.service");
+   assert_se(streq(changes[0].path, p));

```

```

+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("a.service"), false, &changes,
&n_changes) == 1);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/a.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/a.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "a.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "b.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "c.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "d.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+
+   /* Enabling it again should succeed but be a NOP */
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("a.service"), false, &changes,
&n_changes) == 1);
+   assert_se(n_changes == 0);
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_disable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("a.service"), &changes,
&n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_UNLINK);
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/a.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "a.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "b.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "c.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "d.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+   /* Disabling a disabled unit must succeed but be a NOP */

```

```

+   assert_se(unit_file_disable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("a.service"), &changes,
&n_changes) >= 0);
+   assert_se(n_changes == 0);
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   /* Let's enable this indirectly via a symlink */
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("d.service"), false, &changes,
&n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/a.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/a.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "a.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "b.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "c.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "d.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+
+   /* Let's try to reenable */
+
+   assert_se(unit_file_reenable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("b.service"), false, &changes,
&n_changes) >= 0);
+   assert_se(n_changes == 2);
+   assert_se(changes[0].type == UNIT_FILE_UNLINK);
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/a.service");
+   assert_se(streq(changes[0].path, p));
+   assert_se(changes[1].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[1].source, "/usr/lib/systemd/system/a.service"));
+   assert_se(streq(changes[1].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "a.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "b.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "c.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "d.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);

```

```

+}
+
+static void test_linked_units(const char *root) {
+    const char *p, *q;
+    UnitFileState state;
+    UnitFileChange *changes = NULL;
+    unsigned n_changes = 0, i;
+
+    /*
+     * We'll test three cases here:
+     *
+     * a) a unit file in /opt, that we use "systemctl link" and
+     * "systemctl enable" on to make it available to the system
+     *
+     * b) a unit file in /opt, that is statically linked into
+     * /usr/lib/systemd/system, that "enable" should work on
+     * correctly.
+     *
+     * c) a unit file in /opt, that is linked into
+     * /etc/systemd/system, and where "enable" should result in
+     * -ELOOP, since using information from /etc to generate
+     * information in /etc should not be allowed.
+     */
+
+    p = strjoina(root, "/opt/linked.service");
+    assert_se(write_string_file(p,
+                                "[Install]\n"
+                                "WantedBy=multi-user.target\n") >= 0);
+
+    p = strjoina(root, "/opt/linked2.service");
+    assert_se(write_string_file(p,
+                                "[Install]\n"
+                                "WantedBy=multi-user.target\n") >= 0);
+
+    p = strjoina(root, "/opt/linked3.service");
+    assert_se(write_string_file(p,
+                                "[Install]\n"
+                                "WantedBy=multi-user.target\n") >= 0);
+
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked.service", NULL) == -ENOENT);
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked2.service", NULL) == -ENOENT);
+    assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked3.service", NULL) == -ENOENT);
+
+    p = strjoina(root, "/usr/lib/systemd/system/linked2.service");
+    assert_se(symlink("/opt/linked2.service", p) >= 0);
+
+    p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/linked3.service");
+    assert_se(symlink("/opt/linked3.service", p) >= 0);

```



```

+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked.service", &state) == -ENOENT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked2.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked3.service", &state) >= 0 && state ==
UNIT_FILE_LINKED);
+
+   /* First, let's link the unit into the search path */
+   assert_se(unit_file_link(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("/opt/linked.service"), false,
&changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/opt/linked.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/linked.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked.service", &state) >= 0 && state ==
UNIT_FILE_LINKED);
+
+   /* Let's unlink it from the search path again */
+   assert_se(unit_file_disable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("linked.service"), &changes,
&n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_UNLINK);
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/linked.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked.service", NULL) == -ENOENT);
+
+   /* Now, let's not just link it, but also enable it */
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("/opt/linked.service"), false,
&changes, &n_changes) >= 0);
+   assert_se(n_changes == 2);
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/linked.service");
+   q = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/linked.service");
+   for (i = 0 ; i < n_changes; i++) {
+       assert_se(changes[i].type == UNIT_FILE_SYMLINK);
+       assert_se(streq(changes[i].source, "/opt/linked.service"));
+
+       if (p && streq(changes[i].path, p))
+           p = NULL;
+       else if (q && streq(changes[i].path, q))
+           q = NULL;
+       else

```

```

+         assert_not_reached("wut?");
+     }
+     assert(!p && !q);
+     unit_file_changes_free(changes, n_changes);
+     changes = NULL; n_changes = 0;
+
+     assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+
+     /* And let's unlink it again */
+     assert_se(unit_file_disable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("linked.service"), &changes,
&n_changes) >= 0);
+     assert_se(n_changes == 2);
+     p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/linked.service");
+     q = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/linked.service");
+     for (i = 0; i < n_changes; i++) {
+         assert_se(changes[i].type == UNIT_FILE_UNLINK);
+
+         if (p && streq(changes[i].path, p))
+             p = NULL;
+         else if (q && streq(changes[i].path, q))
+             q = NULL;
+         else
+             assert_not_reached("wut?");
+     }
+     assert(!p && !q);
+     unit_file_changes_free(changes, n_changes);
+     changes = NULL; n_changes = 0;
+
+     assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "linked.service", NULL) == -ENOENT);
+
+     assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("linked2.service"), false,
&changes, &n_changes) >= 0);
+     assert_se(n_changes == 2);
+     p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/linked2.service");
+     q = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/linked2.service");
+     for (i = 0; i < n_changes; i++) {
+         assert_se(changes[i].type == UNIT_FILE_SYMLINK);
+         assert_se(streq(changes[i].source, "/opt/linked2.service"));
+
+         if (p && streq(changes[i].path, p))
+             p = NULL;
+         else if (q && streq(changes[i].path, q))
+             q = NULL;
+         else
+             assert_not_reached("wut?");
+     }
+     assert(!p && !q);

```

```

+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("linked3.service"), false,
&changes, &n_changes) == -ELOOP);
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+}
+
+static void test_default(const char *root) {
+   _cleanup_free_ char *def = NULL;
+   UnitFileChange *changes = NULL;
+   unsigned n_changes = 0;
+   const char *p;
+
+   p = strjoina(root, "/usr/lib/systemd/system/test-default-real.target");
+   assert_se(write_string_file(p, "# pretty much empty") >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system/test-default.target");
+   assert_se(symlink("test-default-real.target", p) >= 0);
+
+   assert_se(unit_file_get_default(UNIT_FILE_SYSTEM, root, &def) == -ENOENT);
+
+   assert_se(unit_file_set_default(UNIT_FILE_SYSTEM, root, "idontexist.target", false, &changes,
&n_changes) == -ENOENT);
+   assert_se(n_changes == 0);
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_default(UNIT_FILE_SYSTEM, root, &def) == -ENOENT);
+
+   assert_se(unit_file_set_default(UNIT_FILE_SYSTEM, root, "test-default.target", false, &changes,
&n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/test-default-real.target"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/default.target");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_default(UNIT_FILE_SYSTEM, root, &def) >= 0);
+   assert_se(streq_ptr(def, "test-default-real.target"));
+}
+
+static void test_add_dependency(const char *root) {
+   UnitFileChange *changes = NULL;
+   unsigned n_changes = 0;

```

```

+   const char *p;
+
+   p = strjoina(root, "/usr/lib/systemd/system/real-add-dependency-test-target.target");
+   assert_se(write_string_file(p, "# pretty much empty") >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system/add-dependency-test-target.target");
+   assert_se(symlink("real-add-dependency-test-target.target", p) >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system/real-add-dependency-test-service.service");
+   assert_se(write_string_file(p, "# pretty much empty") >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system/add-dependency-test-service.service");
+   assert_se(symlink("real-add-dependency-test-service.service", p) >= 0);
+
+   assert_se(unit_file_add_dependency(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("add-dependency-
test-service.service"), "add-dependency-test-target.target", UNIT_WANTS, false, &changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/real-add-dependency-test-service.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/real-add-dependency-test-target.target.wants/real-add-
dependency-test-service.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+}
+
+static void test_template_enable(const char *root) {
+   UnitFileChange *changes = NULL;
+   unsigned n_changes = 0;
+   UnitFileState state;
+   const char *p;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@.service", &state) == -ENOENT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@def.service", &state) == -ENOENT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@foo.service", &state) == -ENOENT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@foo.service", &state) == -
ENOENT);
+
+   p = strjoina(root, "/usr/lib/systemd/system/template@.service");
+   assert_se(write_string_file(p,
+                               "[Install]\n"
+                               "DefaultInstance=def\n"
+                               "WantedBy=multi-user.target\n") >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system/template-symlink@.service");
+   assert_se(symlink("template@.service", p) >= 0);
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@.service", &state) >= 0 && state ==

```

```

UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@def.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@foo.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@.service", &state) >= 0 &&
state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@def.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@foo.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("template@.service"), false,
&changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/template@.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/template@def.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@def.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@foo.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@.service", &state) >= 0 &&
state == UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@def.service", &state) >= 0
&& state == UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@foo.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_disable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("template@.service"),
&changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_UNLINK);
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@def.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@foo.service", &state) >= 0 && state ==

```

```

UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@.service", &state) >= 0 &&
state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@def.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@foo.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("template@foo.service"), false,
&changes, &n_changes) >= 0);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/template@.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/template@foo.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@def.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@foo.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@foo.service", &state) >= 0
&& state == UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@def.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@foo.service", &state) >= 0
&& state == UNIT_FILE_ENABLED);
+
+   assert_se(unit_file_disable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("template@foo.service"),
&changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_UNLINK);
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@def.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@foo.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@quux.service", &state) >= 0 && state
== UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@.service", &state) >= 0 &&
state == UNIT_FILE_DISABLED);

```

```

+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@def.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@foo.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@quux.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("template-
symlink@quux.service"), false, &changes, &n_changes) >= 0);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/template@.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/template@quux.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@def.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@foo.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template@quux.service", &state) >= 0 && state
== UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@.service", &state) >= 0 &&
state == UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@def.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@foo.service", &state) >= 0
&& state == UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "template-symlink@quux.service", &state) >= 0
&& state == UNIT_FILE_ENABLED);
+}
+
+static void test_indirect(const char *root) {
+   UnitFileChange *changes = NULL;
+   unsigned n_changes = 0;
+   UnitFileState state;
+   const char *p;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirecta.service", &state) == -ENOENT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirectb.service", &state) == -ENOENT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirectc.service", &state) == -ENOENT);
+
+   p = strjoina(root, "/usr/lib/systemd/system/indirecta.service");
+   assert_se(write_string_file(p,
+                               "[Install]\n"
+                               "Also=indirectb.service\n") >= 0);

```

```

+
+   p = strjoina(root, "/usr/lib/systemd/system/indirectb.service");
+   assert_se(write_string_file(p,
+                               "[Install]\n"
+                               "WantedBy=multi-user.target\n") >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system/indirectc.service");
+   assert_se(symmlink("indirecta.service", p) >= 0);
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirecta.service", &state) >= 0 && state ==
UNIT_FILE_INDIRECT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirectb.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirectc.service", &state) >= 0 && state ==
UNIT_FILE_INDIRECT);
+
+   assert_se(unit_file_enable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("indirectc.service"), false,
&changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/indirectb.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/indirectb.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirecta.service", &state) >= 0 && state ==
UNIT_FILE_INDIRECT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirectb.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "indirectc.service", &state) >= 0 && state ==
UNIT_FILE_INDIRECT);
+
+   assert_se(unit_file_disable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("indirectc.service"),
&changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_UNLINK);
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/indirectb.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+}
+
+static void test_preset_and_list(const char *root) {
+   UnitFileChange *changes = NULL;
+   unsigned n_changes = 0, i;
+   const char *p, *q;
+   UnitFileState state;

```



```

+   bool got_yes = false, got_no = false;
+   Iterator j;
+   UnitFileList *fl;
+   Hashmap *h;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-yes.service", &state) == -ENOENT);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-no.service", &state) == -ENOENT);
+
+   p = strjoina(root, "/usr/lib/systemd/system/preset-yes.service");
+   assert_se(write_string_file(p,
+                               "[Install]\n"
+                               "WantedBy=multi-user.target\n") >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system/preset-no.service");
+   assert_se(write_string_file(p,
+                               "[Install]\n"
+                               "WantedBy=multi-user.target\n") >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system-preset/test.preset");
+   assert_se(write_string_file(p,
+                               "enable *-yes.*\n"
+                               "disable *\n") >= 0);
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-yes.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-no.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_preset(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("preset-yes.service"),
UNIT_FILE_PRESET_FULL, false, &changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_SYMLINK);
+   assert_se(streq(changes[0].source, "/usr/lib/systemd/system/preset-yes.service"));
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/preset-yes.service");
+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-yes.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-no.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_disable(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("preset-yes.service"),
&changes, &n_changes) >= 0);
+   assert_se(n_changes == 1);
+   assert_se(changes[0].type == UNIT_FILE_UNLINK);
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/preset-yes.service");

```

```

+   assert_se(streq(changes[0].path, p));
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-yes.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-no.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_preset(UNIT_FILE_SYSTEM, false, root, STRV_MAKE("preset-no.service"),
UNIT_FILE_PRESET_FULL, false, &changes, &n_changes) >= 0);
+   assert_se(n_changes == 0);
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-yes.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-no.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+   assert_se(unit_file_preset_all(UNIT_FILE_SYSTEM, false, root, UNIT_FILE_PRESET_FULL, false,
&changes, &n_changes) >= 0);
+
+   assert_se(n_changes > 0);
+
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/multi-user.target.wants/preset-yes.service");
+
+   for (i = 0; i < n_changes; i++) {
+       if (changes[i].type == UNIT_FILE_SYMLINK) {
+           assert_se(streq(changes[i].source, "/usr/lib/systemd/system/preset-yes.service"));
+           assert_se(streq(changes[i].path, p));
+       } else
+           assert_se(changes[i].type == UNIT_FILE_UNLINK);
+   }
+
+   unit_file_changes_free(changes, n_changes);
+   changes = NULL; n_changes = 0;
+
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-yes.service", &state) >= 0 && state ==
UNIT_FILE_ENABLED);
+   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, "preset-no.service", &state) >= 0 && state ==
UNIT_FILE_DISABLED);
+
+   assert_se(h = hashmap_new(&string_hash_ops));
+   assert_se(unit_file_get_list(UNIT_FILE_SYSTEM, root, h) >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system/preset-yes.service");

```

```

+   q = strjoina(root, "/usr/lib/systemd/system/preset-no.service");
+
+   HASHMAP_FOREACH(fl, h, j) {
+       assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, root, basename(fl->path), &state) >= 0);
+       assert_se(fl->state == state);
+
+       if (streq(fl->path, p)) {
+           got_yes = true;
+           assert_se(fl->state == UNIT_FILE_ENABLED);
+       } else if (streq(fl->path, q)) {
+           got_no = true;
+           assert_se(fl->state == UNIT_FILE_DISABLED);
+       } else
+           assert_se(IN_SET(fl->state, UNIT_FILE_DISABLED, UNIT_FILE_STATIC,
UNIT_FILE_INDIRECT));
+   }
+
+   unit_file_list_free(h);
+
+   assert_se(got_yes && got_no);
+}
+
+int main(int argc, char *argv[]) {
+   char root[] = "/tmp/rootXXXXXX";
+   const char *p;
+
+   assert_se(mkdtemp(root));
+
+   p = strjoina(root, "/usr/lib/systemd/system/");
+   assert_se(mkdir_p(p, 0755) >= 0);
+
+   p = strjoina(root, SYSTEM_CONFIG_UNIT_PATH"/");
+   assert_se(mkdir_p(p, 0755) >= 0);
+
+   p = strjoina(root, "/run/systemd/system/");
+   assert_se(mkdir_p(p, 0755) >= 0);
+
+   p = strjoina(root, "/opt/");
+   assert_se(mkdir_p(p, 0755) >= 0);
+
+   p = strjoina(root, "/usr/lib/systemd/system-preset/");
+   assert_se(mkdir_p(p, 0755) >= 0);
+
+   test_basic_mask_and_enable(root);
+   test_linked_units(root);
+   test_default(root);
+   test_add_dependency(root);
+   test_template_enable(root);

```

```

+ test_indirect(root);
+ test_preset_and_list(root);
+
+ assert_se(rm_rf_dangerous(root, false, true, false));
+
+ return 0;
+}
diff --git a/src/test/test-install.c b/src/test/test-install.c
index 467970b007..08a1faf2c4 100644
--- a/src/test/test-install.c
+++ b/src/test/test-install.c
@@ -50,17 +50,19 @@ int main(int argc, char* argv[]) {
    const char *const files2[] = { "/home/lennart/test.service", NULL };
    UnitFileChange *changes = NULL;
    unsigned n_changes = 0;
+   UnitFileState state = 0;

    h = hashmap_new(&string_hash_ops);
    r = unit_file_get_list(UNIT_FILE_SYSTEM, NULL, h);
    assert_se(r == 0);

    HASHMAP_FOREACH(p, h, i) {
-       UnitFileState s;
+       UnitFileState s = _UNIT_FILE_STATE_INVALID;

-       s = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(p->path));
+       r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(p->path), &s);

-       assert_se(p->state == s);
+       assert_se((r < 0 && p->state == UNIT_FILE_BAD) ||
+                (p->state == s));

        fprintf(stderr, "%s (%s)\n",
                p->path,
@@ -82,7 +84,9 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0]) == UNIT_FILE_ENABLED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0], &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_ENABLED);

    log_error("disable");

@@ -95,7 +99,9 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

```

```

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0]) == UNIT_FILE_DISABLED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0], &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_DISABLED);

    log_error("mask");
    changes = NULL;
@@ -110,7 +116,9 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0]) == UNIT_FILE_MASKED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0], &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_MASKED);

    log_error("unmask");
    changes = NULL;
@@ -125,7 +133,9 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0]) == UNIT_FILE_DISABLED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0], &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_DISABLED);

    log_error("mask");
    changes = NULL;
@@ -137,7 +147,9 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0]) == UNIT_FILE_MASKED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0], &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_MASKED);

    log_error("disable");
    changes = NULL;
@@ -152,7 +164,9 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0]) == UNIT_FILE_MASKED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0], &state);
+   assert_se(r >= 0);

```

```

+   assert_se(state == UNIT_FILE_MASKED);

   log_error("umask");
   changes = NULL;
@@ -164,7 +178,9 @@ int main(int argc, char* argv[]) {
   dump_changes(changes, n_changes);
   unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0]) == UNIT_FILE_DISABLED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, files[0], &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_DISABLED);

   log_error("enable files2");
   changes = NULL;
@@ -176,19 +192,22 @@ int main(int argc, char* argv[]) {
   dump_changes(changes, n_changes);
   unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0])) ==
UNIT_FILE_ENABLED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0]), &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_ENABLED);

   log_error("disable files2");
   changes = NULL;
   n_changes = 0;

-   r = unit_file_disable(UNIT_FILE_SYSTEM, false, NULL, (char**) files2, &changes, &n_changes);
+   r = unit_file_disable(UNIT_FILE_SYSTEM, false, NULL, STRV_MAKE(basename(files2[0])), &changes,
&n_changes);
   assert_se(r >= 0);

   dump_changes(changes, n_changes);
   unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0])) ==
_UNIT_FILE_STATE_INVALID);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0]), &state);
+   assert_se(r < 0);

   log_error("link files2");
   changes = NULL;
@@ -200,19 +219,22 @@ int main(int argc, char* argv[]) {
   dump_changes(changes, n_changes);
   unit_file_changes_free(changes, n_changes);

```

```

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0])) ==
UNIT_FILE_LINKED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0]), &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_LINKED);

    log_error("disable files2");
    changes = NULL;
    n_changes = 0;

-   r = unit_file_disable(UNIT_FILE_SYSTEM, false, NULL, (char**) files2, &changes, &n_changes);
+   r = unit_file_disable(UNIT_FILE_SYSTEM, false, NULL, STRV_MAKE(basename(files2[0])), &changes,
&n_changes);
    assert_se(r >= 0);

    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0])) ==
_UNIT_FILE_STATE_INVALID);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0]), &state);
+   assert_se(r < 0);

    log_error("link files2");
    changes = NULL;
@@ -224,7 +246,9 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0])) ==
UNIT_FILE_LINKED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0]), &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_LINKED);

    log_error("reenable files2");
    changes = NULL;
@@ -236,19 +260,22 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0])) ==
UNIT_FILE_ENABLED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0]), &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_ENABLED);

    log_error("disable files2");

```

```

changes = NULL;
n_changes = 0;

-   r = unit_file_disable(UNIT_FILE_SYSTEM, false, NULL, (char**) files2, &changes, &n_changes);
+   r = unit_file_disable(UNIT_FILE_SYSTEM, false, NULL, STRV_MAKE(basename(files2[0])), &changes,
&n_changes);
    assert_se(r >= 0);

    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0])) ==
_UNIT_FILE_STATE_INVALID);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files2[0]), &state);
+   assert_se(r < 0);
    log_error("preset files");
    changes = NULL;
    n_changes = 0;
@@ -259,7 +286,9 @@ int main(int argc, char* argv[]) {
    dump_changes(changes, n_changes);
    unit_file_changes_free(changes, n_changes);

-   assert_se(unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files[0])) ==
UNIT_FILE_ENABLED);
+   r = unit_file_get_state(UNIT_FILE_SYSTEM, NULL, basename(files[0]), &state);
+   assert_se(r >= 0);
+   assert_se(state == UNIT_FILE_ENABLED);

    return 0;
}

```

Found in path(s):

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm/download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0296-install-follow-unit-file-symlinks-in-usr-but-not-etc.patch
```

No license file was found, but licenses were detected in source scan.

From 5ec508cc5c13d831c93ce98d84b1d9cedb0117a7 Mon Sep 17 00:00:00 2001

From: Jan Synacek <jsynacek@redhat.com>

Date: Mon, 1 Feb 2016 09:23:58 +0100

Subject: [PATCH] sd-journal: introduce has\_runtime\_files and has\_persistent\_files

Also introduce sd\_journal\_has\_runtime\_files() and sd\_journal\_has\_persistent\_files() to the public API. These functions can be used to easily find out if the open journal files are runtime and/or persistent.



Cherry-picked from: 39fd5b08a73f144a20202a665bd25cad51d8a90b

Resolves: #1082179

---

```
Makefile-man.am          | 7 ++
man/sd-journal.xml       | 8 ++-
man/sd_journal_has_runtime_files.xml | 95 ++++++
src/journal/journal-internal.h   | 2 +
src/journal/sd-journal.c        | 29 ++++++
src/systemd/sd-journal.h        | 3 +
6 files changed, 133 insertions(+), 11 deletions(-)
create mode 100644 man/sd_journal_has_runtime_files.xml
```

diff --git a/Makefile-man.am b/Makefile-man.am

index 497be6612c..7ec709c8b8 100644

--- a/Makefile-man.am

+++ b/Makefile-man.am

@@ -40,6 +40,7 @@ MANPAGES += \  
man/sd\_journal\_get\_fd.3 \  
man/sd\_journal\_get\_realtime\_usec.3 \  
man/sd\_journal\_get\_usage.3 \  
+ man/sd\_journal\_has\_runtime\_files.3 \  
man/sd\_journal\_next.3 \  
man/sd\_journal\_open.3 \  
man/sd\_journal\_print.3 \  
@@ -176,6 +177,7 @@ MANPAGES\_ALIAS += \  
man/sd\_journal\_get\_events.3 \  
man/sd\_journal\_get\_monotonic\_usec.3 \  
man/sd\_journal\_get\_timeout.3 \  
+ man/sd\_journal\_has\_persistent\_files.3 \  
man/sd\_journal\_next\_skip.3 \  
man/sd\_journal\_open\_container.3 \  
man/sd\_journal\_open\_directory.3 \  
@@ -287,6 +289,7 @@ man/sd\_journal\_get\_data\_threshold.3: man/sd\_journal\_get\_data.3  
man/sd\_journal\_get\_events.3: man/sd\_journal\_get\_fd.3  
man/sd\_journal\_get\_monotonic\_usec.3: man/sd\_journal\_get\_realtime\_usec.3  
man/sd\_journal\_get\_timeout.3: man/sd\_journal\_get\_fd.3  
+man/sd\_journal\_has\_persistent\_files.3: man/sd\_journal\_has\_runtime\_files.3  
man/sd\_journal\_next\_skip.3: man/sd\_journal\_next.3  
man/sd\_journal\_open\_container.3: man/sd\_journal\_open.3  
man/sd\_journal\_open\_directory.3: man/sd\_journal\_open.3  
@@ -500,6 +503,9 @@ man/sd\_journal\_get\_monotonic\_usec.html: man/sd\_journal\_get\_realtime\_usec.html  
man/sd\_journal\_get\_timeout.html: man/sd\_journal\_get\_fd.html  
\$(html-alias)  
  
+man/sd\_journal\_has\_persistent\_files.html: man/sd\_journal\_has\_runtime\_files.html  
+ \$(html-alias)  
+  
man/sd\_journal\_next\_skip.html: man/sd\_journal\_next.html

\$(html-alias)

```
@@ -1727,6 +1733,7 @@ EXTRA_DIST += \  
man/sd_journal_get_fd.xml \  
man/sd_journal_get_realtime_usec.xml \  
man/sd_journal_get_usage.xml \  
+ man/sd_journal_has_runtime_files.xml \  
man/sd_journal_next.xml \  
man/sd_journal_open.xml \  
man/sd_journal_print.xml \  
diff --git a/man/sd-journal.xml b/man/sd-journal.xml  
index 9b1a52207f..a1185d372b 100644  
--- a/man/sd-journal.xml  
+++ b/man/sd-journal.xml  
@@ -81,9 +81,11 @@  
<citerefentry><refentrytitle>sd_journal_get_cutoff_realtime_usec</refentrytitle><manvolnum>3</manvolnum></ci  
terefentry>,  
<citerefentry><refentrytitle>sd_journal_get_cutoff_monotonic_usec</refentrytitle><manvolnum>3</manvolnum><  
/citerefentry>,  
  <citerefentry><refentrytitle>sd_journal_get_usage</refentrytitle><manvolnum>3</manvolnum></citerefentry>,  
-  
<citerefentry><refentrytitle>sd_journal_get_catalog</refentrytitle><manvolnum>3</manvolnum></citerefentry>  
+  
<citerefentry><refentrytitle>sd_journal_get_catalog</refentrytitle><manvolnum>3</manvolnum></citerefentry>,  
+ <citerefentry><refentrytitle>sd_journal_get_fd</refentrytitle><manvolnum>3</manvolnum></citerefentry>,  
+  
<citerefentry><refentrytitle>sd_journal_has_runtime_files</refentrytitle><manvolnum>3</manvolnum></citerefen  
try>  
  and  
- <citerefentry><refentrytitle>sd_journal_get_fd</refentrytitle><manvolnum>3</manvolnum></citerefentry>  
+  
<citerefentry><refentrytitle>sd_journal_has_persistent_files</refentrytitle><manvolnum>3</manvolnum></citerefe  
ntry>  
  for more information about the functions implemented.</para>  
  
<para>Command line access for submitting entries to the journal is  
@@ -116,6 +118,8 @@  
  <citerefentry><refentrytitle>sd_journal_get_fd</refentrytitle><manvolnum>3</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>sd_journal_query_unique</refentrytitle><manvolnum>3</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>sd_journal_get_catalog</refentrytitle><manvolnum>3</manvolnum></citerefentry>,+  
<citerefentry><refentrytitle>sd_journal_has_runtime_files</refentrytitle><manvolnum>3</manvolnum></citerefen  
try>,  
+  
<citerefentry><refentrytitle>sd_journal_has_persistent_files</refentrytitle><manvolnum>3</manvolnum></citerefe  
ntry>,  
  <citerefentry><refentrytitle>journalctl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,  
  <citerefentry><refentrytitle>sd-id128</refentrytitle><manvolnum>3</manvolnum></citerefentry>,  
  <citerefentry project='die-net'><refentrytitle>pkg-
```

```

config</refentrytitle><manvolnum>1</manvolnum></citerefentry>
diff --git a/man/sd_journal_has_runtime_files.xml b/man/sd_journal_has_runtime_files.xml
new file mode 100644
index 0000000000..237e649206
--- /dev/null
+++ b/man/sd_journal_has_runtime_files.xml
@@ -0,0 +1,95 @@
+<?xml version='1.0'?> <!--*-nxml-*-->
+<!DOCTYPE refentry PUBLIC "-//OASIS//DTD DocBook XML V4.2//EN"
+ "http://www.oasis-open.org/docbook/xml/4.2/docbookx.dtd">
+
+
+<!--
+ This file is part of systemd.
+
+ Copyright 2016 Jan Synáek
+
+ systemd is free software; you can redistribute it and/or modify it
+ under the terms of the GNU Lesser General Public License as published by
+ the Free Software Foundation; either version 2.1 of the License, or
+ (at your option) any later version.
+
+ systemd is distributed in the hope that it will be useful, but
+ WITHOUT ANY WARRANTY; without even the implied warranty of
+ MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License
+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+-->
+
+<refentry id="sd_journal_has_runtime_files">
+
+ <refentryinfo>
+ <title>sd_journal_has_runtime_files</title>
+ <productname>systemd</productname>
+
+ <authorgroup>
+ <author>
+ <contrib>Developer</contrib>
+ <firstname>Jan</firstname>
+ <surname>Synáek</surname>
+ <email>jan.synacek@gmail.com</email>
+ </author>
+ </authorgroup>
+ </refentryinfo>
+
+ <refmeta>
+ <refentrytitle>sd_journal_has_runtime_files</refentrytitle>

```

```

+ <manvolnum>3</manvolnum>
+ </refmeta>
+
+ <refnamediv>
+ <refname>sd_journal_has_runtime_files</refname>
+ <refname>sd_journal_has_persistent_files</refname>
+ <refpurpose>Query availability of runtime or persistent journal files.</refpurpose>
+ </refnamediv>
+
+ <refsynopsisdiv>
+ <funcsynopsis>
+ <funcsynopsisinfo>#include <systemd/sd-journal.h></funcsynopsisinfo>
+
+ <funcprototype>
+ <funcdef>int <function>sd_journal_has_runtime_files</function></funcdef>
+ <paramdef>sd_journal *<parameter>j</parameter></paramdef>
+ </funcprototype>
+
+ <funcprototype>
+ <funcdef>int <function>sd_journal_has_persistent_files</function></funcdef>
+ <paramdef>sd_journal *<parameter>j</parameter></paramdef>
+ </funcprototype>
+
+ </funcsynopsis>
+ </refsynopsisdiv>
+
+ <refsect1>
+ <title>Description</title>
+
+ <para><function>sd_journal_has_runtime_files</function> returns a positive value
+ if runtime journal files (present in /run/systemd/journal/) have been found.
+ Otherwise returns 0.</para>
+
+ <para><function>sd_journal_has_persistent_files</function> returns a positive value
+ if persistent journal files (present in /var/log/journal/) have been found.
+ Otherwise returns 0.</para>
+ </refsect1>
+
+ <refsect1>
+ <title>Return value</title>
+ <para>Both <function>sd_journal_has_runtime_files</function>
+ and <function>sd_journal_has_persistent_files</function> return -EINVAL
+ if their argument is NULL.
+ </para>
+ </refsect1>
+
+ <refsect1>
+ <title>See Also</title>

```

```

+ <para>
+ <citerefentry><refentrytitle>sd-journal</refentrytitle><manvolnum>3</manvolnum></citerefentry>
+ </para>
+ </refsect1>
+
+</refentry>
diff --git a/src/journal/journal-internal.h b/src/journal/journal-internal.h
index b51ecdb600..115d7776da 100644
--- a/src/journal/journal-internal.h
+++ b/src/journal/journal-internal.h
@@ -115,6 +115,8 @@ struct sd_journal {
                removed, and there were no more
                files, so sd_j_enumerate_unique
                will return a value equal to 0. */
+   bool has_runtime_files:1;
+   bool has_persistent_files:1;

    size_t data_threshold;

diff --git a/src/journal/sd-journal.c b/src/journal/sd-journal.c
index 9b9e8ac859..20456c3a12 100644
--- a/src/journal/sd-journal.c
+++ b/src/journal/sd-journal.c
@@ -1230,8 +1230,7 @@ static int add_any_file(sd_journal *j, const char *path) {
}

static int add_file(sd_journal *j, const char *prefix, const char *filename) {
-   _cleanup_free_ char *path = NULL;
-   int r;
+   char *path = NULL;

    assert(j);
    assert(prefix);
@@ -1241,14 +1240,14 @@ static int add_file(sd_journal *j, const char *prefix, const char *filename) {
    !file_type_wanted(j->flags, filename))
        return 0;

-   path = strjoin(prefix, "/", filename, NULL);
-   if (!path)
-       return -ENOMEM;
+   path = strjoina(prefix, "/", filename);

-   r = add_any_file(j, path);
-   if (r == -ENOENT)
-       return 0;
-   return r;
+   if (!j->has_runtime_files && path_startswith(path, "/run/log/journal"))
+       j->has_runtime_files = true;

```

```

+   else if (!j->has_persistent_files && path_startswith(path, "/var/log/journal"))
+       j->has_persistent_files = true;
+
+   return add_any_file(j, path);
+ }

static int remove_file(sd_journal *j, const char *prefix, const char *filename) {
@@ -2616,3 +2615,15 @@ _public_ int sd_journal_get_data_threshold(sd_journal *j, size_t *sz) {
    *sz = j->data_threshold;
    return 0;
}
+
+_public_ int sd_journal_has_runtime_files(sd_journal *j) {
+   assert_return(j, -EINVAL);
+
+   return j->has_runtime_files;
+}
+
+_public_ int sd_journal_has_persistent_files(sd_journal *j) {
+   assert_return(j, -EINVAL);
+
+   return j->has_persistent_files;
+}
diff --git a/src/systemd/sd-journal.h b/src/systemd/sd-journal.h
index 00237a2158..d5fd46eea4 100644
--- a/src/systemd/sd-journal.h
+++ b/src/systemd/sd-journal.h
@@ -138,6 +138,9 @@ int sd_journal_reliable_fd(sd_journal *j);
int sd_journal_get_catalog(sd_journal *j, char **text);
int sd_journal_get_catalog_for_message_id(sd_id128_t id, char **text);

+int sd_journal_has_runtime_files(sd_journal *j);
+int sd_journal_has_persistent_files(sd_journal *j);
+
/* the inverse condition avoids ambiguity of danling 'else' after the macro */
#define SD_JOURNAL_FOREACH(j) \
    if (sd_journal_seek_head(j) < 0) { } \

```

Found in path(s):

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm.download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0278-sd-journal-introduce-has_runtime_files-and-has_persi.patch
```

No license file was found, but licenses were detected in source scan.

From a0def1365a2c50f7e1d4ec14c104bfe5cbd8bf8a Mon Sep 17 00:00:00 2001

From: =?UTF-8?q?Zbigniew=20J=C4=99drzejewski-Szmek?= <zbyczek@in.waw.pl>

Date: Fri, 13 Mar 2015 21:22:39 -0500

Subject: [PATCH] man: fix a bunch of links

All hail linkchecker!

(cherry picked from commit 3ba3a79df4ae094d1008c04a9af8d1ff970124c4)

Conflicts:

```
man/systemd-efi-boot-generator.xml
---
man/busctl.xml | 4 +--
man/crypttab.xml | 20 ++++++-----
man/file-hierarchy.xml | 2 +-
man/kernel-command-line.xml | 2 +-
man/locale.conf.xml | 8 +++--
man/localectl.xml | 8 +++--
man/logind.conf.xml | 2 +-
man/machine-id.xml | 4 +--
man/modules-load.d.xml | 2 +-
man/os-release.xml | 2 +-
man/sd_bus_message_append.xml | 2 +-
man/sd_bus_open_user.xml | 2 +-
man/sd_event_add_signal.xml | 4 +--
man/sd_journal_get_catalog.xml | 2 +-
man/sd_journal_get_cursor.xml | 2 +-
man/sd_journal_print.xml | 14 +++++-----
man/sysctl.d.xml | 8 +++--
man/systemctl.xml | 6 +++--
man/systemd-activate.xml | 2 +-
man/systemd-analyze.xml | 4 +--
man/systemd-cat.xml | 2 +-
man/systemd-cryptsetup-generator.xml | 2 +-
man/systemd-cryptsetup@.service.xml | 2 +-
man/systemd-efi-boot-generator.xml | 4 +--
man/systemd-firstboot.xml | 14 +++++-----
man/systemd-fstab-generator.xml | 4 +--
man/systemd-gpt-auto-generator.xml | 8 +++--
man/systemd-hibernate-resume-generator.xml | 2 +-
man/systemd-journald.service.xml | 2 +-
man/systemd-localed.service.xml | 8 +++--
man/systemd-nspawn.xml | 4 +--
man/systemd-quotacheck.service.xml | 2 +-
man/systemd-remount-fs.service.xml | 6 +--
man/systemd-socket-proxyd.xml | 8 +++--
man/systemd-sysctl.service.xml | 8 +++--
man/systemd-system.conf.xml | 2 +-
man/systemd-update-utmp.service.xml | 2 +-
man/systemd-vconsole-setup.service.xml | 8 +++--
man/systemd.automount.xml | 6 +--
man/systemd.exec.xml | 16 +++++-----
```

```

man/systemd.generator.xml      | 2 +-
man/systemd.journal-fields.xml | 2 +-
man/systemd.kill.xml          | 4 +--
man/systemd.mount.xml         | 14 +++++-----
man/systemd.network.xml       | 8 +----
man/systemd.path.xml          | 4 +--
man/systemd.socket.xml        | 32 ++++++++-----
man/systemd.swap.xml          | 10 +-----
man/systemd.unit.xml          | 4 +--
man/systemd.xml                | 6 +---
man/vconsole.conf.xml         | 6 +--

```

51 files changed, 151 insertions(+), 151 deletions(-)

```
diff --git a/man/busctl.xml b/man/busctl.xml
```

```
index 251233bb96..cc1844b0a0 100644
```

```
--- a/man/busctl.xml
```

```
+++ b/man/busctl.xml
```

```
@@ -288,7 +288,7 @@
```

```

url="http://wiki.wireshark.org/Development/LibpcapFileFormat">Libpcap
File Format</ulink> description. Make sure to redirect the
output to STDOUT to a file. Tools like

```

```
- <citerefentry><refentrytitle>wireshark</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
+ <citerefentry project='die-
```

```
net'><refentrytitle>wireshark</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```

may be used to dissect and view the generated
files.</para></listitem>

```

```
</varlistentry>
```

```
@@ -472,7 +472,7 @@ o "/org/freedesktop/systemd1/job/42684"</programlisting>
```

```
<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</refentrytitle><manvolnum>8</manvolnum></citerefentry>,</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
- <citerefentry><refentrytitle>wireshark</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
+ <citerefentry project='die-
```

```
net'><refentrytitle>wireshark</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
</para>
```

```
</refsect1>
```

```
</refentry>
```

```
diff --git a/man/crypttab.xml b/man/crypttab.xml
```

```
index aeacc57973..3e249ad23e 100644
```

```
--- a/man/crypttab.xml
```

```
+++ b/man/crypttab.xml
```

```
@@ -75,7 +75,7 @@
```

```
<para>Setting up encrypted block devices using this file supports
```

```
three encryption modes: LUKS, TrueCrypt and plain. See
```

```
- <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>
```

```
+ <citerefentry project='die-
```

```
net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>
```



for more information about each mode. When no mode is specified in the options field and the block device contains a LUKS signature, it is opened as a LUKS device; otherwise, it is assumed to be in

@@ -117,7 +117,7 @@

<term><option>cipher=</option></term>

<listitem><para>Specifies the cipher to use. See

- <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

+ <citerefentry project='die-

net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

for possible values and the default value of this option. A

cipher with unpredictable IV values, such as

<literal>aes-cbc-essiv:sha256</literal>, is

@@ -129,7 +129,7 @@

<listitem><para>Specifies the hash to use for password hashing. See

- <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

+ <citerefentry project='die-

net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

for possible values and the default value of this

option.</para></listitem>

</varlistentry>

@@ -140,7 +140,7 @@

<listitem><para>Use a detached (separated) metadata device or file where the LUKS header is stored. This option is only relevant for LUKS devices. See

- <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

+ <citerefentry project='die-

net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

for possible values and the default value of this

option.</para></listitem>

</varlistentry>

@@ -150,7 +150,7 @@

<listitem><para>Specifies the number of bytes to skip at the start of the key file. See

- <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

+ <citerefentry project='die-

net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

for possible values and the default value of this

option.</para></listitem>

</varlistentry>

@@ -160,7 +160,7 @@

<listitem><para>Specifies the maximum number of bytes to read from the key file. See

- <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>

+ <citrefentry project='die-net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>  
 for possible values and the default value of this option. This option is ignored in plain encryption mode, as the key file size is then given by the key size.</para></listitem>

@@ -174,7 +174,7 @@  
 given passphrase or key, but another would, the setup of the device will fail regardless. This option implies <option>luks</option>. See

- <citrefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>

+ <citrefentry project='die-net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>  
 for possible values. The default is to try all key slots in sequential order.</para></listitem>

</varlistentry>

@@ -221,7 +221,7 @@  
 <term><option>size=</option></term>

</listitem><para>Specifies the key size in bits. See

- <citrefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>

+ <citrefentry project='die-net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>  
 for possible values and the default value of this option.</para></listitem>

</varlistentry>

@@ -278,7 +278,7 @@  
 volume provided in the second field. Please note that there is no protection for the hidden volume if the outer volume is mounted instead. See

- <citrefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>

+ <citrefentry project='die-net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>  
 for more information on this limitation.</para></listitem>

</varlistentry>

@@ -383,7 +383,7 @@ hidden /mnt/tc\_hidden /dev/null tcrypt-hidden,tcrypt-keyfile=/etc/keyfil  
 <citrefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citrefentry>,  
 <citrefentry><refentrytitle>systemd-cryptsetup@.service</refentrytitle><manvolnum>8</manvolnum></citrefentry>,  
 <citrefentry><refentrytitle>systemd-cryptsetup-generator</refentrytitle><manvolnum>8</manvolnum></citrefentry>,  
 - <citrefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>,  
 + <citrefentry project='die-net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citrefentry>,  
 <citrefentry project='man-pages'><refentrytitle>mkswap</refentrytitle><manvolnum>8</manvolnum></citrefentry>,  
 <citrefentry project='man-pages'><refentrytitle>mke2fs</refentrytitle><manvolnum>8</manvolnum></citrefentry>

```

</para>
diff --git a/man/file-hierarchy.xml b/man/file-hierarchy.xml
index e9c894f5c8..364e130790 100644
--- a/man/file-hierarchy.xml
+++ b/man/file-hierarchy.xml
@@ -397,7 +397,7 @@
    <term><filename>/dev/shm</filename></term>
    <listitem><para>Place for POSIX shared memory segments, as
    created via
-   <citerefentry><refentrytitle>shm_open</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
+   <citerefentry project='die-
net'><refentrytitle>shm_open</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
    This directory is flushed on boot, and is a
    <literal>tmpfs</literal> file system. Since all users have
    write access to this directory, special care should be taken
diff --git a/man/kernel-command-line.xml b/man/kernel-command-line.xml
index 3741cf9cc2..919bd13745 100644
--- a/man/kernel-command-line.xml
+++ b/man/kernel-command-line.xml
@@ -336,7 +336,7 @@
    <listitem>
    <para>Enables resume from hibernation using the specified
    device. All
-   <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>-like
+   <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>-like
    paths are supported. For details, see
    <citerefentry><refentrytitle>systemd-hibernate-resume-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>.</para>
    </listitem>
diff --git a/man/locale.conf.xml b/man/locale.conf.xml
index 48c0006db2..2c32d16094 100644
--- a/man/locale.conf.xml
+++ b/man/locale.conf.xml
@@ -91,7 +91,7 @@
    might be checked for locale configuration as well, however only as
    fallback.</para>
-   <para><citerefentry><refentrytitle>locaectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>
+   <para><citerefentry project='man-
pages'><refentrytitle>locaectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>
    may be used to alter the settings in this file during runtime from
    the command line. Use
    <citerefentry><refentrytitle>systemd-firstboot</refentrytitle><manvolnum>1</manvolnum></citerefentry>
@@ -121,7 +121,7 @@
    Note that <varname>LC_ALL</varname> may not be configured in this
    file. For details about the meaning and semantics of these
    settings, refer to

```

```

- <citerefentry><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>.</para>
+ <citerefentry project='man-
pages'><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>.</para>
</refsect1>

<refsect1>
@@ -142,8 +142,8 @@ LC_MESSAGES=en_US.UTF-8</programlisting>
<title>See Also</title>
<para>
<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>localectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>localectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
<citerefentry><refentrytitle>systemd-
located.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
<citerefentry><refentrytitle>systemd-firstboot</refentrytitle><manvolnum>1</manvolnum></citerefentry>
</para>
diff --git a/man/localectl.xml b/man/localectl.xml
index aae6e0629c..7def047f62 100644
--- a/man/localectl.xml
+++ b/man/localectl.xml
@@ -124,7 +124,7 @@
<listitem><para>Set the system locale. This takes one or more
assignments such as "LANG=de_DE.utf8",
"LC_MESSAGES=en_GB.utf8", and so on. See
- <citerefentry><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>
for details on the available settings and their meanings. Use
<command>list-locales</command> for a list of available
locales (see below). </para></listitem>
@@ -204,10 +204,10 @@
<title>See Also</title>
<para>
<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
<citerefentry><refentrytitle>vconsole.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+ <citerefentry
project='mankier'><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>,

```

```

    <citerefentry><refentrytitle>kbd</refentrytitle><manvolnum>4</manvolnum></citerefentry>,
    <ulink url="http://www.x.org/releases/current/doc/xorg-docs/input/XKB-Config.html">
    The XKB Configuration Guide
diff --git a/man/logind.conf.xml b/man/logind.conf.xml
index ca2b18783c..d02d573565 100644
--- a/man/logind.conf.xml
+++ b/man/logind.conf.xml
@@ -126,7 +126,7 @@

    <para>Note that setting <varname>KillUserProcesses=1</varname>
    will break tools like
-
<citerefentry><refentrytitle>screen</refentrytitle><manvolnum>1</manvolnum></citerefentry>.</para></listitem>
+ <citerefentry project='die-
net'><refentrytitle>screen</refentrytitle><manvolnum>1</manvolnum></citerefentry>.</para></listitem>
</varlistentry>

<varlistentry>
diff --git a/man/machine-id.xml b/man/machine-id.xml
index 83e0b26ced..92d67a3869 100644
--- a/man/machine-id.xml
+++ b/man/machine-id.xml
@@ -75,7 +75,7 @@
    globally unique ID in the network, which does not change even if
    the local network configuration changes. Due to this and its
    greater length, it is a more useful replacement for the
- <citerefentry><refentrytitle>gethostid</refentrytitle><manvolnum>3</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>gethostid</refentrytitle><manvolnum>3</manvolnum></citerefentry>
    call that POSIX specifies.</para>

    <para>The
@@ -127,7 +127,7 @@ id[8] = (id[8] &amp; 0x3F) | 0x80;</programlisting>
    <para>
    <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-machine-id-
setup</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>gethostid</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>gethostid</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>hostname</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>machine-info</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>os-release</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
diff --git a/man/modules-load.d.xml b/man/modules-load.d.xml
index 34a937db68..4b722aa128 100644
--- a/man/modules-load.d.xml
+++ b/man/modules-load.d.xml
@@ -94,7 +94,7 @@ virtio-net</programlisting>

```

```

    <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-modules-
load.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-delta</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>modprobe</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>modprobe</refentrytitle><manvolnum>8</manvolnum></citerefentry>
    </para>
</refsect1>

```

```
diff --git a/man/os-release.xml b/man/os-release.xml
```

```
index 1b71a49d05..8f4ab10fed 100644
```

```
--- a/man/os-release.xml
```

```
+++ b/man/os-release.xml
```

```
@@ -316,7 +316,7 @@ BUG_REPORT_URL="https://bugzilla.redhat.com/"</programlisting>
```

```
<title>See Also</title>
```

```
<para>
```

```

    <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>lsb_release</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+   <citerefentry project='die-
net'><refentrytitle>lsb_release</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>hostname</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>machine-id</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>machine-info</refentrytitle><manvolnum>5</manvolnum></citerefentry>

```

```
diff --git a/man/sd_bus_message_append.xml b/man/sd_bus_message_append.xml
```

```
index 0c49a0c7c9..11fa07c636 100644
```

```
--- a/man/sd_bus_message_append.xml
```

```
+++ b/man/sd_bus_message_append.xml
```

```
@@ -245,7 +245,7 @@ sd_bus_message_append(m, "ynqiuxt", y, n, q, i, u, x, t, d);</programlisting>
```

```

    <citerefentry><refentrytitle>sd_bus_new</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>sd_bus_ref</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>sd_bus_unref</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>ssh</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+   <citerefentry project='die-net'><refentrytitle>ssh</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-
mached.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>machinectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>
    </para>

```

```
diff --git a/man/sd_bus_open_user.xml b/man/sd_bus_open_user.xml
```

```
index e7a765962a..2bbb010696 100644
```

```
--- a/man/sd_bus_open_user.xml
```

```
+++ b/man/sd_bus_open_user.xml
```

```
@@ -208,7 +208,7 @@ along with systemd; If not, see <http://www.gnu.org/licenses/>.
```

```

    <citerefentry><refentrytitle>sd_bus_new</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>sd_bus_ref</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>sd_bus_unref</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>ssh</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+   <citerefentry project='die-net'><refentrytitle>ssh</refentrytitle><manvolnum>1</manvolnum></citerefentry>,

```

<citerefentry><refentrytitle>systemd-  
machined.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>machinectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>  
</para>

diff --git a/man/sd\_event\_add\_signal.xml b/man/sd\_event\_add\_signal.xml  
index 0299aa5a53..7c8df7df8d 100644

--- a/man/sd\_event\_add\_signal.xml

+++ b/man/sd\_event\_add\_signal.xml

@@ -86,7 +86,7 @@ along with systemd; If not, see <<http://www.gnu.org/licenses/>>.

the <parameter>source</parameter> parameter. The

<parameter>signal</parameter> parameter specifies the signal to be handled

(see

- <citerefentry><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>).

+ <citerefentry project='man-

pages'><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>).

The <parameter>handler</parameter> must reference a function to

call when the signal is delivered or be <constant>NULL</constant>.

The handler function will be passed the

@@ -94,7 +94,7 @@ along with systemd; If not, see <<http://www.gnu.org/licenses/>>.

freely by the caller. The handler also receives a pointer to a

<structname>const struct sigalfd\_siginfo</structname> containing

the information about the received signal. See

- <citerefentry><refentrytitle>sigalfd</refentrytitle><manvolnum>2</manvolnum></citerefentry>

+ <citerefentry project='man-

pages'><refentrytitle>sigalfd</refentrytitle><manvolnum>2</manvolnum></citerefentry>

for further information.</para>

<para>Only a single handler may be installed for a specific

diff --git a/man/sd\_journal\_get\_catalog.xml b/man/sd\_journal\_get\_catalog.xml

index 1dcbadd186..c19eb11b20 100644

--- a/man/sd\_journal\_get\_catalog.xml

+++ b/man/sd\_journal\_get\_catalog.xml

@@ -130,7 +130,7 @@

<citerefentry><refentrytitle>sd\_journal\_open</refentrytitle><manvolnum>3</manvolnum></citerefentry>,

<citerefentry><refentrytitle>sd\_journal\_next</refentrytitle><manvolnum>3</manvolnum></citerefentry>,

<citerefentry><refentrytitle>sd\_journal\_get\_data</refentrytitle><manvolnum>3</manvolnum></citerefentry>,

- <citerefentry><refentrytitle>malloc</refentrytitle><manvolnum>3</manvolnum></citerefentry>

+ <citerefentry project='man-

pages'><refentrytitle>malloc</refentrytitle><manvolnum>3</manvolnum></citerefentry>

</para>

</refsect1>

diff --git a/man/sd\_journal\_get\_cursor.xml b/man/sd\_journal\_get\_cursor.xml

index 2b7f443f29..a400d8b1b5 100644

--- a/man/sd\_journal\_get\_cursor.xml

+++ b/man/sd\_journal\_get\_cursor.xml

@@ -84,7 +84,7 @@

time) available entry. The call takes two arguments: a journal

context object and a pointer to a string pointer where the cursor string will be placed. The string is allocated via libc

```
- <citerefentry><refentrytitle>malloc</refentrytitle><manvolnum>3</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>malloc</refentrytitle><manvolnum>3</manvolnum></citerefentry>
and should be freed after use with
<citerefentry project='man-
pages'><refentrytitle>free</refentrytitle><manvolnum>3</manvolnum></citerefentry>.</para>
```

```
diff --git a/man/sd_journal_print.xml b/man/sd_journal_print.xml
index 068b10e7ca..0cd0b45b9a 100644
```

```
--- a/man/sd_journal_print.xml
+++ b/man/sd_journal_print.xml
@@ -119,7 +119,7 @@
<function>sd_journal_print()</function> but takes a variable
argument list encapsulated in an object of type
<varname>va_list</varname> (see
- <citerefentry><refentrytitle>stdarg</refentrytitle><manvolnum>3</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>stdarg</refentrytitle><manvolnum>3</manvolnum></citerefentry>
for more information) instead of the format string. It is
otherwise equivalent in behavior.</para>
```

```
@@ -145,7 +145,7 @@
<function>sd_journal_send()</function> but takes an array of
<varname>struct iovec</varname> (as defined in
<filename>uio.h</filename>, see
- <citerefentry><refentrytitle>readv</refentrytitle><manvolnum>3</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>readv</refentrytitle><manvolnum>3</manvolnum></citerefentry>
for details) instead of the format string. Each structure should
reference one field of the entry to submit. The second argument
specifies the number of structures in the array.
```

```
@@ -154,7 +154,7 @@
necessary.</para>
```

```
<para><function>sd_journal_perror()</function> is a similar to
- <citerefentry><refentrytitle>perror</refentrytitle><manvolnum>3</manvolnum></citerefentry>
+ <citerefentry project='die-
net'><refentrytitle>perror</refentrytitle><manvolnum>3</manvolnum></citerefentry>
and writes a message to the journal that consists of the passed
string, suffixed with ": " and a human readable representation of
the current error code stored in
```

```
@@ -219,7 +219,7 @@ sd_journal_send("MESSAGE=Hello World, this is PID %lu!", (unsigned long) getpid(
<title>Async signal safety</title>
```

```
<para><function>sd_journal_sendv()</function> is "async signal
safe" in the meaning of
- <citerefentry><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>.
```



```

+ <citerefentry project='man-
pages'><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>.
</para>

<para><function>sd_journal_print</function>,
@@ -249,11 +249,11 @@ sd_journal_send("MESSAGE=Hello World, this is PID %lu!", (unsigned long) getpid(
<citerefentry><refentrytitle>sd-journal</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
<citerefentry><refentrytitle>sd_journal_stream_fd</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
<citerefentry project='man-
pages'><refentrytitle>syslog</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>perror</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
+ <citerefentry project='die-
net'><refentrytitle>perror</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
<citerefentry project='man-
pages'><refentrytitle>errno</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
<citerefentry><refentrytitle>systemd.journal-
fields</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
</para>
</refsect1>

```

```
diff --git a/man/sysctl.d.xml b/man/sysctl.d.xml
```

```
index 5a35cfe2c8..8a131791a5 100644
```

```
--- a/man/sysctl.d.xml
```

```
+++ b/man/sysctl.d.xml
```

```
@@ -57,7 +57,7 @@
```

```

<para>At boot,
<citerefentry><refentrytitle>systemd-sysctl.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>
reads configuration files from the above directories to configure
- <citerefentry><refentrytitle>sysctl</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>sysctl</refentrytitle><manvolnum>8</manvolnum></citerefentry>
kernel parameters.</para>
</refsect1>

```

```
@@ -162,9 +162,9 @@ net.bridge.bridge-nf-call-arptables = 0
```

```

<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
<citerefentry><refentrytitle>systemd-
sysctl.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
<citerefentry><refentrytitle>systemd-delta</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>sysctl</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>sysctl.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>modprobe</refentrytitle><manvolnum>8</manvolnum></citerefentry>

```

```

+ <citerefentry project='man-
pages'><refentrytitle>sysctl</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>sysctl.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>modprobe</refentrytitle><manvolnum>8</manvolnum></citerefentry>
  </para>
</refsect1>

```

```
diff --git a/man/systemctl.xml b/man/systemctl.xml
```

```
index 6f30474c39..07eb43165e 100644
```

```
--- a/man/systemctl.xml
```

```
+++ b/man/systemctl.xml
```

```
@@ -1703,9 +1703,9 @@ kobject_uevent 1 systemd-udevd-kernel.socket systemd-udevd.service
```

```

<varname>$VISUAL</varname> are present or if it is set to an empty
string or if their execution failed, systemctl will try to execute well
known editors in this order:

```

```
- <citerefentry><refentrytitle>nano</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</refsect1>
```

```
- <citerefentry><refentrytitle>vim</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</refsect1>
```

```
- <citerefentry><refentrytitle>vi</refentrytitle><manvolnum>1</manvolnum></citerefentry>.</refsect1>
```

```
+ <citerefentry project='die-
```

```
net'><refentrytitle>nano</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</refsect1>
```

```
+ <citerefentry project='die-
```

```
net'><refentrytitle>vim</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</refsect1>
```

```
+ <citerefentry project='die-net'><refentrytitle>vi</refentrytitle><manvolnum>1</manvolnum></citerefentry>.</refsect1>
```

```
  </para></listitem>
```

```
</varlistentry>
```

```
</variablelist>
```

```
diff --git a/man/systemd-activate.xml b/man/systemd-activate.xml
```

```
index e64894a28b..cb68a79be7 100644
```

```
--- a/man/systemd-activate.xml
```

```
+++ b/man/systemd-activate.xml
```

```
@@ -165,7 +165,7 @@
```

```

<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</refsect1>
```

```

<citerefentry><refentrytitle>systemd.socket</refentrytitle><manvolnum>5</manvolnum></citerefentry>,</refsect1>
```

```

<citerefentry><refentrytitle>systemd.service</refentrytitle><manvolnum>5</manvolnum></citerefentry>,</refsect1>
```

```
- <citerefentry><refentrytitle>cat</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
+ <citerefentry project='man-
```

```
pages'><refentrytitle>cat</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
  </para>
```

```
</refsect1>
```

```
</refentry>
```

```
diff --git a/man/systemd-analyze.xml b/man/systemd-analyze.xml
```

```
index 1ff81d3d5a..198315052f 100644
```

```
--- a/man/systemd-analyze.xml
```

```
+++ b/man/systemd-analyze.xml
```

```
@@ -145,7 +145,7 @@
```

```

<para><command>systemd-analyze dot</command> generates textual
```

dependency graph description in dot format for further processing  
with the GraphViz

```
- <citerefentry><refentrytitle>dot</refentrytitle><manvolnum>1</manvolnum></citerefentry>
+ <citerefentry project='die-net'><refentrytitle>dot</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

tool. Use a command line like <command>systemd-analyze dot | dot  
-Tsvg > systemd.svg</command> to generate a graphical dependency  
tree. Unless <option>--order</option> or

```
@@ -229,7 +229,7 @@
```

<command>dot</command> command (see above), this selects which  
relationships are shown in the dependency graph. Both options  
require a

```
- <citerefentry><refentrytitle>glob</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+ <citerefentry project='die-
```

```
net'><refentrytitle>glob</refentrytitle><manvolnum>7</manvolnum></citerefentry>
```

pattern as an argument, which will be matched against the  
left-hand and the right-hand, respectively, nodes of a  
relationship.</para>

```
diff --git a/man/systemd-cat.xml b/man/systemd-cat.xml
```

```
index 38ddf66d27..9b1a8809dc 100644
```

```
--- a/man/systemd-cat.xml
```

```
+++ b/man/systemd-cat.xml
```

```
@@ -171,7 +171,7 @@
```

```
<para>
```

```
<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
<citerefentry><refentrytitle>systemctl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
```

```
- <citerefentry><refentrytitle>logger</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
+ <citerefentry project='man-
```

```
pages'><refentrytitle>logger</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
</para>
```

```
</refsect1>
```

```
diff --git a/man/systemd-cryptsetup-generator.xml b/man/systemd-cryptsetup-generator.xml
```

```
index 1974cd7a2d..b6270358ea 100644
```

```
--- a/man/systemd-cryptsetup-generator.xml
```

```
+++ b/man/systemd-cryptsetup-generator.xml
```

```
@@ -185,7 +185,7 @@
```

```
<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
```

```
<citerefentry><refentrytitle>crypttab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
```

```
<citerefentry><refentrytitle>systemd-
```

```
cryptsetup@.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
```

```
- <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
```

```
+ <citerefentry project='die-
```

```
net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
```

```
<citerefentry><refentrytitle>systemd-fstab-
```

```
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>
```

```
</para>
```

```
</refsect1>
```

```
diff --git a/man/systemd-cryptsetup@.service.xml b/man/systemd-cryptsetup@.service.xml
```

index bd03637deb..ea524851eb 100644

--- a/man/systemd-cryptsetup@.service.xml  
+++ b/man/systemd-cryptsetup@.service.xml  
@@ -78,7 +78,7 @@

<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>systemd-cryptsetup-  
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>crypttab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
- <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>  
+ <citerefentry project='die-  
net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>  
</para>  
</refsect1>

diff --git a/man/systemd-efi-boot-generator.xml b/man/systemd-efi-boot-generator.xml

index fd7ba79837..3431c3ce5b 100644

--- a/man/systemd-efi-boot-generator.xml  
+++ b/man/systemd-efi-boot-generator.xml  
@@ -62,7 +62,7 @@

does not communicate the used ESP to the OS, on systems where  
<filename>/boot</filename> is an explicitly configured mount (for  
example, listed in  
- <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>)  
+ <citerefentry project='man-  
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>)  
or where the <filename>/boot</filename> mount point is non-empty.  
Since this generator creates an automount unit, the mount will  
only be activated on-demand, when accessed.</para>

@@ -79,7 +79,7 @@

<citerefentry><refentrytitle>systemd.automount</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>systemd-gpt-auto-  
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>gummiboot</refentrytitle><manvolnum>8</manvolnum></citerefentry>,  
- <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
+ <citerefentry project='man-  
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
</para>  
</refsect1>

diff --git a/man/systemd-firstboot.xml b/man/systemd-firstboot.xml

index 67d38ba31f..67289daa26 100644

--- a/man/systemd-firstboot.xml  
+++ b/man/systemd-firstboot.xml  
@@ -91,7 +91,7 @@

<para>Note that this tool operates directly on the file system and  
does not involve any running system services, unlike  
- <citerefentry><refentrytitle>localectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,</para>

+ <citerefentry project='man-  
pages'><refentrytitle>localectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>timedatectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>  
or  
<citerefentry><refentrytitle>hostnamectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>.

@@ -125,7 +125,7 @@  
<varname>LANG=</varname> and <varname>LC\_MESSAGES</varname>  
settings. The argument should be a valid locale identifier,  
such as <literal>de\_DE.UTF-8</literal>. This controls the

- <citerefentry><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
+ <citerefentry project='man-  
pages'><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
configuration file.</para></listitem>  
</varlistentry>

@@ -163,7 +163,7 @@

<listitem><para>Sets the password of the system's root user.  
This creates a

- <citerefentry><refentrytitle>shadow</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
+ <citerefentry project='die-  
net'><refentrytitle>shadow</refentrytitle><manvolnum>5</manvolnum></citerefentry>

file. This setting exists in two forms:

<option>--root-password=</option> accepts the password to set  
directly on the command line,

@@ -171,7 +171,7 @@

Note that it is not recommended specifying passwords on the  
command line as other users might be able to see them simply  
by invoking

-  
<citerefentry><refentrytitle>ps</refentrytitle><manvolnum>1</manvolnum></citerefentry>.</para></listitem>  
+ <citerefentry project='die-  
net'><refentrytitle>ps</refentrytitle><manvolnum>1</manvolnum></citerefentry>.</para></listitem>  
</varlistentry>

<varlistentry>

@@ -244,13 +244,13 @@

<title>See Also</title>

<para>

<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,  
- <citerefentry><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
+ <citerefentry project='man-  
pages'><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>localtime</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>hostname</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
<citerefentry><refentrytitle>machine-id</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
- <citerefentry><refentrytitle>shadow</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
+ <citerefentry project='die-

```

net'<refentrytitle>shadow</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd-machine-id-
setup</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>localectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>localectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>timedatectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>hostnamectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>
</para>

```

```

diff --git a/man/systemd-fstab-generator.xml b/man/systemd-fstab-generator.xml
index 022efb4130..bdc2dc1d0e 100644
--- a/man/systemd-fstab-generator.xml
+++ b/man/systemd-fstab-generator.xml
@@ -54,7 +54,7 @@

```

```

<para><filename>systemd-fstab-generator</filename> is a generator
that translates <filename>/etc/fstab</filename> (see
- <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>
for details) into native systemd units early at boot and when
configuration of the system manager is reloaded. This will
instantiate mount and swap units as necessary.</para>

```

```
@@ -173,7 +173,7 @@
```

```
<title>See Also</title>
```

```

<para>
  <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.mount</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.swap</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd-cryptsetup-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>

```

```

diff --git a/man/systemd-gpt-auto-generator.xml b/man/systemd-gpt-auto-generator.xml
index 8d2eaca4f6..bcc64ec9b5 100644
--- a/man/systemd-gpt-auto-generator.xml
+++ b/man/systemd-gpt-auto-generator.xml
@@ -66,7 +66,7 @@

```

```

Partitions Specification</ulink>. Note that this generator has no
effect on non-GPT systems, on systems where the units are
explicitly configured (for example, listed in
- <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>),
+ <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>),
or where the mount points are non-empty.</para>

```

```
<para>This generator will only look for root partitions on the
```

```

@@ -169,9 +169,9 @@
    <citerefentry><refentrytitle>systemd-fstab-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-efi-boot-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-
cryptsetup@.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>btrfs</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+   <citerefentry project='die-
net'><refentrytitle>cryptsetup</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+   <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
+   <citerefentry project='man-
pages'><refentrytitle>btrfs</refentrytitle><manvolnum>8</manvolnum></citerefentry>
</para>
</refsect1>

```

```

diff --git a/man/systemd-hibernate-resume-generator.xml b/man/systemd-hibernate-resume-generator.xml
index a21782cbf9..d811b9b551 100644

```

```

--- a/man/systemd-hibernate-resume-generator.xml
+++ b/man/systemd-hibernate-resume-generator.xml

```

```

@@ -73,7 +73,7 @@
    <listitem><para>Takes a path to the resume device. Both
persistent block device paths like
<filename>/dev/disk/by-foo/bar</filename> and
-   <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>-style
+   <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>-style
specifiers like <literal>FOO=bar</literal> are
supported.</para></listitem>
</varlistentry>

```

```

diff --git a/man/systemd-journald.service.xml b/man/systemd-journald.service.xml
index 6b250b65e6..8280d6c874 100644

```

```

--- a/man/systemd-journald.service.xml
+++ b/man/systemd-journald.service.xml

```

```

@@ -241,7 +241,7 @@
    <citerefentry><refentrytitle>systemd.journal-
fields</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>sd-journal</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-coredump</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>setfacl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+   <citerefentry project='die-
net'><refentrytitle>setfacl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>sd_journal_print</refentrytitle><manvolnum>4</manvolnum></citerefentry>,
    <command>pydoc systemd.journal</command>.
</para>

```

```
diff --git a/man/systemd-locale.service.xml b/man/systemd-locale.service.xml
```

```
index 8999166383..06aa78c0e4 100644
```

```
--- a/man/systemd-locale.service.xml
```

```
+++ b/man/systemd-locale.service.xml
```

```
@@ -64,7 +64,7 @@
```

```
unused.</para>
```

```
<para>The tool
```

```
- <citerefentry><refentrytitle>locaectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
+ <citerefentry project='man-
```

```
pages'><refentrytitle>locaectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
is a command line client to this service.</para>
```

```
<para>See the <ulink
```

```
@@ -77,10 +77,10 @@
```

```
<title>See Also</title>
```

```
<para>
```

```
<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,&br/>
```

```
- <citerefentry><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,&br/>
```

```
+ <citerefentry project='man-
```

```
pages'><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,&br/>
```

```
<citerefentry><refentrytitle>vconsole.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,&br/>
```

```
- <citerefentry><refentrytitle>locaectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,&br/>
```

```
- <citerefentry><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
+ <citerefentry project='man-
```

```
pages'><refentrytitle>locaectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,&br/>
```

```
+ <citerefentry
```

```
project='mankier'><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>
```

```
</para>
```

```
</refsect1>
```

```
diff --git a/man/systemd-nspawn.xml b/man/systemd-nspawn.xml
```

```
index 4a936d326f..65b4c2f294 100644
```

```
--- a/man/systemd-nspawn.xml
```

```
+++ b/man/systemd-nspawn.xml
```

```
@@ -598,7 +598,7 @@
```

```
<listitem><para>Control the architecture ("personality")
```

```
reported by
```

```
- <citerefentry><refentrytitle>uname</refentrytitle><manvolnum>2</manvolnum></citerefentry>
```

```
+ <citerefentry project='man-
```

```
pages'><refentrytitle>uname</refentrytitle><manvolnum>2</manvolnum></citerefentry>
```

```
in the container. Currently, only <literal>x86</literal> and
```

```
<literal>x86-64</literal> are supported. This is useful when
```

```
running a 32-bit container on a 64-bit host. If this setting
```

```
@@ -735,7 +735,7 @@
```

```
<citerefentry
```

```
project='archlinux'><refentrytitle>pacman</refentrytitle><manvolnum>8</manvolnum></citerefentry>,&br/>
```



```

    <citerefentry><refentrytitle>systemd.slice</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>machinectl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>btrfs</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>btrfs</refentrytitle><manvolnum>8</manvolnum></citerefentry>
    </para>
</refsect1>

```

```

diff --git a/man/systemd-quotacheck.service.xml b/man/systemd-quotacheck.service.xml
index 2179f11e95..9d4976274e 100644

```

```

--- a/man/systemd-quotacheck.service.xml
+++ b/man/systemd-quotacheck.service.xml
@@ -86,7 +86,7 @@

```

```

    <title>See Also</title>
    <para>
        <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>quotacheck</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+   <citerefentry project='die-
net'><refentrytitle>quotacheck</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
        <citerefentry><refentrytitle>systemd-
fsck@.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>
    </para>
</refsect1>

```

```

diff --git a/man/systemd-remount-fs.service.xml b/man/systemd-remount-fs.service.xml
index 7b88ac3f3c..8e60e31b5c 100644

```

```

--- a/man/systemd-remount-fs.service.xml
+++ b/man/systemd-remount-fs.service.xml
@@ -56,7 +56,7 @@

```

```

    <para><filename>systemd-remount-fs.service</filename> is an
    early-boot service that applies mount options listed in
-   <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>
    to the root file system, the <filename>/usr/</filename> file system
    and the kernel API file systems. This is required so that the
    mount options of these file systems -- which are pre-mounted by
@@ -80,8 +80,8 @@

```

```

    <title>See Also</title>
    <para>
        <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
+   <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
    </para>

```

</refsect1>

diff --git a/man/systemd-socket-proxyd.xml b/man/systemd-socket-proxyd.xml  
index 1c78b656e1..0b852e6bc1 100644

--- a/man/systemd-socket-proxyd.xml

+++ b/man/systemd-socket-proxyd.xml

@@ -72,7 +72,7 @@

to a configured server for each client, and then bidirectionally  
forwards data between the two.</para>

<para>This utility's behavior is similar to

- <citerefentry><refentrytitle>socat</refentrytitle><manvolnum>1</manvolnum></citerefentry>.

+ <citerefentry project='die-

net'><refentrytitle>socat</refentrytitle><manvolnum>1</manvolnum></citerefentry>.

The main differences for <command>systemd-socket-proxyd</command>

are support for socket activation with

<literal>Accept=false</literal> and an event-driven

@@ -183,9 +183,9 @@ \$ curl http://localhost:80/]]</programlisting>

<citerefentry><refentrytitle>systemd.socket</refentrytitle><manvolnum>5</manvolnum></citerefentry>,

<citerefentry><refentrytitle>systemd.service</refentrytitle><manvolnum>5</manvolnum></citerefentry>,

<citerefentry><refentrytitle>systemctl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,

- <citerefentry><refentrytitle>socat</refentrytitle><manvolnum>1</manvolnum></citerefentry>,

- <citerefentry><refentrytitle>nginx</refentrytitle><manvolnum>1</manvolnum></citerefentry>,

- <citerefentry><refentrytitle>curl</refentrytitle><manvolnum>1</manvolnum></citerefentry>

+ <citerefentry project='die-

net'><refentrytitle>socat</refentrytitle><manvolnum>1</manvolnum></citerefentry>,

+ <citerefentry project='die-

net'><refentrytitle>nginx</refentrytitle><manvolnum>1</manvolnum></citerefentry>,

+ <citerefentry project='die-net'><refentrytitle>curl</refentrytitle><manvolnum>1</manvolnum></citerefentry>

</para>

</refsect1>

</refentry>

diff --git a/man/systemd-sysctl.service.xml b/man/systemd-sysctl.service.xml

index f35a18a4d4..d4c1a7ebe3 100644

--- a/man/systemd-sysctl.service.xml

+++ b/man/systemd-sysctl.service.xml

@@ -56,11 +56,11 @@

<para><filename>systemd-sysctl.service</filename> is an early-boot  
service that configures

- <citerefentry><refentrytitle>sysctl</refentrytitle><manvolnum>8</manvolnum></citerefentry>

+ <citerefentry project='man-

pages'><refentrytitle>sysctl</refentrytitle><manvolnum>8</manvolnum></citerefentry>

kernel parameters.</para>

<para>See

- <citerefentry><refentrytitle>sysctl.d</refentrytitle><manvolnum>5</manvolnum></citerefentry>

+ <citerefentry project='man-

pages'><refentrytitle>sysctl.d</refentrytitle><manvolnum>5</manvolnum></citerefentry>

for information about the configuration of this service.</para>  
</refsect1>

@@ -68,8 +68,8 @@

<title>See Also</title>

<para>

<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,  
- <citerefentry><refentrytitle>sysctl.d</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
- <citerefentry><refentrytitle>sysctl</refentrytitle><manvolnum>8</manvolnum></citerefentry>,  
+ <citerefentry project='man-  
pages'><refentrytitle>sysctl.d</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
+ <citerefentry project='man-  
pages'><refentrytitle>sysctl</refentrytitle><manvolnum>8</manvolnum></citerefentry>,  
</para>

</refsect1>

diff --git a/man/systemd-system.conf.xml b/man/systemd-system.conf.xml

index c7bcfaee4d..1b74ed38f7 100644

--- a/man/systemd-system.conf.xml

+++ b/man/systemd-system.conf.xml

@@ -172,7 +172,7 @@

<citerefentry project='man-  
pages'><refentrytitle>capabilities</refentrytitle><manvolnum>7</manvolnum></citerefentry>  
for details. Takes a whitespace-separated list of capability  
names as read by  
- <citerefentry><refentrytitle>cap\_from\_name</refentrytitle><manvolnum>3</manvolnum></citerefentry>.  
+ <citerefentry  
project='mankier'><refentrytitle>cap\_from\_name</refentrytitle><manvolnum>3</manvolnum></citerefentry>.  
Capabilities listed will be included in the bounding set, all  
others are removed. If the list of capabilities is prefixed  
with ~, all but the listed capabilities will be included, the

diff --git a/man/systemd-update-utmp.service.xml b/man/systemd-update-utmp.service.xml

index b842d29721..c8a9cb7c90 100644

--- a/man/systemd-update-utmp.service.xml

+++ b/man/systemd-update-utmp.service.xml

@@ -69,7 +69,7 @@

<para>

<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,  
<citerefentry project='man-  
pages'><refentrytitle>utmp</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
- <citerefentry><refentrytitle>auditd</refentrytitle><manvolnum>8</manvolnum></citerefentry>  
+ <citerefentry project='man-  
pages'><refentrytitle>auditd</refentrytitle><manvolnum>8</manvolnum></citerefentry>  
</para>

</refsect1>

diff --git a/man/systemd-vconsole-setup.service.xml b/man/systemd-vconsole-setup.service.xml

index 59bb5e4e8c..7c6ed08997 100644

```

--- a/man/systemd-vconsole-setup.service.xml
+++ b/man/systemd-vconsole-setup.service.xml
@@ -57,9 +57,9 @@
  <para><filename>systemd-vconsole-setup.service</filename> is an
  early-boot service that configures the virtual console font and
  console keymap. Internally it calls
- <citerefentry><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>
+ <citerefentry
project='mankier'><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>
  and
- <citerefentry><refentrytitle>setfont</refentrytitle><manvolnum>8</manvolnum></citerefentry>.</para>
+ <citerefentry project='die-
net'><refentrytitle>setfont</refentrytitle><manvolnum>8</manvolnum></citerefentry>.</para>

```

```

  <para>See
  <citerefentry><refentrytitle>vconsole.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>
@@ -105,8 +105,8 @@
  <para>
  <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>vconsole.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>setfont</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+ <citerefentry
project='mankier'><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+ <citerefentry project='die-
net'><refentrytitle>setfont</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd-
located.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>
  </para>
</refsect1>

```

```

diff --git a/man/systemd.automount.xml b/man/systemd.automount.xml
index 3db65d988d..b5b5885cdf 100644

```

```

--- a/man/systemd.automount.xml
+++ b/man/systemd.automount.xml
@@ -96,7 +96,7 @@
  <para>Automount units may either be configured via unit files, or
  via <filename>/etc/fstab</filename> (see
- <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>
  for details).</para>

```

```

  <para>For details how systemd parses
@@ -145,8 +145,8 @@
  <citerefentry><refentrytitle>systemctl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.unit</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.mount</refentrytitle><manvolnum>5</manvolnum></citerefentry>,

```

```

- <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>automount</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+ <citerefentry project='die-
net'><refentrytitle>automount</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.directives</refentrytitle><manvolnum>7</manvolnum></citerefentry>
</para>
</refsect1>
diff --git a/man/systemd.exec.xml b/man/systemd.exec.xml
index fdb1578641..56b53e6015 100644
--- a/man/systemd.exec.xml
+++ b/man/systemd.exec.xml
@@ -663,7 +663,7 @@
  <citerefentry project='man-
pages'><refentrytitle>capabilities</refentrytitle><manvolnum>7</manvolnum></citerefentry>
  for details. Takes a whitespace-separated list of capability
  names as read by
- <citerefentry><refentrytitle>cap_from_name</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
+ <citerefentry
project='mankier'><refentrytitle>cap_from_name</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
  e.g. <constant>CAP_SYS_ADMIN</constant>,
  <constant>CAP_DAC_OVERRIDE</constant>,
  <constant>CAP_SYS_PTRACE</constant>. Capabilities listed will
@@ -711,7 +711,7 @@
  set for the executed process. Take a capability string
  describing the effective, permitted and inherited capability
  sets as documented in
- <citerefentry><refentrytitle>cap_from_text</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
+ <citerefentry
project='mankier'><refentrytitle>cap_from_text</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
  Note that these capability sets are usually influenced (and
  filtered) by the capabilities attached to the executed file.
  Due to that <varname>CapabilityBoundingSet=</varname> is
@@ -881,7 +881,7 @@
  <option>private</option>, which control whether mounts in the
  file system namespace set up for this unit's processes will
  receive or propagate mounts or unmounts. See
- <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>2</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>2</manvolnum></citerefentry>
  for details. Defaults to <option>shared</option>. Use
  <option>shared</option> to ensure that mounts and unmounts are
  propagated from the host to the container and vice versa. Use
@@ -929,7 +929,7 @@
  authorize the transition. This directive is ignored if SELinux
  is disabled. If prefixed by <literal>-</literal>, all errors
  will be ignored. See

```

- <citerefentry><refentrytitle>setexeccon</refentrytitle><manvolnum>3</manvolnum></citerefentry>  
+ <citerefentry project='die-net'><refentrytitle>setexeccon</refentrytitle><manvolnum>3</manvolnum></citerefentry>  
for details.</para></listitem>  
</varlistentry>

@@ -1076,7 +1076,7 @@

prefixed with <constant>~</constant> the listed address families will be applied as blacklist, otherwise as whitelist. Note that this restricts access to the

- <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>2</manvolnum></citerefentry>  
+ <citerefentry project='man-pages'><refentrytitle>socket</refentrytitle><manvolnum>2</manvolnum></citerefentry>  
system call only. Sockets passed into the process by other means (for example, by using socket activation with socket units, see

@@ -1104,7 +1104,7 @@

<term><varname>Personality=</varname></term>

<listitem><para>Controls which kernel architecture

- <citerefentry><refentrytitle>uname</refentrytitle><manvolnum>2</manvolnum></citerefentry>  
+ <citerefentry project='man-pages'><refentrytitle>uname</refentrytitle><manvolnum>2</manvolnum></citerefentry>  
shall report, when invoked by unit processes. Takes one of <constant>x86</constant> and <constant>x86-64</constant>. This is useful when running 32-bit services on a 64-bit host

@@ -1166,7 +1166,7 @@

<term><varname>\$LANG</varname></term>

<listitem><para>Locale. Can be set in

- <citerefentry><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
+ <citerefentry project='man-pages'><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
or on the kernel command line (see <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry> and

@@ -1184,7 +1184,7 @@

login shell. The variables are set for the units that have <varname>User=</varname> set, which includes user <command>systemd</command> instances. See

- <citerefentry><refentrytitle>passwd</refentrytitle><manvolnum>5</manvolnum></citerefentry>.  
+ <citerefentry project='die-net'><refentrytitle>passwd</refentrytitle><manvolnum>5</manvolnum></citerefentry>.  
</para></listitem>  
</varlistentry>

diff --git a/man/systemd.generator.xml b/man/systemd.generator.xml

index ccb698752a..9b39e732e3 100644

```

--- a/man/systemd.generator.xml
+++ b/man/systemd.generator.xml
@@ -333,7 +333,7 @@ find $dir</programlisting>
    <citerefentry><refentrytitle>systemd-debug-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-efi-boot-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-fstab-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
+   <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-getty-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-gpt-auto-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-hibernate-resume-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
diff --git a/man/systemd.journal-fields.xml b/man/systemd.journal-fields.xml
index 1fd46de31f..7d6c5c715f 100644
--- a/man/systemd.journal-fields.xml
+++ b/man/systemd.journal-fields.xml
@@ -134,7 +134,7 @@
    derived from glibc's
    <varname>program_invocation_short_name</varname> variable,
    see
-
<citerefentry><refentrytitle>program_invocation_short_name</refentrytitle><manvolnum>3</manvolnum></citerefentry>.)</para>
+   <citerefentry project='die-
net'><refentrytitle>program_invocation_short_name</refentrytitle><manvolnum>3</manvolnum></citerefentry>.)
</para>
</listitem>

</varlistentry>
diff --git a/man/systemd.kill.xml b/man/systemd.kill.xml
index c974e22489..e57f0e7242 100644
--- a/man/systemd.kill.xml
+++ b/man/systemd.kill.xml
@@ -135,7 +135,7 @@
    of shutting down a unit (see above), and is usually followed
    by <constant>SIGKILL</constant> (see above and below). For a
    list of valid signals, see
-   <citerefentry><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>.
+   <citerefentry project='man-
pages'><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>.
    Defaults to <constant>SIGTERM</constant>. </para></listitem>
</varlistentry>

```

```
@@ -176,7 +176,7 @@
    <citerefentry><refentrytitle>systemd.exec</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd.directives</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>kill</refentrytitle><manvolnum>2</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>signal</refentrytitle><manvolnum>7</manvolnum></citerefentry>
    </para>
</refsect1>
```

```
diff --git a/man/systemd.mount.xml b/man/systemd.mount.xml
index 5cbde8b84c..fcb9a44161 100644
```

```
--- a/man/systemd.mount.xml
+++ b/man/systemd.mount.xml
@@ -68,7 +68,7 @@
    <para>Additional options are listed in
    <citerefentry><refentrytitle>systemd.exec</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    which define the execution environment the
-   <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
    binary is executed in, and in
    <citerefentry><refentrytitle>systemd.kill</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    which define the way the processes are terminated, and in
```

```
@@ -78,7 +78,7 @@
    particularly useful for mount units specifying a
    <literal>Type=</literal> option or using configuration not
    specified in <filename>/etc/fstab</filename>;
-   <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
    will refuse options that are not listed in
    <filename>/etc/fstab</filename> if it is not run as UID 0.</para>
```

```
@@ -118,7 +118,7 @@

    <para>Mount units may either be configured via unit files, or via
    <filename>/etc/fstab</filename> (see
-   <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>
    for details). Mounts listed in <filename>/etc/fstab</filename>
    will be converted into native units dynamically at boot and when
    the configuration of the system manager is reloaded. In general,
```

```
@@ -231,7 +231,7 @@
    <term><varname>What=</varname></term>
    <listitem><para>Takes an absolute path of a device node, file
```



or other resource to mount. See

```
- <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
  for details. If this refers to a device node, a dependency on
  the respective device unit is automatically created. (See
  <citerefentry><refentrytitle>systemd.device</refentrytitle><manvolnum>5</manvolnum></citerefentry>
@@ -251,7 +251,7 @@
```

<varlistentry>

<term><varname>Type=</varname></term>

<listitem><para>Takes a string for the file system type. See

```
- <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>
  for details. This setting is optional.</para></listitem>
</varlistentry>
```

@@ -270,7 +270,7 @@

the options specified in <varname>Options=</varname> is relaxed, and unknown mount options are tolerated. This corresponds with

```
- <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>'s
+ <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>'s
  <parameter>-s</parameter> switch. Defaults to
  off.</para></listitem>
</varlistentry>
```

@@ -321,7 +321,7 @@

```
<citerefentry><refentrytitle>systemd.service</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
<citerefentry><refentrytitle>systemd.device</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
<citerefentry project='man-
pages'><refentrytitle>proc</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>mount</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd-fstab-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.directives</refentrytitle><manvolnum>7</manvolnum></citerefentry>
</para>
```

diff --git a/man/systemd.network.xml b/man/systemd.network.xml

index 24f8416ef9..97386271d6 100644

--- a/man/systemd.network.xml

+++ b/man/systemd.network.xml

@@ -286,7 +286,7 @@

separated by a <literal></literal> character. Specify this key more than once to configure several addresses.

The format of the address must be as described in

```
- <citerefentry><refentrytitle>inet_pton</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
```

```

+ <citerefentry project='man-
pages'><refentrytitle>inet_pton</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
  <para>This is a short-hand for an [Address] section only
  containing an Address key (see below). This option may be
  specified more than once.
@@ -312,7 +312,7 @@
  <listitem>
  <para>The gateway address, which must be in the format
  described in
- <citerefentry><refentrytitle>inet_pton</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
+ <citerefentry project='man-
pages'><refentrytitle>inet_pton</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
  <para>This is a short-hand for a [Route] section only containing
  a Gateway key. This option may be specified more than
  once.</para>
@@ -323,7 +323,7 @@
  <listitem>
  <para>A DNS server address, which must be in the format
  described in
- <citerefentry><refentrytitle>inet_pton</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
+ <citerefentry project='man-
pages'><refentrytitle>inet_pton</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
  <para>This option may be specified more than once.</para>
  </listitem>
  </varlistentry>
@@ -429,7 +429,7 @@
  <listitem>
  <para>The broadcast address, which must be in the format
  described in
- <citerefentry><refentrytitle>inet_pton</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
+ <citerefentry project='man-
pages'><refentrytitle>inet_pton</refentrytitle><manvolnum>3</manvolnum></citerefentry>.
  <para>This key only applies to IPv4 addresses. If it is not
  given, it is derived from the <literal>Address</literal>
  key.</para>
diff --git a/man/systemd.path.xml b/man/systemd.path.xml
index 08a7ec8975..d02bc92ae6 100644
--- a/man/systemd.path.xml
+++ b/man/systemd.path.xml
@@ -74,7 +74,7 @@
  <para>(see below).</para>

```

```

  <para>Internally, path units use the
- <citerefentry><refentrytitle>inotify</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>inotify</refentrytitle><manvolnum>7</manvolnum></citerefentry>
  API to monitor file systems. Due to that, it suffers by the same
  limitations as inotify, and for example cannot be used to monitor

```

```

files or directories changed by other machines on remote NFS file
@@ -187,7 +187,7 @@
    <citerefentry><refentrytitle>systemctl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd.unit</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd.service</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
-   <citerefentry><refentrytitle>inotify</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
+   <citerefentry project='man-
pages'><refentrytitle>inotify</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd.directives</refentrytitle><manvolnum>7</manvolnum></citerefentry>
</para>
</refsect1>
diff --git a/man/systemd.socket.xml b/man/systemd.socket.xml
index 3938345fac..2f541937f8 100644
--- a/man/systemd.socket.xml
+++ b/man/systemd.socket.xml
@@ -265,7 +265,7 @@
    <listitem><para>Takes a one of <option>default</option>,
    <option>both</option> or <option>ipv6-only</option>. Controls
    the IPV6_V6ONLY socket option (see
-   <citerefentry><refentrytitle>ipv6</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+   <citerefentry project='die-
net'><refentrytitle>ipv6</refentrytitle><manvolnum>7</manvolnum></citerefentry>
    for details). If <option>both</option>, IPv6 sockets bound
    will be accessible via both IPv4 and IPv6. If
    <option>ipv6-only</option>, they will be accessible via IPv6
@@ -294,7 +294,7 @@
    this socket to. If set, traffic will only be accepted from the
    specified network interfaces. This controls the
    SO_BINDTODEVICE socket option (see
-   <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
    for details). If this option is used, an automatic dependency
    from this socket unit on the network interface device unit
    (<citerefentry><refentrytitle>systemd.device</refentrytitle><manvolnum>5</manvolnum></citerefentry>
@@ -380,7 +380,7 @@
    <filename>/proc/sys/net/ipv4/tcp_keepalive_time</filename>)
    for all TCP streams accepted on this socket. This controls the
    SO_KEEPALIVE socket option (see
-   <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+   <citerefentry project='man-
pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
    and the <ulink
    url="http://www.tldp.org/HOWTO/html_single/TCP-Keepalive-HOWTO/">TCP
    Keepalive HOWTO</ulink> for details.) Defaults to
@@ -392,7 +392,7 @@
    <listitem><para>Takes time (in seconds) as argument . The connection needs to remain
    idle before TCP starts sending keepalive probes. This controls the TCP_KEEPPIDLE

```

socket option (see

- <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- + <citerefentry project='man-

pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>

and the <ulink  
url="http://www.tldp.org/HOWTO/html\_single/TCP-Keepalive-HOWTO/">TCP  
Keepalive HOWTO</ulink> for details.)

@@ -405,7 +405,7 @@

individual keepalive probes, if the socket option SO\_KEEPA  
LIVE has been set on this socket seconds as argument. This controls  
the TCP\_KEEPA  
LIVE socket option (see

- <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- + <citerefentry project='man-

pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>

and the <ulink  
url="http://www.tldp.org/HOWTO/html\_single/TCP-Keepalive-HOWTO/">TCP  
Keepalive HOWTO</ulink> for details.) Defaults value is 75

@@ -418,7 +418,7 @@

unacknowledged probes to send before considering the  
connection dead and notifying the application layer. This  
controls the TCP\_KEEPA  
LIVE socket option (see

- <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- + <citerefentry project='man-

pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>

and the <ulink  
url="http://www.tldp.org/HOWTO/html\_single/TCP-Keepalive-HOWTO/">TCP  
Keepalive HOWTO</ulink> for details.) Defaults value is

@@ -431,7 +431,7 @@

algorithm works by combining a number of small outgoing  
messages, and sending them all at once. This controls the  
TCP\_KEEPA  
LIVE socket option (see

- <citerefentry><refentrytitle>tcp</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- + <citerefentry project='die-

net'><refentrytitle>tcp</refentrytitle><manvolnum>7</manvolnum></citerefentry>

Defaults to <option>>false</option>.</para></listitem>

</varlistentry>

@@ -440,7 +440,7 @@

<listitem><para>Takes an integer argument controlling the  
priority for all traffic sent from this socket. This controls  
the SO\_KEEPA  
LIVE socket option (see

- <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- + <citerefentry project='man-

pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>

for details.)</para></listitem>

</varlistentry>

@@ -453,7 +453,7 @@

established. When this option is set, the  
<constant>TCP\_DEFER\_ACCEPT</constant> socket option will be  
used (see

- <citerefentry><refentrytitle>tcp</refentrytitle><manvolnum>7</manvolnum></citerefentry>),
- + <citerefentry project='die-net'><refentrytitle>tcp</refentrytitle><manvolnum>7</manvolnum></citerefentry>),

and the kernel will ignore initial ACK packets without any  
data. The argument specifies the approximate amount of time  
the kernel should wait for incoming data before falling back

@@ -480,7 +480,7 @@

<listitem><para>Takes an integer argument controlling the  
receive or send buffer sizes of this socket, respectively.

This controls the SO\_RCVBUF and SO\_SNDBUF socket options (see

- <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- + <citerefentry project='man-pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>

for details.). The usual suffixes K, M, G are supported and  
are understood to the base of 1024.</para></listitem>

</varlistentry>

@@ -490,7 +490,7 @@

<listitem><para>Takes an integer argument controlling the IP  
Type-Of-Service field for packets generated from this socket.

This controls the IP\_TOS socket option (see

- <citerefentry><refentrytitle>ip</refentrytitle><manvolnum>7</manvolnum></citerefentry>
  - + <citerefentry project='die-net'><refentrytitle>ip</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- for details.). Either a numeric string or one of

<option>low-delay</option>, <option>throughput</option>,  
<option>reliability</option> or <option>low-cost</option> may

@@ -503,9 +503,9 @@

Time-To-Live/IPv6 Hop-Count field for packets generated from  
this socket. This sets the IP\_TTL/IPV6\_UNICAST\_HOPS socket  
options (see

- <citerefentry><refentrytitle>ip</refentrytitle><manvolnum>7</manvolnum></citerefentry>
  - + <citerefentry project='die-net'><refentrytitle>ip</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- and

- <citerefentry><refentrytitle>ipv6</refentrytitle><manvolnum>7</manvolnum></citerefentry>
- + <citerefentry project='die-net'><refentrytitle>ipv6</refentrytitle><manvolnum>7</manvolnum></citerefentry>

for details.)</para></listitem>

</varlistentry>

@@ -515,7 +515,7 @@

mark of packets generated by this socket. This can be used in  
the firewall logic to filter packets from this socket. This  
sets the SO\_MARK socket option. See

- <citerefentry><refentrytitle>iptables</refentrytitle><manvolnum>8</manvolnum></citerefentry>
- + <citerefentry project='die-net'><refentrytitle>iptables</refentrytitle><manvolnum>8</manvolnum></citerefentry>

for details.</para></listitem>  
</varlistentry>

@@ -526,7 +526,7 @@

<citerefentry><refentrytitle>bind</refentrytitle><manvolnum>2</manvolnum></citerefentry>s  
to this TCP or UDP port. This controls the SO\_REUSEPORT socket  
option. See  
- <citerefentry><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>  
+ <citerefentry project='man-  
pages'><refentrytitle>socket</refentrytitle><manvolnum>7</manvolnum></citerefentry>  
for details.</para></listitem>  
</varlistentry>

@@ -578,7 +578,7 @@

control the mq\_maxmsg field or the mq\_msgsize field,  
respectively, when creating the message queue. Note that  
either none or both of these variables need to be set. See  
- <citerefentry><refentrytitle>mq\_setattr</refentrytitle><manvolnum>3</manvolnum></citerefentry>  
+ <citerefentry project='die-  
net'><refentrytitle>mq\_setattr</refentrytitle><manvolnum>3</manvolnum></citerefentry>  
for details.</para></listitem>  
</varlistentry>

diff --git a/man/systemd.swap.xml b/man/systemd.swap.xml

index 23b9c712ed..5016f453d5 100644

--- a/man/systemd.swap.xml

+++ b/man/systemd.swap.xml

@@ -69,7 +69,7 @@

<para>Additional options are listed in  
<citerefentry><refentrytitle>systemd.exec</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
which define the execution environment the  
- <citerefentry><refentrytitle>swapon</refentrytitle><manvolnum>8</manvolnum></citerefentry>  
+ <citerefentry project='man-  
pages'><refentrytitle>swapon</refentrytitle><manvolnum>8</manvolnum></citerefentry>  
binary is executed in, and in  
<citerefentry><refentrytitle>systemd.kill</refentrytitle><manvolnum>5</manvolnum></citerefentry>,  
which define the way the processes are terminated, and in

@@ -100,7 +100,7 @@

<para>Swap units may either be configured via unit files, or via  
<filename>/etc/fstab</filename> (see  
- <citerefentry><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
+ <citerefentry project='man-  
pages'><refentrytitle>fstab</refentrytitle><manvolnum>5</manvolnum></citerefentry>  
for details). Swaps listed in <filename>/etc/fstab</filename> will  
be converted into native units dynamically at boot and when the  
configuration of the system manager is reloaded. See

@@ -161,7 +161,7 @@

```

<term><varname>What=</varname></term>
<listitem><para>Takes an absolute path of a device node or
file to use for paging. See
- <citerefentry><refentrytitle>swapon</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>swapon</refentrytitle><manvolnum>8</manvolnum></citerefentry>
  for details. If this refers to a device node, a dependency on
  the respective device unit is automatically created. (See
  <citerefentry><refentrytitle>systemd.device</refentrytitle><manvolnum>5</manvolnum></citerefentry>
@@ -187,7 +187,7 @@
  device. This may be used for controlling discard options among
  other functionality, if the swap backing device supports the
  discard or trim operation. (See
- <citerefentry><refentrytitle>swapon</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>swapon</refentrytitle><manvolnum>8</manvolnum></citerefentry>
  for more information.) </para></listitem>
</varlistentry>

@@ -229,7 +229,7 @@
  <citerefentry><refentrytitle>systemd.resource-
control</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.device</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.mount</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>swapon</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>swapon</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd-fstab-
generator</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.directives</refentrytitle><manvolnum>7</manvolnum></citerefentry>
</para>
diff --git a/man/systemd.unit.xml b/man/systemd.unit.xml
index a452f87baf..c2e374a94e 100644
--- a/man/systemd.unit.xml
+++ b/man/systemd.unit.xml
@@ -826,7 +826,7 @@
  <varname>cris</varname> to test
  against a specific architecture. The architecture is
  determined from the information returned by
- <citerefentry><refentrytitle>uname</refentrytitle><manvolnum>2</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'><refentrytitle>uname</refentrytitle><manvolnum>2</manvolnum></citerefentry>
  and is thus subject to
  <citerefentry><refentrytitle>personality</refentrytitle><manvolnum>2</manvolnum></citerefentry>.
  Note that a <varname>Personality=</varname> setting in the
@@ -1438,7 +1438,7 @@ PrivateTmp=yes</programlisting>
  <citerefentry><refentrytitle>systemd-analyze</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
  <citerefentry project='man-

```

```

pages'<refentrytitle>capabilities</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd.directives</refentrytitle><manvolnum>7</manvolnum></citerefentry>,
- <citerefentry><refentrytitle>uname</refentrytitle><manvolnum>1</manvolnum></citerefentry>
+ <citerefentry project='man-
pages'<refentrytitle>uname</refentrytitle><manvolnum>1</manvolnum></citerefentry>
  </para>
</refsect1>

```

```
diff --git a/man/systemd.xml b/man/systemd.xml
```

```
index 9b92140e6b..d006b0bb99 100644
```

```
--- a/man/systemd.xml
```

```
+++ b/man/systemd.xml
```

```
@@ -1012,9 +1012,9 @@
```

```

<listitem><para>Set the system locale to use. This overrides
the settings in <filename>/etc/locale.conf</filename>. For
more information see

```

```
- <citerefentry><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>
```

```
+ <citerefentry project='man-
```

```
pages'<refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>
```

```
and
```

```
- <citerefentry><refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>.
```

```
+ <citerefentry project='man-
```

```
pages'<refentrytitle>locale</refentrytitle><manvolnum>7</manvolnum></citerefentry>.
```

```
  </para></listitem>
```

```
  </varlistentry>
```

```
</variablelist>
```

```
@@ -1077,7 +1077,7 @@
```

```
<para>
```

```
The <ulink url="http://www.freedesktop.org/wiki/Software/systemd/">systemd Homepage</ulink>.
```

```
<citerefentry><refentrytitle>systemd-system.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>.
```

```
- <citerefentry><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>.
```

```
+ <citerefentry project='man-
```

```
pages'<refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>.
```

```
<citerefentry><refentrytitle>systemctl</refentrytitle><manvolnum>1</manvolnum></citerefentry>.
```

```
<citerefentry><refentrytitle>journalctl</refentrytitle><manvolnum>1</manvolnum></citerefentry>.
```

```
<citerefentry><refentrytitle>systemd-notify</refentrytitle><manvolnum>1</manvolnum></citerefentry>.
```

```
diff --git a/man/vconsole.conf.xml b/man/vconsole.conf.xml
```

```
index 17bea8b682..27196d44e9 100644
```

```
--- a/man/vconsole.conf.xml
```

```
+++ b/man/vconsole.conf.xml
```

```
@@ -129,9 +129,9 @@ FONT=eurlatgr</programlisting>
```

```
<para>
```

```
<citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>.
```

```
<citerefentry><refentrytitle>systemd-vconsole-
```

```
setup.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>.
```

```
- <citerefentry><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>.
```

```
- <citerefentry><refentrytitle>setfont</refentrytitle><manvolnum>8</manvolnum></citerefentry>.
```

```
- <citerefentry><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>.
```



```
+ <citerefentry
project='mankier'><refentrytitle>loadkeys</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+ <citerefentry project='die-
net'><refentrytitle>setfont</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
+ <citerefentry project='man-
pages'><refentrytitle>locale.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
  <citerefentry><refentrytitle>systemd-
located.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>
  </para>
</refsect1>
```

Found in path(s):

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm.download/systemd-219-78.el7.src.rpm.cosi-expand-archive-AelyEoeN/0102-man-fix-a-bunch-of-links.patch
```

No license file was found, but licenses were detected in source scan.

From 66d069acb953ed8f2bfc6d76561d594520b5c67b Mon Sep 17 00:00:00 2001

From: =?UTF-8?q?Zbigniew=20J=C4=99drzejewski-Szmek?= <zbyszek@in.waw.pl>

Date: Thu, 26 Feb 2015 19:05:51 -0500

Subject: [PATCH] sysctl: add some hints how to override settings

Also a link to decent documentation for sysrq keys. It is surprising hard to find.

<https://lists.fedoraproject.org/pipermail/devel/2015-February/208412.html>  
(cherry picked from commit 16b65d7f463e91f6299dfa7b83d4b5fbeb109d1c)

---

```
sysctl.d/50-default.conf | 9 ++++++++
1 file changed, 8 insertions(+), 1 deletion(-)
```

```
diff --git a/sysctl.d/50-default.conf b/sysctl.d/50-default.conf
```

```
index f18923399b..def151bb84 100644
```

```
--- a/sysctl.d/50-default.conf
```

```
+++ b/sysctl.d/50-default.conf
```

```
@@ -5,9 +5,16 @@
```

```
# the Free Software Foundation; either version 2.1 of the License, or
# (at your option) any later version.
```

```
+# See sysctl.d(5) and core(5) for for details.
```

```
+# See sysctl.d(5) and core(5) for for documentation.
```

```
+
```

```
+# To override settings in this file, create a local file in /etc
```

```
+# (e.g. /etc/sysctl.d/90-override.conf), and put any assignments
```

```
+# there.
```

```
# System Request functionality of the kernel (SYNC)
```

```
+#
```

```
+# Use kernel.sysrq = 1 to allow all keys.
+# See http://fedoraproject.org/wiki/QA/Sysrq for a list of values and keys.
kernel.sysrq = 16
```

```
# Append the PID to the core filename
```

```
Found in path(s):
```

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm.download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0032-sysctl-add-some-hints-how-to-override-settings.patch
```

```
No license file was found, but licenses were detected in source scan.
```

```
From 0756d902734c3d4353264d1b4c2ccec87359bd4a Mon Sep 17 00:00:00 2001
```

```
From: Lennart Poettering <lennart@poettering.net>
```

```
Date: Tue, 21 Apr 2015 17:26:56 +0200
```

```
Subject: [PATCH] tmpfiles: there's no systemd-forbid-user-logins.service service
```

```
(cherry picked from commit 451d691ae110a600497348d9f6288bc84efb8642)
```

```
Cherry-picked from: 0d2b365
```

```
Resolves: #1222517
```

```
---
```

```
tmpfiles.d/systemd-nologin.conf | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)
```

```
diff --git a/tmpfiles.d/systemd-nologin.conf b/tmpfiles.d/systemd-nologin.conf
```

```
index d61232b534..a30a8da604 100644
```

```
--- a/tmpfiles.d/systemd-nologin.conf
```

```
+++ b/tmpfiles.d/systemd-nologin.conf
```

```
@@ -5,7 +5,7 @@
```

```
# the Free Software Foundation; either version 2.1 of the License, or
```

```
# (at your option) any later version.
```

```
+# See tmpfiles.d(5) and systemd-forbid-user-logins.service(5).
```

```
+# See tmpfiles.d(5), systemd-user-session.service(5) and pam_nologin(8).
```

```
# This file has special suffix so it is not run by mistake.
```

```
F! /run/nologin 0644 - - - "System is booting up. See pam_nologin(8)"
```

```
Found in path(s):
```

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm.download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0171-tmpfiles-there-s-no-systemd-forbid-user-logins.servi.patch
```

```
No license file was found, but licenses were detected in source scan.
```

```
From c45af40e61ab34508862f9e668f47cc6eb2f6d45 Mon Sep 17 00:00:00 2001
```

```
From: Lukas Nykryn <lnykryn@redhat.com>
```

Date: Thu, 16 Apr 2015 10:50:10 +0200  
Subject: [PATCH] journal: remove audit socket unit-files

```
---  
Makefile.am | 6 ++----  
units/systemd-journald-audit.socket | 19 -----  
units/systemd-journald.service.in | 4 +++--  
3 files changed, 4 insertions(+), 25 deletions(-)  
delete mode 100644 units/systemd-journald-audit.socket  
  
diff --git a/Makefile.am b/Makefile.am  
index bec32c39e5..6d6b650f24 100644  
--- a/Makefile.am  
+++ b/Makefile.am  
@@ -4518,8 +4518,7 @@ bin_PROGRAMS += \  
  
dist_systemunit_DATA += \  
units/systemd-journald.socket \  
- units/systemd-journald-dev-log.socket \  
- units/systemd-journald-audit.socket  
+ units/systemd-journald-dev-log.socket  
  
nodist_systemunit_DATA += \  
units/systemd-journald.service \  
@@ -4539,8 +4538,7 @@ dist_catalog_DATA = \  
  
SOCKETS_TARGET_WANTS += \  
systemd-journald.socket \  
- systemd-journald-dev-log.socket \  
- systemd-journald-audit.socket  
+ systemd-journald-dev-log.socket  
  
SYSINIT_TARGET_WANTS += \  
systemd-journald.service \  
diff --git a/units/systemd-journald-audit.socket b/units/systemd-journald-audit.socket  
deleted file mode 100644  
index 35397aeb8..0000000000  
--- a/units/systemd-journald-audit.socket  
+++ /dev/null  
@@ -1,19 +0,0 @@  
-# This file is part of systemd.  
-#  
-# systemd is free software; you can redistribute it and/or modify it  
-# under the terms of the GNU Lesser General Public License as published by  
-# the Free Software Foundation; either version 2.1 of the License, or  
-# (at your option) any later version.  
-  
-[Unit]
```

```
-Description=Journal Audit Socket
-Documentation=man:systemd-journald.service(8) man:journald.conf(5)
-DefaultDependencies=no
-Before=sockets.target
-ConditionSecurity=audit
-
-[Socket]
-Service=systemd-journald.service
-ReceiveBuffer=128M
-ListenNetlink=audit 1
-PassCredentials=yes
diff --git a/units/systemd-journald.service.in b/units/systemd-journald.service.in
index 87704bb9c1..1bcc290ec4 100644
--- a/units/systemd-journald.service.in
+++ b/units/systemd-journald.service.in
@@ -10,12 +10,12 @@ Description=Journal Service
Documentation=man:systemd-journald.service(8) man:journald.conf(5)
DefaultDependencies=no
Requires=systemd-journald.socket
-After=systemd-journald.socket systemd-journald-dev-log.socket systemd-journald-audit.socket syslog.socket
+After=systemd-journald.socket systemd-journald-dev-log.socket syslog.socket
Before=sysinit.target
```

[Service]

```
Type=notify
-Sockets=systemd-journald.socket systemd-journald-dev-log.socket systemd-journald-audit.socket
+Sockets=systemd-journald.socket systemd-journald-dev-log.socket
ExecStart=@rootlibexecdir@/systemd-journald
Restart=always
RestartSec=0
```

Found in path(s):

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm.download/systemd-219-78.el7.src.rpm.cosi-expand-archive-AelyEoeN/0127-journal-remove-audit-socket-unit-files.patch
```

No license file was found, but licenses were detected in source scan.

From 1b83fbe90a241c6d5c4ab0dc8a3f97215fb277bf Mon Sep 17 00:00:00 2001

From: Lukas Nykryn <lnykryn@redhat.com>

Date: Wed, 19 Nov 2014 12:14:00 +0100

Subject: [PATCH] Revert "remove references of readahead"

This reverts commit 3b71c18d3e3906f8606c66bea98b327684394e61.

---

```
.gitignore | 1 +
README    | 1 +
TODO      | 7 +++++++
3 files changed, 9 insertions(+)
```

```
diff --git a/.gitignore b/.gitignore
index e8a4085a3a..0360f7c6bd 100644
--- a/.gitignore
+++ b/.gitignore
@@ -107,6 +107,7 @@
/systemd-quotacheck
/systemd-random-seed
/systemd-rc-local-generator
+/systemd-readahead
/systemd-remount-api-vfs
/systemd-remount-fs
/systemd-reply-password
diff --git a/README b/README
index 5f5783a684..287d05c9b4 100644
--- a/README
+++ b/README
@@ -30,6 +30,7 @@ AUTHOR:
```

#### LICENSE:

```
    LGPLv2.1+ for all code
+   - except sd-readahead.[ch] which is MIT
+   - except src/shared/MurmurHash2.c which is Public Domain
+   - except src/shared/siphash24.c which is CC0 Public Domain
+   - except src/journal/lookup3.c which is Public Domain
```

```
diff --git a/TODO b/TODO
index 255a4f2d07..90b2c4b30a 100644
--- a/TODO
+++ b/TODO
@@ -786,6 +786,13 @@ Features:
```

\* and a dbus call to generate target from current state

+\* readahead:

```
+ - drop /.readahead on bigger upgrades with yum
+ - move readahead files into /var (look for them with .path units?)
+ - readahead: use BTRFS_IOC_DEFRAG_RANGE instead of BTRFS_IOC_DEFRAG ioctl, with START_IO
+ - readahead: when bumping /sys readahead variable save mtime and compare later to detect changes
+ - readahead: make use of EXT4_IOC_MOVE_EXT, as used by http://e4rat.sourceforge.net/
+
* GC unreferenced jobs (such as .device jobs)
```

\* write blog stories about:

Found in path(s):

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm/download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0008-Revert-remove-references-of-readahead.patch
```

No license file was found, but licenses were detected in source scan.

From fff80c5a2aba519d1c58a1bfc7c0fa96b1e4c30c Mon Sep 17 00:00:00 2001

From: Lukas Nykryn <lnykryn@redhat.com>

Date: Wed, 19 Nov 2014 12:17:19 +0100

Subject: [PATCH] Revert "readahead: wipe out readahead"

This reverts commit d6bc8348d5be8576a475ac8ced2b0146e60fb71f.

Conflicts:

units/systemd-firstboot.service.in

Conflicts:

man/sd-daemon.xml

man/sd-login.xml

man/systemd-notify.xml

src/notify/notify.c

---

Makefile-man.am	31 +
Makefile.am	54 +-
configure.ac	9 +
man/sd-daemon.xml	1 +
man/sd-login.xml	1 +
man/sd-readahead.xml	117 +++++
man/sd_readahead.xml	178 ++++++
man/systemd-notify.xml	11 +
man/systemd-readahead-replay.service.xml	203 ++++++
po/POTFILES.skip	1 +
shell-completion/zsh/_systemd	3 +-
src/cryptsetup/cryptsetup-generator.c	2 +-
src/gpt-auto-generator/gpt-auto-generator.c	1 +
src/notify/notify.c	20 +-
src/readahead/Makefile	1 +
src/readahead/readahead-analyze.c	146 +++++
src/readahead/readahead-collect.c	650 ++++++
src/readahead/readahead-common.c	398 ++++++
src/readahead/readahead-common.h	61 ++
src/readahead/readahead-replay.c	281 ++++++
src/readahead/readahead.c	163 +++++
src/readahead/sd-readahead.c	89 +++
src/readahead/test-ssd.c	41 ++
src/systemd/sd-readahead.h	73 ++
system-preset/90-systemd.preset	1 +
units/.gitignore	3 +
units/ldconfig.service	2 +-
units/quotaon.service.in	2 +-
units/system-update.target	2 +-
units/systemd-backlight@.service.in	2 +-

```

units/systemd-binfmt.service.in      | 2 +-
units/systemd-firstboot.service.in   | 2 +-
units/systemd-fsck-root.service.in   | 1 +
units/systemd-fsck@.service.in       | 2 +-
units/systemd-hwdb-update.service.in  | 2 +-
.../systemd-journal-catalog-update.service.in | 2 +-
units/systemd-modules-load.service.in | 1 +
units/systemd-quotacheck.service.in  | 2 +-
units/systemd-random-seed.service.in  | 2 +-
units/systemd-readahead-collect.service.in | 28 +
units/systemd-readahead-done.service.in | 22 +
units/systemd-readahead-done.timer    | 22 +
units/systemd-readahead-drop.service  | 19 +
units/systemd-readahead-replay.service.in | 26 +
units/systemd-remount-fs.service.in   | 2 +-
units/systemd-rfkill@.service.in      | 2 +-
units/systemd-sysctl.service.in       | 1 +
units/systemd-sysusers.service.in     | 2 +-
units/systemd-tmpfiles-clean.service.in | 2 +-
units/systemd-tmpfiles-setup-dev.service.in | 2 +-
units/systemd-tmpfiles-setup.service.in | 2 +-
units/systemd-update-done.service.in  | 2 +-
units/systemd-update-utmp.service.in  | 2 +-
units/systemd-vconsole-setup.service.in | 1 +
54 files changed, 2675 insertions(+), 23 deletions(-)
create mode 100644 man/sd-readahead.xml
create mode 100644 man/sd_readahead.xml
create mode 100644 man/systemd-readahead-replay.service.xml
create mode 120000 src/readahead/Makefile
create mode 100644 src/readahead/readahead-analyze.c
create mode 100644 src/readahead/readahead-collect.c
create mode 100644 src/readahead/readahead-common.c
create mode 100644 src/readahead/readahead-common.h
create mode 100644 src/readahead/readahead-replay.c
create mode 100644 src/readahead/readahead.c
create mode 100644 src/readahead/sd-readahead.c
create mode 100644 src/readahead/test-ssd.c
create mode 100644 src/systemd/sd-readahead.h
create mode 100644 units/systemd-readahead-collect.service.in
create mode 100644 units/systemd-readahead-done.service.in
create mode 100644 units/systemd-readahead-done.timer
create mode 100644 units/systemd-readahead-drop.service
create mode 100644 units/systemd-readahead-replay.service.in

diff --git a/Makefile-man.am b/Makefile-man.am
index d0fb9aa1ae..ac6f69af70 100644
--- a/Makefile-man.am
+++ b/Makefile-man.am

```

@@ -1234,6 +1234,34 @@ man/systemd-random-seed.html: man/systemd-random-seed.service.html

endif

```
+if ENABLE_READAHEAD
+MANPAGES += \
+ man/sd-readahead.3 \
+ man/sd_readahead.3 \
+ man/systemd-readahead-replay.service.8
+MANPAGES_ALIAS += \
+ man/systemd-readahead-collect.service.8 \
+ man/systemd-readahead-done.service.8 \
+ man/systemd-readahead-done.timer.8 \
+ man/systemd-readahead.8
+man/systemd-readahead-collect.service.8: man/systemd-readahead-replay.service.8
+man/systemd-readahead-done.service.8: man/systemd-readahead-replay.service.8
+man/systemd-readahead-done.timer.8: man/systemd-readahead-replay.service.8
+man/systemd-readahead.8: man/systemd-readahead-replay.service.8
+man/systemd-readahead-collect.service.html: man/systemd-readahead-replay.service.html
+ $(html-alias)
+
+man/systemd-readahead-done.service.html: man/systemd-readahead-replay.service.html
+ $(html-alias)
+
+man/systemd-readahead-done.timer.html: man/systemd-readahead-replay.service.html
+ $(html-alias)
+
+man/systemd-readahead.html: man/systemd-readahead-replay.service.html
+ $(html-alias)
+
+endif
```

```
if ENABLE_RESOLVED
MANPAGES += \
 man/resolved.conf.5 \
@@ -1660,6 +1688,7 @@ EXTRA_DIST += \
 man/sd-id128.xml \
 man/sd-journal.xml \
 man/sd-login.xml \
+ man/sd-readahead.xml \
 man/sd_booted.xml \
 man/sd_bus_creds_get_pid.xml \
 man/sd_bus_creds_new_from_pid.xml \
@@ -1707,6 +1736,7 @@ EXTRA_DIST += \
 man/sd_machine_get_class.xml \
 man/sd_notify.xml \
 man/sd_pid_get_session.xml \
+ man/sd_readahead.xml \
```



```

man/sd_seat_get_active.xml \
man/sd_session_is_active.xml \
man/sd_uid_get_state.xml \
@@ -1766,6 +1796,7 @@ EXTRA_DIST += \
man/systemd-path.xml \
man/systemd-quotacheck.service.xml \
man/systemd-random-seed.service.xml \
+ man/systemd-readahead-replay.service.xml \
man/systemd-remount-fs.service.xml \
man/systemd-resolved.service.xml \
man/systemd-rfkill@.service.xml \
diff --git a/Makefile.am b/Makefile.am
index 70e4fbc6d4..b0e4b5a42a 100644
--- a/Makefile.am
+++ b/Makefile.am
@@ -2603,7 +2603,8 @@ systemctl_LDADD = \

# -----
systemd_notify_SOURCES = \
- src/notify/notify.c
+ src/notify/notify.c \
+ src/readahead/sd-readahead.c

systemd_notify_LDADD = \
libsystemd-internal.la \
@@ -4735,6 +4736,57 @@ EXTRA_DIST += \
src/vconsole/90-vconsole.rules.in \
units/systemd-vconsole-setup.service.in

+# -----
+if ENABLE_READAHEAD
+systemd_readahead_SOURCES = \
+ src/readahead/readahead.c \
+ src/readahead/readahead-collect.c \
+ src/readahead/readahead-replay.c \
+ src/readahead/readahead-analyze.c \
+ src/readahead/readahead-common.c \
+ src/readahead/readahead-common.h
+
+systemd_readahead_LDADD = \
+ libsystemd-internal.la \
+ libudev-internal.la \
+ libsystemd-shared.la
+
+dist_doc_DATA += \
+ src/readahead/sd-readahead.c \
+ src/systemd/sd-readahead.h
+

```

```

+rootlibexec_PROGRAMS += \
+ systemd-readahead
+
+dist_systemunit_DATA += \
+ units/systemd-readahead-drop.service \
+ units/systemd-readahead-done.timer
+
+nodist_systemunit_DATA += \
+ units/systemd-readahead-collect.service \
+ units/systemd-readahead-replay.service \
+ units/systemd-readahead-done.service
+
+manual_tests += \
+ test-ssd
+
+test_ssd_SOURCES = \
+ src/readahead/test-ssd.c \
+ src/readahead/readahead-common.c \
+ src/readahead/readahead-common.h
+
+test_ssd_LDADD = \
+ libsystemd-internal.la \
+ libudev-internal.la \
+ libsystemd-shared.la
+
+endif
+
+EXTRA_DIST += \
+ units/systemd-readahead-collect.service.in \
+ units/systemd-readahead-replay.service.in \
+ units/systemd-readahead-done.service.in
+
# -----
if ENABLE_BOOTCHART
systemd_bootchart_SOURCES = \
diff --git a/configure.ac b/configure.ac
index 3f50887a8d..f701bcf716 100644
--- a/configure.ac
+++ b/configure.ac
@@ -930,6 +930,14 @@ if test "x$enable_vconsole" != "xno"; then
fi
AM_CONDITIONAL(ENABLE_VCONSOLE, [test "$have_vconsole" = "yes"])

+# -----
+have_readahead=no
+AC_ARG_ENABLE(readahead, AS_HELP_STRING([--disable-readahead], [disable readahead tools]))
+if test "x$enable_readahead" != "xno"; then
+   have_readahead=yes

```

```

+fi
+AM_CONDITIONAL(ENABLE_READAHEAD, [test "$have_readahead" = "yes"])
+
# -----
have_bootchart=no
AC_ARG_ENABLE(bootchart, AS_HELP_STRING([--disable-bootchart], [disable bootchart tool]))
@@ -1474,6 +1482,7 @@ AC_MSG_RESULT([
    ELFUTILS:      ${have_elfutils}
    binfmt:        ${have_binfmt}
    vconsole:      ${have_vconsole}
+   readahead:    ${have_readahead}
    bootchart:     ${have_bootchart}
    quotacheck:    ${have_quotacheck}
    tmpfiles:      ${have_tmpfiles}
diff --git a/man/sd-daemon.xml b/man/sd-daemon.xml
index b7ba363656..b12abe2dc8 100644
--- a/man/sd-daemon.xml
+++ b/man/sd-daemon.xml
@@ -137,6 +137,7 @@
    <citerefentry><refentrytitle>systemd.service</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd.socket</refentrytitle><manvolnum>5</manvolnum></citerefentry>,
    <citerefentry project='man-
pages'><refentrytitle>fprintf</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
+   <citerefentry><refentrytitle>sd-readahead</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry project='die-net'><refentrytitle>pkg-
config</refentrytitle><manvolnum>1</manvolnum></citerefentry>
    </para>
  </refsect1>
diff --git a/man/sd-login.xml b/man/sd-login.xml
index 328f71164d..abcd99f6f 100644
--- a/man/sd-login.xml
+++ b/man/sd-login.xml
@@ -128,6 +128,7 @@
    <citerefentry><refentrytitle>sd_get_seats</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
<citerefentry><refentrytitle>sd_login_monitor_new</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>sd-daemon</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
+   <citerefentry><refentrytitle>sd-readahead</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
    <citerefentry project='die-net'><refentrytitle>pkg-
config</refentrytitle><manvolnum>1</manvolnum></citerefentry>
    </para>
  </refsect1>
diff --git a/man/sd-readahead.xml b/man/sd-readahead.xml
new file mode 100644
index 0000000000..bcc46b24d8
--- /dev/null
+++ b/man/sd-readahead.xml
@@ -0,0 +1,117 @@
+<?xml version='1.0'?> <!--*-nxml-*-->

```

```

+<!DOCTYPE refentry PUBLIC "-//OASIS//DTD DocBook XML V4.2//EN"
+  "http://www.oasis-open.org/docbook/xml/4.2/docbookx.dtd">
+
+<!--
+ This file is part of systemd.
+
+ Copyright 2010 Lennart Poettering
+
+ systemd is free software; you can redistribute it and/or modify it
+ under the terms of the GNU Lesser General Public License as published by
+ the Free Software Foundation; either version 2.1 of the License, or
+ (at your option) any later version.
+
+ systemd is distributed in the hope that it will be useful, but
+ WITHOUT ANY WARRANTY; without even the implied warranty of
+ MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License
+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+-->
+<refentry id="sd-readahead" conditional='ENABLE_READAHEAD'>
+
+  <refentryinfo>
+    <title>sd-readahead</title>
+    <productname>systemd</productname>
+
+    <authorgroup>
+      <author>
+        <contrib>Developer</contrib>
+        <firstname>Lennart</firstname>
+        <surname>Poettering</surname>
+        <email>lennart@poettering.net</email>
+      </author>
+    </authorgroup>
+  </refentryinfo>
+
+  <refmeta>
+    <refentrytitle>sd-readahead</refentrytitle>
+    <manvolnum>3</manvolnum>
+  </refmeta>
+
+  <refnamediv>
+    <refname>sd-readahead</refname>
+    <refpurpose>Reference implementation of APIs for
+    controlling boot-time read-ahead</refpurpose>
+  </refnamediv>

```

```

+
+ <refsynopsisdiv>
+   <funcsynopsis>
+     <funcsynopsisinfo>#include "sd-readahead.h"</funcsynopsisinfo>
+   </funcsynopsis>
+ </refsynopsisdiv>
+
+ <refsect1>
+   <title>Description</title>
+
+   <para><filename>sd-readahead.c</filename> and
+   <filename>sd-readahead.h</filename> provide a
+   reference implementation for APIs for controlling boot-time
+   read-ahead, as implemented by the read-ahead subsystem
+   of the
+   <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>
+   init system.</para>
+
+   <para>See
+   <citerefentry><refentrytitle>sd_readahead</refentrytitle><manvolnum>3</manvolnum></citerefentry>
+   for more information about the function
+   implemented.</para>
+ </refsect1>
+
+ <refsect1>
+   <title>Notes</title>
+
+   <para>This interface is provided by the reference
+   implementation of APIs for controlling boot-time
+   read-ahead and distributed with the systemd
+   package. The algorithms it implements are simple, and
+   can easily be reimplemented in daemons if it is
+   important to support this interface without using the
+   reference implementation. See the respective function
+   man pages for details.</para>
+
+   <para>In addition, for details about the algorithms,
+   check the liberally licensed reference implementation
+   sources:
+   <ulink url="http://cgit.freedesktop.org/systemd/systemd/plain/src/readahead/sd-readahead.c"/>
+   and <ulink url="http://cgit.freedesktop.org/systemd/systemd/plain/src/systemd/sd-readahead.h"/></para>
+
+   <para>These APIs are implemented in the reference
+   implementation's drop-in
+   <filename>sd-readahead.c</filename> and
+   <filename>sd-readahead.h</filename> files. It is
+   recommended that applications consuming these APIs copy
+   the implementation into their source tree, either

```

```

+     verbatim or in excerpts. These interfaces are
+     currently not available in a dynamic library.</para>
+
+     <para>The functions provided by this interface become
+     NOPs when -DDISABLE_SYSTEMD is set during
+     compilation. In addition, if
+     <filename>sd-readhead.c</filename> is compiled on
+     non-Linux systems it becomes NOPs.</para>
+ </refsect1>
+
+ <refsect1>
+     <title>See Also</title>
+     <para>
+         <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+
+ <citerefentry><refentrytitle>sd_readahead</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
+         <citerefentry><refentrytitle>sd-
+ daemon</refentrytitle><manvolnum>3</manvolnum></citerefentry>
+     </para>
+ </refsect1>
+
+ </refentry>
diff --git a/man/sd_readahead.xml b/man/sd_readahead.xml
new file mode 100644
index 0000000000..98272997cb
--- /dev/null
+++ b/man/sd_readahead.xml
@@ -0,0 +1,178 @@
+<?xml version='1.0'?> <!--*-nxml*-->
+<!DOCTYPE refentry PUBLIC "-//OASIS//DTD DocBook XML V4.2//EN"
+     "http://www.oasis-open.org/docbook/xml/4.2/docbookx.dtd">
+
+<!--
+ This file is part of systemd.
+
+ Copyright 2010 Lennart Poettering
+
+ systemd is free software; you can redistribute it and/or modify it
+ under the terms of the GNU Lesser General Public License as published by
+ the Free Software Foundation; either version 2.1 of the License, or
+ (at your option) any later version.
+
+ systemd is distributed in the hope that it will be useful, but
+ WITHOUT ANY WARRANTY; without even the implied warranty of
+ MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License

```

```

+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+-->
+
+<refentry id="sd_readahead" conditional='ENABLE_READAHEAD'>
+
+  <refentryinfo>
+    <title>sd_readahead</title>
+    <productname>systemd</productname>
+
+    <authorgroup>
+      <author>
+        <contrib>Developer</contrib>
+        <firstname>Lennart</firstname>
+        <surname>Poettering</surname>
+        <email>lennart@poettering.net</email>
+      </author>
+    </authorgroup>
+  </refentryinfo>
+
+  <refmeta>
+    <refentrytitle>sd_readahead</refentrytitle>
+    <manvolnum>3</manvolnum>
+  </refmeta>
+
+  <refnamediv>
+    <refname>sd_readahead</refname>
+    <refpurpose>Control ongoing disk boot-time read-ahead operations</refpurpose>
+  </refnamediv>
+
+  <refsynopsisdiv>
+    <funcsynopsis>
+      <funcsynopsisinfo>#include "sd-readahead.h"</funcsynopsisinfo>
+
+      <funcprototype>
+        <funcdef>int <function>sd_readahead</function></funcdef>
+        <paramdef>const char *<parameter>action</parameter></paramdef>
+      </funcprototype>
+    </funcsynopsis>
+  </refsynopsisdiv>
+
+  <refsect1>
+    <title>Description</title>
+    <para><function>sd_readahead()</function> may be
+    called by programs involved with early boot-up to
+    control ongoing boot-time disk read-ahead operations. It may be
+    used to terminate read-ahead operations in case an
+    uncommon disk access pattern is to be expected and
+    hence read-ahead replay or collection is unlikely to

```

```

+     have the desired speed-up effect on the current or
+     future boot-ups.</para>
+
+     <para>The <parameter>action</parameter> should be one
+     of the following strings:</para>
+
+     <variablelist>
+       <varlistentry>
+         <term>cancel</term>
+
+         <listitem><para>Terminates read-ahead
+         data collection, and drops all
+         read-ahead data collected during this
+         boot-up.</para></listitem>
+       </varlistentry>
+
+       <varlistentry>
+         <term>done</term>
+
+         <listitem><para>Terminates read-ahead
+         data collection, but keeps all
+         read-ahead data collected during this
+         boot-up around for use during
+         subsequent boot-ups.</para></listitem>
+       </varlistentry>
+
+       <varlistentry>
+         <term>noreplay</term>
+
+         <listitem><para>Terminates read-ahead
+         replay.</para></listitem>
+       </varlistentry>
+     </variablelist>
+
+ </refsect1>
+
+ <refsect1>
+   <title>Return Value</title>
+
+   <para>On failure, these calls return a negative
+   errno-style error code. It is generally recommended to
+   ignore the return value of this call.</para>
+ </refsect1>
+
+ <refsect1>
+   <title>Notes</title>
+
+

```



+ <para>This function is provided by the reference  
+ implementation of APIs for controlling boot-time  
+ read-ahead and distributed with the systemd  
+ package. The algorithm it implements is simple, and  
+ can easily be reimplemented in daemons if it is  
+ important to support this interface without using the  
+ reference implementation.</para>

+  
+ <para>Internally, this function creates a file in  
+ <filename>/run/systemd/readahead/</filename> which is  
+ then used as flag file to notify the read-ahead  
+ subsystem.</para>

+  
+ <para>For details about the algorithm check the  
+ liberally licensed reference implementation sources:  
+ <ulink url="http://cgit.freedesktop.org/systemd/systemd/plain/src/readahead/sd-readahead.c"/>  
+ and <ulink  
+ url="http://cgit.freedesktop.org/systemd/systemd/plain/src/systemd/sd-readahead.h"/></para>

+  
+ <para><function>sd\_readahead()</function> is  
+ implemented in the reference implementation's drop-in  
+ <filename>sd-readahead.c</filename> and  
+ <filename>sd-readahead.h</filename> files. It is  
+ recommended that applications consuming this API copy  
+ the implementation into their source tree. For more  
+ details about the reference implementation, see  
+ <citerefentry><refentrytitle>sd-  
+ readahead</refentrytitle><manvolnum>3</manvolnum></citerefentry></para>

+  
+ <para>If `-DDISABLE_SYSTEMD` is set during compilation,  
+ this function will always return 0 and otherwise  
+ become a NOP.</para>

+ </refsect1>

+ <refsect1>  
+ <title>Examples</title>

+ <example>  
+ <title>Cancelling all read-ahead operations</title>

+ <para>During boots where SELinux has to  
+ relabel the file system hierarchy, it will  
+ create a large amount of disk accesses that  
+ are not necessary during normal boots. Hence  
+ it is a good idea to disable both read-ahead replay and read-ahead collection.  
+ </para>

+ <programlisting>sd\_readahead("cancel");

```

+sd_readahead("noreplay");</programlisting>
+   </example>
+
+ </refsect1>
+
+ <refsect1>
+   <title>See Also</title>
+   <para>
+     <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+     <citerefentry><refentrytitle>sd-
+     readahead</refentrytitle><manvolnum>3</manvolnum></citerefentry>,
+     <citerefentry><refentrytitle>daemon</refentrytitle><manvolnum>7</manvolnum></citerefentry>
+   </para>
+ </refsect1>
+
+</refentry>
diff --git a/man/systemd-notify.xml b/man/systemd-notify.xml
index 06d5ae5319..46ede1ab8f 100644
--- a/man/systemd-notify.xml
+++ b/man/systemd-notify.xml
@@ -127,6 +127,17 @@
<citerefentry><refentrytitle>sd_booted</refentrytitle><manvolnum>3</manvolnum></citerefentry>.</para></listitem>
  </varlistentry>

+ <varlistentry>
+   <term><option>--readahead=</option></term>
+
+   <listitem><para>Controls disk
+   read-ahead operations. The argument
+   must be a string, and either "cancel",
+   "done" or "noreplay". For details
+   about the semantics of this option see
+
+   <citerefentry><refentrytitle>sd_readahead</refentrytitle><manvolnum>3</manvolnum></citerefentry>.</para></listitem>
+ </varlistentry>
+
+   <xi:include href="standard-options.xml" xpointer="help" />
+   <xi:include href="standard-options.xml" xpointer="version" />
+ </variablelist>
diff --git a/man/systemd-readahead-replay.service.xml b/man/systemd-readahead-replay.service.xml
new file mode 100644
index 0000000000..669fe78942
--- /dev/null
+++ b/man/systemd-readahead-replay.service.xml
@@ -0,0 +1,203 @@
+<?xml version='1.0'?> <!--*-nxml-*-->

```

```

+<!DOCTYPE refentry PUBLIC "-//OASIS//DTD DocBook XML V4.2//EN"
+  "http://www.oasis-open.org/docbook/xml/4.2/docbookx.dtd">
+
+<!--
+ This file is part of systemd.
+
+ Copyright 2010 Lennart Poettering
+
+ systemd is free software; you can redistribute it and/or modify it
+ under the terms of the GNU Lesser General Public License as published by
+ the Free Software Foundation; either version 2.1 of the License, or
+ (at your option) any later version.
+
+ systemd is distributed in the hope that it will be useful, but
+ WITHOUT ANY WARRANTY; without even the implied warranty of
+ MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License
+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+-->
+
+<refentry id="systemd-readahead-replay.service" conditional='ENABLE_READAHEAD'
+  xmlns:xi="http://www.w3.org/2001/XInclude">
+
+  <refentryinfo>
+    <title>systemd-readahead-replay.service</title>
+    <productname>systemd</productname>
+
+    <authorgroup>
+      <author>
+        <contrib>Developer</contrib>
+        <firstname>Lennart</firstname>
+        <surname>Poettering</surname>
+        <email>lennart@poettering.net</email>
+      </author>
+    </authorgroup>
+  </refentryinfo>
+
+  <refmeta>
+    <refentrytitle>systemd-readahead-replay.service</refentrytitle>
+    <manvolnum>8</manvolnum>
+  </refmeta>
+
+  <refnamediv>
+    <refname>systemd-readahead-replay.service</refname>
+    <refname>systemd-readahead-collect.service</refname>
+    <refname>systemd-readahead-done.service</refname>

```

```

+     <refname>systemd-readahead-done.timer</refname>
+     <refname>systemd-readahead</refname>
+     <refpurpose>Disk read ahead logic</refpurpose>
+ </refnamediv>
+
+ <refsynopsisdiv>
+   <para><filename>systemd-readahead-replay.service</filename></para>
+   <para><filename>systemd-readahead-collect.service</filename></para>
+   <para><filename>systemd-readahead-done.service</filename></para>
+   <para><filename>systemd-readahead-done.timer</filename></para>
+   <cmdsynopsis>
+     <command>/usr/lib/systemd/systemd-readahead/systemd-readahead</command>
+     <arg choice="opt" rep="repeat">OPTIONS</arg>
+     <arg choice="plain">COMMAND</arg>
+     <arg choice="opt">DIRECTORY | FILE</arg>
+   </cmdsynopsis>
+ </refsynopsisdiv>
+
+ <refsect1>
+   <title>Description</title>
+
+   <para><filename>systemd-readahead-collect.service</filename>
+   is a service that collects disk usage patterns at boot
+   time. <filename>systemd-readahead-replay.service</filename>
+   is a service that replays this access data collected
+   at the subsequent boot. Since disks tend to be
+   magnitudes slower than RAM, this is intended to improve
+   boot speeds by pre-loading early at boot all data on
+   disk that is known to be read for the complete boot
+   process.</para>
+
+   <para><filename>systemd-readahead-done.service</filename>
+   is executed a short while after boot completed and signals
+   <filename>systemd-readahead-collect.service</filename>
+   to end data collection. On this signal, this service
+   will then sort the collected disk accesses and store
+   information about them in
+   <filename>/.readahead</filename>.</para>
+
+   <para>Normally, both
+   <filename>systemd-readahead-collect.service</filename>
+   and
+   <filename>systemd-readahead-replay.service</filename>
+   are activated at boot so that access patterns from the
+   preceding boot are replayed and new data collected
+   for the subsequent boot. However, on read-only media
+   where the collected data cannot be stored, it might
+   be a good idea to disable

```

```

+ <filename>systemd-readahead-collect.service</filename>.</para>
+
+ <para>On rotating media, when replaying disk accesses
+ at early boot,
+ <filename>systemd-readahead-replay.service</filename>
+ will order read requests by their location on disk. On
+ non-rotating media, they will be ordered by their
+ original access timestamp. If the file system supports
+ it,
+ <filename>systemd-readahead-collect.service</filename>
+ will also defragment and rearrange files on disk to
+ optimize subsequent boot times.</para>
+ </refsect1>
+
+ <refsect1>
+ <title>Options</title>
+
+ <para><filename>systemd-readahead</filename> understands
+ the following options:</para>
+
+ <variablelist>
+ <varlistentry>
+ <term><option>--files-max=</option></term>
+
+ <listitem><para>Maximum number of
+ files to read ahead. Only valid
+ for the <command>collect</command>
+ command.</para></listitem>
+ </varlistentry>
+
+ <varlistentry>
+ <term><option>--file-size-max=</option></term>
+
+ <listitem><para>Maximum size of files
+ in bytes to read ahead. Only valid
+ for the <command>collect</command>
+ and <command>replay</command>
+ commands.</para></listitem>
+ </varlistentry>
+
+ <varlistentry>
+ <term><option>--timeout=</option></term>
+
+ <listitem><para>Maximum time in microseconds
+ to spend collecting data. Only valid
+ for the <command>collect</command>
+ command.</para></listitem>
+ </varlistentry>

```

```

+
+         <xi:include href="standard-options.xml" xpointer="help" />
+         <xi:include href="standard-options.xml" xpointer="version" />
+     </variablelist>
+
+ </refsect1>
+
+ <refsect1>
+     <title>Commands</title>
+
+     <para>The following commands are understood by
+     <filename>systemd-readahead</filename>:</para> <variablelist>
+         <varlistentry>
+             <term><command>collect
+             [<replaceable>DIRECTORY</replaceable>]</command></term>
+             <listitem>
+                 <para>Collect read-ahead data on
+                 early boot. When terminating, it will
+                 write out a pack file to the indicated
+                 directory containing the read-ahead
+                 data. </para>
+             </listitem>
+         </varlistentry>
+
+         <varlistentry>
+             <term><command>replay
+             [<replaceable>DIRECTORY</replaceable>]</command></term>
+             <listitem>
+                 <para>Perform read-ahead on the
+                 specified directory tree.</para>
+             </listitem>
+         </varlistentry>
+
+         <varlistentry>
+             <term><command>analyze
+             [<replaceable>FILE</replaceable>]</command></term>
+             <listitem>
+                 <para>Dumps the content of the
+                 read-ahead pack file to the
+                 terminal. For each file, the
+                 output lists approximately how
+                 much will be read ahead by
+                 the <command>replay</command>
+                 command.</para>
+             </listitem>
+         </varlistentry>
+     </variablelist>

```

```

+ </refsect1>
+
+ <refsect1>
+ <title>See Also</title>
+ <para>
+ <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>
+ </para>
+ </refsect1>
+
+</refentry>
diff --git a/po/POTFILES.skip b/po/POTFILES.skip
index 51254ec533..b552029b82 100644
--- a/po/POTFILES.skip
+++ b/po/POTFILES.skip
@@ -17,5 +17,6 @@ src/hostname/hostnamed.c
src/locale/localed.c
src/core/org.freedesktop.systemd1.policy.in
src/timedate/timedated.c
+units/systemd-readahead-done.service.in
units/user@.service.in
units/debug-shell.service.in
diff --git a/shell-completion/zsh/_systemd b/shell-completion/zsh/_systemd
index 58b1c7b4e5..06f03bd1e7 100644
--- a/shell-completion/zsh/_systemd
+++ b/shell-completion/zsh/_systemd
@@ -63,7 +63,8 @@ case "$service" in
    '--ready[Inform the init system about service start-up completion.]' \
    '--pid=[Inform the init system about the main PID of the daemon]' \
    '--status=[Send a free-form status string for the daemon to the init systemd]' \
-    '--booted[Returns 0 if the system was booted up with systemd]'
+    '--booted[Returns 0 if the system was booted up with systemd]' \
+    '--readahead=[Controls disk read-ahead operations]:arguments:(cancel done noreply)'
    ;;
systemd-tty-ask-password-agent)
    _arguments \
diff --git a/src/cryptsetup/cryptsetup-generator.c b/src/cryptsetup/cryptsetup-generator.c
index 05061c0704..dfbca8754f 100644
--- a/src/cryptsetup/cryptsetup-generator.c
+++ b/src/cryptsetup/cryptsetup-generator.c
@@ -111,7 +111,7 @@ static int create_disk(
    "Conflicts=umount.target\n"
    "BindsTo=dev-mapper-%i.device\n"
    "IgnoreOnIsolate=true\n"
-    "After=cryptsetup-pre.target\n",
+    "After=systemd-readahead-collect.service systemd-readahead-replay.service cryptsetup-pre.target\n",
    f);

    if (!nofail)

```

```

diff --git a/src/gpt-auto-generator/gpt-auto-generator.c b/src/gpt-auto-generator/gpt-auto-generator.c
index 5c58b58f8a..7d5a6c6508 100644
--- a/src/gpt-auto-generator/gpt-auto-generator.c
+++ b/src/gpt-auto-generator/gpt-auto-generator.c
@@ -133,6 +133,7 @@ static int add_cryptsetup(const char *id, const char *what, bool rw, char **devi
    "Before=umount.target cryptsetup.target\n"
    "After=%s\n"
    "IgnoreOnIsolate=true\n"
+   "After=systemd-readahead-collect.service systemd-readahead-replay.service\n"
    "[Service]\n"
    "Type=oneshot\n"
    "RemainAfterExit=yes\n"
diff --git a/src/notify/notify.c b/src/notify/notify.c
index f98075d513..e4a128b0b2 100644
--- a/src/notify/notify.c
+++ b/src/notify/notify.c
@@ -31,6 +31,7 @@
#include "strv.h"
#include "util.h"
#include "log.h"
+#include "sd-readahead.h"
#include "build.h"
#include "env-util.h"

@@ -38,6 +39,7 @@ static bool arg_ready = false;
static pid_t arg_pid = 0;
static const char *arg_status = NULL;
static bool arg_booted = false;
+static const char *arg_readahead = NULL;

static void help(void) {
    printf("%s [OPTIONS...] [VARIABLE=VALUE...]\n\n"
@@ -48,6 +50,7 @@ static void help(void) {
    "  --pid[=PID]    Set main pid of daemon\n"
    "  --status=TEXT  Set status text\n"
    "  --booted       Check if the system was booted up with systemd\n",
+   "  --readahead=ACTION Controls read-ahead operations\n",
    program_invocation_short_name);
}

@@ -59,6 +62,7 @@ static int parse_argv(int argc, char *argv[]) {
    ARG_PID,
    ARG_STATUS,
    ARG_BOOTED,
+   ARG_READAHEAD
};

static const struct option options[] = {

```



```

@@ -68,6 +72,7 @@ static int parse_argv(int argc, char *argv[] {
    {"pid",    optional_argument, NULL, ARG_PID    },
    {"status", required_argument, NULL, ARG_STATUS  },
    {"booted", no_argument,    NULL, ARG_BOOTED   },
+   {"readahead", required_argument, NULL, ARG_READAHEAD },
    {}
};

@@ -113,6 +118,10 @@ static int parse_argv(int argc, char *argv[] {
    arg_booted = true;
    break;

+   case ARG_READAHEAD:
+       arg_readahead = optarg;
+       break;
+
    case '?':
        return -EINVAL;

@@ -125,7 +134,8 @@ static int parse_argv(int argc, char *argv[] {
    !arg_ready &&
    !arg_status &&
    !arg_pid &&
-   !arg_booted) {
+   !arg_booted &&
+   !arg_readahead) {
    help();
    return -EINVAL;
}

@@ -150,6 +160,14 @@ int main(int argc, char* argv[] {
    if (arg_booted)
        return sd_booted() <= 0;

+   if (arg_readahead) {
+       r = sd_readahead(arg_readahead);
+       if (r < 0) {
+           log_error("Failed to issue read-ahead control command: %s", strerror(-r));
+           goto finish;
+       }
+   }

    if (arg_ready)
        our_env[i++] = (char*) "READY=1";

diff --git a/src/readahead/Makefile b/src/readahead/Makefile
new file mode 120000
index 0000000000..d0b0e8e008
--- /dev/null

```

```

+++ b/src/readahead/Makefile
@@ -0,0 +1 @@
+./Makefile
\ No newline at end of file
diff --git a/src/readahead/readahead-analyze.c b/src/readahead/readahead-analyze.c
new file mode 100644
index 0000000000..76db3cb7e4
--- /dev/null
+++ b/src/readahead/readahead-analyze.c
@@ -0,0 +1,146 @@
+/*-*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*-*/
+
+/**
+ This file is part of systemd.
+
+ Copyright 2012 Auke Kok <auke-jan.h.kok@intel.com>
+
+ systemd is free software; you can redistribute it and/or modify it
+ under the terms of the GNU Lesser General Public License as published by
+ the Free Software Foundation; either version 2.1 of the License, or
+ (at your option) any later version.
+
+ systemd is distributed in the hope that it will be useful, but
+ WITHOUT ANY WARRANTY; without even the implied warranty of
+ MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License
+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+*/
+
+#include <stdio.h>
+#include <stdlib.h>
+#include <stdbool.h>
+#include <unistd.h>
+#include <inttypes.h>
+#include <linux/limits.h>
+#include <sys/types.h>
+#include <sys/stat.h>
+#include <string.h>
+
+#include "readahead-common.h"
+
+int main_analyze(const char *pack_path) {
+    char line[LINE_MAX];
+    _cleanup_fclose_ FILE *pack = NULL;
+    int a;

```

```

+ int missing = 0;
+ size_t tsize = 0;
+
+ if (!pack_path)
+     pack_path = "/.readahead";
+
+ pack = fopen(pack_path, "re");
+ if (!pack) {
+     log_error("Pack file missing.");
+     goto fail;
+ }
+
+ if (!fgets(line, sizeof(line), pack)) {
+     log_error("Pack file corrupt.");
+     goto fail;
+ }
+
+ char_array_0(line);
+
+ if (!lendswith(line, READAHEAD_PACK_FILE_VERSION)) {
+     log_error("Pack file version incompatible with this parser.");
+     goto fail;
+ }
+
+ if ((a = getc(pack)) == EOF) {
+     log_error("Pack file corrupt.");
+     goto fail;
+ }
+
+ fputs(" pct sections size: path\n"
+       " ==== ===== : =====\n", stdout);
+
+ for (;;) {
+     char path[PATH_MAX];
+     struct stat st;
+     uint64_t inode;
+     int pages = 0;
+     int sections = 0;
+
+     if (!fgets(path, sizeof(path), pack))
+         break; /* done */
+
+     path[strlen(path)-1] = 0;
+
+     if (fread(&inode, sizeof(inode), 1, pack) != 1) {
+         log_error("Pack file corrupt.");
+         goto fail;
+     }
+ }

```

```

+
+     for (;;) {
+         uint32_t b, c;
+
+         if (fread(&b, sizeof(b), 1, pack) != 1 ||
+             fread(&c, sizeof(c), 1, pack) != 1) {
+             log_error("Pack file corrupt.");
+             goto fail;
+         }
+         if ((b == 0) && (c == 0))
+             break;
+
+         /* Uncomment this to get all the chunks separately
+            printf(" %d: %d %d\n", sections, b, c);
+            */
+
+         pages += (c - b);
+         sections++;
+     }
+
+     if (stat(path, &st) == 0) {
+         off_t size;
+
+         if (sections == 0)
+             size = st.st_size;
+         else
+             size = pages * page_size();
+
+         tsize += size;
+
+         printf(" %4jd%% (%2d) %12jd: %s\n",
+                (intmax_t) (sections && st.st_size ? size * 100 / st.st_size : 100),
+                sections ? sections : 1,
+                (intmax_t) size,
+                path);
+     } else {
+         printf(" %4dp (%2d) %12s: %s (MISSING)\n",
+                sections ? pages : -1,
+                sections ? sections : 1,
+                "???",
+                path);
+         missing++;
+     }
+
+ }
+
+ printf("\nHOST: %s"
+        "\nTYPE: %c\n"

```

```

+     "MISSING: %d\n"
+     "TOTAL: %zu\n",
+     line,
+     a,
+     missing,
+     tsize);
+
+     return EXIT_SUCCESS;
+
+fail:
+     return EXIT_FAILURE;
+}
diff --git a/src/readahead/readahead-collect.c b/src/readahead/readahead-collect.c
new file mode 100644
index 0000000000..822a803a41
--- /dev/null
+++ b/src/readahead/readahead-collect.c
@@ -0,0 +1,650 @@
+/*-*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*-*/
+
+/**
+ * This file is part of systemd.
+ *
+ * Copyright 2010 Lennart Poettering
+ *
+ * systemd is free software; you can redistribute it and/or modify it
+ * under the terms of the GNU Lesser General Public License as published by
+ * the Free Software Foundation; either version 2.1 of the License, or
+ * (at your option) any later version.
+ *
+ * systemd is distributed in the hope that it will be useful, but
+ * WITHOUT ANY WARRANTY; without even the implied warranty of
+ * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
+ * Lesser General Public License for more details.
+ *
+ * You should have received a copy of the GNU Lesser General Public License
+ * along with systemd; If not, see <http://www.gnu.org/licenses/>.
+ */
+
+#include <errno.h>
+#include <inttypes.h>
+#include <fcntl.h>
+#include <linux/limits.h>
+#include <stdbool.h>
+#include <stdio.h>
+#include <stdlib.h>
+#include <string.h>
+#include <sys/select.h>

```

```

#include <sys/time.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <unistd.h>
#include <linux/fanotify.h>
#include <sys/signalfd.h>
#include <sys/poll.h>
#include <sys/mman.h>
#include <linux/fs.h>
#include <linux/fiemap.h>
#include <sys/ioctl.h>
#include <sys/vfs.h>
#include <getopt.h>
#include <sys/inotify.h>
#include <math.h>
+
#ifdef HAVE_LINUX_BTRFS_H
#include <linux/btrfs.h>
#endif
+
#ifdef HAVE_FANOTIFY_INIT
#include <sys/fanotify.h>
#endif
+
#include "systemd/sd-daemon.h"
+
#include "missing.h"
#include "util.h"
#include "set.h"
#include "ioprio.h"
#include "readahead-common.h"
#include "virt.h"
+
+/* fixme:
+ *
+ * - detect ssd on btrfs/lvm...
+ * - read ahead directories
+ * - gzip?
+ * - remount rw?
+ * - handle files where nothing is in mincore
+ * - does ioprio_set work with fadvise()?
+ */
+
+static ReadaheadShared *shared = NULL;
+static usec_t starttime;
+
+/* Avoid collisions with the NULL pointer */
#define SECTOR_TO_PTR(s) ULONG_TO_PTR((s)+1)

```

```

+#define PTR_TO_SECTOR(p) (PTR_TO_ULONG(p)-1)
+
+static int btrfs_defrag(int fd) {
+    struct btrfs_ioctl_vol_args data = { .fd = fd };
+
+    return ioctl(fd, BTRFS_IOC_DEFRAG, &data);
+}
+
+static int pack_file(FILE *pack, const char *fn, bool on_btrfs) {
+    struct stat st;
+    void *start = MAP_FAILED;
+    uint8_t *vec;
+    uint32_t b, c;
+    uint64_t inode;
+    size_t l, pages;
+    bool mapped;
+    int r = 0, fd = -1, k;
+
+    assert(pack);
+    assert(fn);
+
+    fd = open(fn, O_RDONLY|O_CLOEXEC|O_NOATIME|O_NOCTTY|O_NOFOLLOW);
+    if (fd < 0) {
+
+        if (errno == ENOENT)
+            return 0;
+
+        if (errno == EPERM || errno == EACCES)
+            return 0;
+
+        log_warning("open(%s) failed: %m", fn);
+        r = -errno;
+        goto finish;
+    }
+
+    k = file_verify(fd, fn, arg_file_size_max, &st);
+    if (k <= 0) {
+        r = k;
+        goto finish;
+    }
+
+    if (on_btrfs)
+        btrfs_defrag(fd);
+
+    l = PAGE_ALIGN(st.st_size);
+    start = mmap(NULL, l, PROT_READ, MAP_SHARED, fd, 0);
+    if (start == MAP_FAILED) {
+        log_warning("mmap(%s) failed: %m", fn);

```

```

+     r = -errno;
+     goto finish;
+ }
+
+ pages = l / page_size();
+ vec = alloca0(pages);
+ if (mincore(start, l, vec) < 0) {
+     log_warning("mincore(%s) failed: %m", fn);
+     r = -errno;
+     goto finish;
+ }
+
+ fputs(fn, pack);
+ fputc('\n', pack);
+
+ /* Store the inode, so that we notice when the file is deleted */
+ inode = (uint64_t) st.st_ino;
+ fwrite(&inode, sizeof(inode), 1, pack);
+
+ mapped = false;
+ for (c = 0; c < pages; c++) {
+     bool new_mapped = !(vec[c] & 1);
+
+     if (!mapped && new_mapped)
+         b = c;
+     else if (mapped && !new_mapped) {
+         fwrite(&b, sizeof(b), 1, pack);
+         fwrite(&c, sizeof(c), 1, pack);
+
+         log_debug("%s: page %u to %u", fn, b, c);
+     }
+
+     mapped = new_mapped;
+ }
+
+ /* We don't write any range data if we should read the entire file */
+ if (mapped && b > 0) {
+     fwrite(&b, sizeof(b), 1, pack);
+     fwrite(&c, sizeof(c), 1, pack);
+
+     log_debug("%s: page %u to %u", fn, b, c);
+ }
+
+ /* End marker */
+ b = 0;
+ fwrite(&b, sizeof(b), 1, pack);
+ fwrite(&b, sizeof(b), 1, pack);
+
+

```



```

+finish:
+   if (start != MAP_FAILED)
+       munmap(start, l);
+
+   safe_close(fd);
+
+   return r;
+}
+
+static unsigned long fd_first_block(int fd) {
+   struct {
+       struct fiemap fiemap;
+       struct fiemap_extent extent;
+   } data = {
+       .fiemap.fm_length = ~0ULL,
+       .fiemap.fm_extent_count = 1,
+   };
+
+   if (ioctl(fd, FS_IOC_FIEMAP, &data) < 0)
+       return 0;
+
+   if (data.fiemap.fm_mapped_extents <= 0)
+       return 0;
+
+   if (data.fiemap.fm_extents[0].fe_flags & FIEMAP_EXTENT_UNKNOWN)
+       return 0;
+
+   return (unsigned long) data.fiemap.fm_extents[0].fe_physical;
+}
+
+struct item {
+   const char *path;
+   unsigned long block;
+   unsigned long bin;
+};
+
+static int qsort_compare(const void *a, const void *b) {
+   const struct item *i, *j;
+
+   i = a;
+   j = b;
+
+   /* sort by bin first */
+   if (i->bin < j->bin)
+       return -1;
+   if (i->bin > j->bin)
+       return 1;
+}

```

```

+ /* then sort by sector */
+ if (i->block < j->block)
+     return -1;
+ if (i->block > j->block)
+     return 1;
+
+ return strcmp(i->path, j->path);
+}
+
+static int collect(const char *root) {
+    enum {
+        FD_FANOTIFY, /* Get the actual fs events */
+        FD_SIGNAL,
+        FD_INOTIFY, /* We get notifications to quit early via this fd */
+        _FD_MAX
+    };
+    struct pollfd pollfd[_FD_MAX] = {};
+    int fanotify_fd = -1, signal_fd = -1, inotify_fd = -1, r = 0;
+    pid_t my_pid;
+    Hashmap *files = NULL;
+    Iterator i;
+    char *p, *q;
+    sigset_t mask;
+    FILE *pack = NULL;
+    char *pack_fn_new = NULL, *pack_fn = NULL;
+    bool on_ssd, on_btrfs;
+    struct statfs sfs;
+    usec_t not_after;
+    uint64_t previous_block_readahead;
+    bool previous_block_readahead_set = false;
+
+    assert(root);
+
+    if (asprintf(&pack_fn, "%s/.readahead", root) < 0) {
+        r = log_oom();
+        goto finish;
+    }
+
+    starttime = now(CLOCK_MONOTONIC);
+
+    /* If there's no pack file yet we lower the kernel readahead
+     * so that mincore() is accurate. If there is a pack file
+     * already we assume it is accurate enough so that kernel
+     * readahead is never triggered. */
+    previous_block_readahead_set =
+        access(pack_fn, F_OK) < 0 &&
+        block_get_readahead(root, &previous_block_readahead) >= 0 &&
+        block_set_readahead(root, 8*1024) >= 0;

```

```

+
+ if (ioprio_set(IOPRIO_WHO_PROCESS, getpid(), IOPRIO_PRIO_VALUE(IOPRIO_CLASS_IDLE, 0)) <
0)
+     log_warning("Failed to set IDLE IO priority class: %m");
+
+ assert_se(sigemptyset(&mask) == 0);
+ sigset_add_many(&mask, SIGINT, SIGTERM, -1);
+ assert_se(sigprocmask(SIG_SETMASK, &mask, NULL) == 0);
+
+ if ((signal_fd = signalfd(-1, &mask, SFD_NONBLOCK|SFD_CLOEXEC)) < 0) {
+     log_error("signalfd(): %m");
+     r = -errno;
+     goto finish;
+ }
+
+ files = hashmap_new(&string_hash_ops);
+ if (!files) {
+     log_error("Failed to allocate set.");
+     r = -ENOMEM;
+     goto finish;
+ }
+
+ fanotify_fd = fanotify_init(FAN_CLOEXEC|FAN_NONBLOCK,
O_RDONLY|O_LARGEFILE|O_CLOEXEC|O_NOATIME);
+ if (fanotify_fd < 0) {
+     log_error("Failed to create fanotify object: %m");
+     r = -errno;
+     goto finish;
+ }
+
+ if (fanotify_mark(fanotify_fd, FAN_MARK_ADD|FAN_MARK_MOUNT, FAN_OPEN, AT_FDCWD,
root) < 0) {
+     log_error("Failed to mark %s: %m", root);
+     r = -errno;
+     goto finish;
+ }
+
+ inotify_fd = open_inotify();
+ if (inotify_fd < 0) {
+     r = inotify_fd;
+     goto finish;
+ }
+
+ not_after = now(CLOCK_MONOTONIC) + arg_timeout;
+
+ my_pid = getpid();
+
+ pollfd[FD_FANOTIFY].fd = fanotify_fd;

```

```

+ pollfd[FD_FANOTIFY].events = POLLIN;
+ pollfd[FD_SIGNAL].fd = signal_fd;
+ pollfd[FD_SIGNAL].events = POLLIN;
+ pollfd[FD_INOTIFY].fd = inotify_fd;
+ pollfd[FD_INOTIFY].events = POLLIN;
+
+ sd_notify(0,
+     "READY=1\n"
+     "STATUS=Collecting readahead data");
+
+ log_debug("Collecting...");
+
+ if (access("/run/systemd/readahead/cancel", F_OK) >= 0) {
+     log_debug("Collection canceled");
+     r = -ECANCELED;
+     goto finish;
+ }
+
+ if (access("/run/systemd/readahead/done", F_OK) >= 0) {
+     log_debug("Got termination request");
+     goto done;
+ }
+
+ for (;;) {
+     union {
+         struct fanotify_event_metadata metadata;
+         char buffer[4096];
+     } data;
+     ssize_t n;
+     struct fanotify_event_metadata *m;
+     usec_t t;
+     int h;
+
+     if (hashmap_size(files) > arg_files_max) {
+         log_debug("Reached maximum number of read ahead files, ending collection.");
+         break;
+     }
+
+     t = now(CLOCK_MONOTONIC);
+     if (t >= not_after) {
+         log_debug("Reached maximum collection time, ending collection.");
+         break;
+     }
+
+     if ((h = poll(pollfd, _FD_MAX, (int) ((not_after - t) / USEC_PER_MSEC))) < 0) {
+
+         if (errno == EINTR)
+             continue;

```

```

+
+     log_error("poll(): %m");
+     r = -errno;
+     goto finish;
+ }
+
+ if (h == 0) {
+     log_debug("Reached maximum collection time, ending collection.");
+     break;
+ }
+
+ if (pollfd[FD_SIGNAL].revents) {
+     log_debug("Got signal.");
+     break;
+ }
+
+ if (pollfd[FD_INOTIFY].revents) {
+     uint8_t inotify_buffer[sizeof(struct inotify_event) + FILENAME_MAX];
+     struct inotify_event *e;
+
+     if ((n = read(inotify_fd, &inotify_buffer, sizeof(inotify_buffer))) < 0) {
+         if (errno == EINTR || errno == EAGAIN)
+             continue;
+
+         log_error("Failed to read inotify event: %m");
+         r = -errno;
+         goto finish;
+     }
+
+     e = (struct inotify_event*) inotify_buffer;
+     while (n > 0) {
+         size_t step;
+
+         if ((e->mask & IN_CREATE) && streq(e->name, "cancel")) {
+             log_debug("Collection canceled");
+             r = -ECANCELED;
+             goto finish;
+         }
+
+         if ((e->mask & IN_CREATE) && streq(e->name, "done")) {
+             log_debug("Got termination request");
+             goto done;
+         }
+
+         step = sizeof(struct inotify_event) + e->len;
+         assert(step <= (size_t) n);
+
+         e = (struct inotify_event*) ((uint8_t*) e + step);

```

```

+         n -= step;
+     }
+ }
+
+ n = read(fanotify_fd, &data, sizeof(data));
+ if (n < 0) {
+
+     if (errno == EINTR || errno == EAGAIN)
+         continue;
+
+     /* fanotify sometimes returns EACCES on read()
+      * where it shouldn't. For now let's just
+      * ignore it here (which is safe), but
+      * eventually this should be
+      * dropped when the kernel is fixed.
+      *
+      * https://bugzilla.redhat.com/show_bug.cgi?id=707577 */
+     if (errno == EACCES)
+         continue;
+
+     log_error("Failed to read event: %m");
+     r = -errno;
+     goto finish;
+ }
+
+ for (m = &data.metadata; FAN_EVENT_OK(m, n); m = FAN_EVENT_NEXT(m, n)) {
+     char fn[sizeof("/proc/self/fd/") + DECIMAL_STR_MAX(int)];
+     int k;
+
+     if (m->fd < 0)
+         goto next_iteration;
+
+     if (m->pid == my_pid)
+         goto next_iteration;
+
+     __sync_synchronize();
+     if (m->pid == shared->replay)
+         goto next_iteration;
+
+     snprintf(fn, sizeof(fn), "/proc/self/fd/%i", m->fd);
+     k = readlink_malloc(fn, &p);
+     if (k >= 0) {
+         if (startswith(p, "/tmp") ||
+             endswith(p, " (deleted)") ||
+             hashmap_get(files, p))
+             /* Not interesting, or
+              * already read */
+             free(p);

```

```

+         else {
+             unsigned long ul;
+             usec_t entrytime;
+             struct item *entry;
+
+             entry = new0(struct item, 1);
+             if (!entry) {
+                 r = log_oom();
+                 goto finish;
+             }
+
+             ul = fd_first_block(m->fd);
+
+             entrytime = now(CLOCK_MONOTONIC);
+
+             entry->block = ul;
+             entry->path = strdup(p);
+             if (!entry->path) {
+                 free(entry);
+                 r = log_oom();
+                 goto finish;
+             }
+             entry->bin = (entrytime - starttime) / 2000000;
+
+             k = hashmap_put(files, p, entry);
+             if (k < 0) {
+                 log_warning("hashmap_put() failed: %s", strerror(-k));
+                 free(p);
+             }
+         }
+     } else
+         log_warning("readlink(%s) failed: %s", fn, strerror(-k));
+
+     next_iteration:
+         safe_close(m->fd);
+     }
+ }
+
+done:
+     fanotify_fd = safe_close(fanotify_fd);
+
+     log_debug("Writing Pack File...");
+
+     on_ssd = fs_on_ssd(root) > 0;
+     log_debug("On SSD: %s", yes_no(on_ssd));
+
+     on_btrfs = statfs(root, &sfs) >= 0 && F_TYPE_EQUAL(sfs.f_type, BTRFS_SUPER_MAGIC);

```

```

+   log_debug("On btrfs: %s", yes_no(on_btrfs));
+
+   if (asprintf(&pack_fn_new, "%s/.readahead.new", root) < 0) {
+       r = log_oom();
+       goto finish;
+   }
+
+   pack = fopen(pack_fn_new, "we");
+   if (!pack) {
+       log_error("Failed to open pack file: %m");
+       r = -errno;
+       goto finish;
+   }
+
+   fputs(CANONICAL_HOST_READAHEAD_PACK_FILE_VERSION, pack);
+   putc(on_ssd ? 'S' : 'R', pack);
+
+   if (on_ssd || on_btrfs) {
+
+       /* On SSD or on btrfs, just write things out in the
+        * order the files were accessed. */
+
+       HASHMAP_FOREACH_KEY(q, p, files, i)
+           pack_file(pack, p, on_btrfs);
+   } else {
+       unsigned n;
+
+       /* On rotating media, order things by the block
+        * numbers */
+
+       log_debug("Ordering...");
+
+       n = hashmap_size(files);
+       if (n) {
+           _cleanup_free_ struct item *ordered;
+           struct item *j;
+           unsigned k;
+
+           ordered = new(struct item, n);
+           if (!ordered) {
+               r = log_oom();
+               goto finish;
+           }
+
+           j = ordered;
+           HASHMAP_FOREACH_KEY(q, p, files, i) {
+               memcpy(j, q, sizeof(struct item));
+               j++;

```



```

+         }
+
+         assert(ordered + n == j);
+
+         qsort(ordered, n, sizeof(struct item), qsort_compare);
+
+         for (k = 0; k < n; k++)
+             pack_file(pack, ordered[k].path, on_btrfs);
+     } else
+         log_warning("No pack files");
+ }
+
+ log_debug("Finalizing...");
+
+ fflush(pack);
+
+ if (ferror(pack)) {
+     log_error("Failed to write pack file.");
+     r = -EIO;
+     goto finish;
+ }
+
+ if (rename(pack_fn_new, pack_fn) < 0) {
+     log_error("Failed to rename readahead file: %m");
+     r = -errno;
+     goto finish;
+ }
+
+ fclose(pack);
+ pack = NULL;
+
+ log_debug("Done.");
+
+finish:
+ safe_close(fanotify_fd);
+ safe_close(signal_fd);
+ safe_close(inotify_fd);
+
+ if (pack) {
+     fclose(pack);
+     unlink(pack_fn_new);
+ }
+ free(pack_fn_new);
+ free(pack_fn);
+
+ while ((p = hashmap_steal_first_key(files)))
+     free(p);
+

```

```

+   hashmap_free(files);
+
+   if (previous_block_readahead_set) {
+       uint64_t bytes;
+
+       /* Restore the original kernel readahead setting if we
+        * changed it, and nobody has overwritten it since
+        * yet. */
+       if (block_get_readahead(root, &bytes) >= 0 && bytes == 8*1024)
+           block_set_readahead(root, previous_block_readahead);
+   }
+
+   return r;
+}
+
+int main_collect(const char *root) {
+
+   if (!root)
+       root = "/";
+
+   /* Skip this step on read-only media. Note that we check the
+    * underlying block device here, not the read-only flag of the
+    * file system on top, since that one is most likely mounted
+    * read-only anyway at boot, even if the underlying block
+    * device is theoretically writable. */
+   if (fs_on_read_only(root) > 0) {
+       log_info("Disabling readahead collector due to read-only media.");
+       return EXIT_SUCCESS;
+   }
+
+   if (!enough_ram()) {
+       log_info("Disabling readahead collector due to low memory.");
+       return EXIT_SUCCESS;
+   }
+
+   shared = shared_get();
+   if (!shared)
+       return EXIT_FAILURE;
+
+   shared->collect = getpid();
+   __sync_synchronize();
+
+   if (collect(root) < 0)
+       return EXIT_FAILURE;
+
+   return EXIT_SUCCESS;
+}
diff --git a/src/readahead/readahead-common.c b/src/readahead/readahead-common.c

```

```

new file mode 100644
index 0000000000..3ca48a7257
--- /dev/null
+++ b/src/readahead/readahead-common.c
@@ -0,0 +1,398 @@
+/*-*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*-*/
+
+/**
+ This file is part of systemd.
+
+ Copyright 2010 Lennart Poettering
+
+ systemd is free software; you can redistribute it and/or modify it
+ under the terms of the GNU Lesser General Public License as published by
+ the Free Software Foundation; either version 2.1 of the License, or
+ (at your option) any later version.
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+ Lesser General Public License for more details.
+
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+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+***/
+
+#include <errno.h>
+#include <stdlib.h>
+#include <string.h>
+#include <sys/sysinfo.h>
+#include <sys/inotify.h>
+#include <fcntl.h>
+#include <sys/mman.h>
+#include <unistd.h>
+
+#include "log.h"
+#include "readahead-common.h"
+#include "util.h"
+#include "missing.h"
+#include "fileio.h"
+#include "libudev.h"
+#include "udev-util.h"
+
+int file_verify(int fd, const char *fn, off_t file_size_max, struct stat *st) {
+    assert(fd >= 0);
+    assert(fn);
+    assert(st);
+}

```

```

+   if (fstat(fd, st) < 0) {
+       log_warning("fstat(%s) failed: %m", fn);
+       return -errno;
+   }
+
+   if (!S_ISREG(st->st_mode)) {
+       log_debug("Not preloading special file %s", fn);
+       return 0;
+   }
+
+   if (st->st_size <= 0 || st->st_size > file_size_max) {
+       assert_cc(sizeof(st->st_size) == 8);
+       log_debug("Not preloading file %s with size out of bounds %"PRIu64,
+               fn, st->st_size);
+       return 0;
+   }
+
+   return 1;
+}
+
+int fs_on_ssd(const char *p) {
+   struct stat st;
+   _cleanup_udev_unref_ struct udev *udev = NULL;
+   _cleanup_udev_device_unref_ struct udev_device *udev_device = NULL;
+   struct udev_device *look_at = NULL;
+   const char *devtype, *rotational, *model, *id;
+   int r;
+
+   assert(p);
+
+   if (stat(p, &st) < 0)
+       return -errno;
+
+   if (major(st.st_dev) == 0) {
+       _cleanup_fclose_ FILE *f = NULL;
+       int mount_id;
+       union file_handle_union h = { .handle.handle_bytes = MAX_HANDLE_SZ, };
+
+       /* Might be btrfs, which exposes "ssd" as mount flag if it is on ssd.
+        *
+        * We first determine the mount ID here, if we can,
+        * and then lookup the mount ID in mountinfo to find
+        * the mount options. */
+
+       r = name_to_handle_at(AT_FDCWD, p, &h.handle, &mount_id, AT_SYMLINK_FOLLOW);
+       if (r < 0)
+           return false;
+   }
+}

```

```

+     f = fopen("/proc/self/mountinfo", "re");
+     if (!f)
+         return false;
+
+     for (;;) {
+         char line[LINE_MAX], *e;
+         _cleanup_free_ char *opts = NULL;
+         int mid;
+
+         if (!fgets(line, sizeof(line), f))
+             return false;
+
+         truncate_nl(line);
+
+         if (sscanf(line, "%i", &mid) != 1)
+             continue;
+
+         if (mid != mount_id)
+             continue;
+
+         e = strstr(line, " - ");
+         if (!e)
+             continue;
+
+         if (sscanf(e+3, "%*s %*s %ms", &opts) != 1)
+             continue;
+
+         if (streq(opts, "ssd") || startswith(opts, "ssd,") || endswith(opts, ",ssd") || strstr(opts, ",ssd,"))
+             return true;
+     }
+
+     return false;
+ }
+
+ udev = udev_new();
+ if (!udev)
+     return -ENOMEM;
+
+ udev_device = udev_device_new_from_devnum(udev, 'b', st.st_dev);
+ if (!udev_device)
+     return false;
+
+ devtype = udev_device_get_property_value(udev_device, "DEVTYPE");
+ if (devtype && streq(devtype, "partition"))
+     look_at = udev_device_get_parent(udev_device);
+ else
+     look_at = udev_device;
+

```

```

+   if (!look_at)
+       return false;
+
+   /* First, try high-level property */
+   id = udev_device_get_property_value(look_at, "ID_SSD");
+   if (id)
+       return streq(id, "1");
+
+   /* Second, try kernel attribute */
+   rotational = udev_device_get_sysattr_value(look_at, "queue/rotational");
+   if (rotational)
+       return streq(rotational, "0");
+
+   /* Finally, fallback to heuristics */
+   look_at = udev_device_get_parent(look_at);
+   if (!look_at)
+       return false;
+
+   model = udev_device_get_sysattr_value(look_at, "model");
+   if (model)
+       return !!strstr(model, "SSD");
+
+   return false;
+}
+
+int fs_on_read_only(const char *p) {
+   struct stat st;
+   _cleanup_udev_unref_ struct udev *udev = NULL;
+   _cleanup_udev_device_unref_ struct udev_device *udev_device = NULL;
+   const char *read_only;
+
+   assert(p);
+
+   if (stat(p, &st) < 0)
+       return -errno;
+
+   if (major(st.st_dev) == 0)
+       return false;
+
+   udev = udev_new();
+   if (!udev)
+       return -ENOMEM;
+
+   udev_device = udev_device_new_from_devnum(udev, 'b', st.st_dev);
+   if (!udev_device)
+       return false;
+
+   read_only = udev_device_get_sysattr_value(udev_device, "ro");

```

```

+   if (read_only)
+       return streq(read_only, "1");
+
+   return false;
+}
+
+bool enough_ram(void) {
+   struct sysinfo si;
+
+   assert_se(sysinfo(&si) >= 0);
+
+   /* Enable readahead only with at least 128MB memory */
+   return si.totalram > 127 * 1024*1024 / si.mem_unit;
+}
+
+static void mkdirs(void) {
+   if (mkdir("/run/systemd", 0755) && errno != EEXIST)
+       log_warning("Failed to create /run/systemd: %m");
+   if (mkdir("/run/systemd/readahead", 0755) && errno != EEXIST)
+       log_warning("Failed to create /run/systemd: %m");
+}
+
+int open_inotify(void) {
+   int fd;
+
+   fd = inotify_init1(IN_CLOEXEC|IN_NONBLOCK);
+   if (fd < 0) {
+       log_error("Failed to create inotify handle: %m");
+       return -errno;
+   }
+
+   mkdirs();
+
+   if (inotify_add_watch(fd, "/run/systemd/readahead", IN_CREATE) < 0) {
+       log_error("Failed to watch /run/systemd/readahead: %m");
+       safe_close(fd);
+       return -errno;
+   }
+
+   return fd;
+}
+
+ReadaheadShared *shared_get(void) {
+   _cleanup_close_ int fd = -1;
+   ReadaheadShared *m = NULL;
+
+   mkdirs();
+}

```

```

+ fd = open("/run/systemd/readahead/shared", O_CREAT|O_RDWR|O_CLOEXEC, 0644);
+ if (fd < 0) {
+     log_error("Failed to create shared memory segment: %m");
+     return NULL;
+ }
+
+ if (ftruncate(fd, sizeof(ReadaheadShared)) < 0) {
+     log_error("Failed to truncate shared memory segment: %m");
+     return NULL;
+ }
+
+ m = mmap(NULL, sizeof(ReadaheadShared), PROT_WRITE|PROT_READ, MAP_SHARED, fd, 0);
+ if (m == MAP_FAILED) {
+     log_error("Failed to mmap shared memory segment: %m");
+     return NULL;
+ }
+
+ return m;
+}
+
+/* We use 20K instead of the more human digestable 16K here. Why?
+ Simply so that it is more unlikely that users end up picking this
+ value too so that we can recognize better whether the user changed
+ the value while we had it temporarily bumped. */
+#define BUMP_REQUEST_NR (20*1024u)
+
+int block_bump_request_nr(const char *p) {
+    struct stat st;
+    uint64_t u;
+    char *ap = NULL, *line = NULL;
+    int r;
+    dev_t d;
+
+    assert(p);
+
+    if (stat(p, &st) < 0)
+        return -errno;
+
+    if (major(st.st_dev) == 0)
+        return 0;
+
+    d = st.st_dev;
+    block_get_whole_disk(d, &d);
+
+    if (asprintf(&ap, "/sys/dev/block/%u:%u/queue/nr_requests", major(d), minor(d)) < 0) {
+        r = -ENOMEM;
+        goto finish;
+    }

```



```

+
+   r = read_one_line_file(ap, &line);
+   if (r < 0) {
+       if (r == -ENOENT)
+           r = 0;
+       goto finish;
+   }
+
+   r = safe_atou64(line, &u);
+   if (r >= 0 && u >= BUMP_REQUEST_NR) {
+       r = 0;
+       goto finish;
+   }
+
+   free(line);
+   line = NULL;
+
+   if (asprintf(&line, "%u", BUMP_REQUEST_NR) < 0) {
+       r = -ENOMEM;
+       goto finish;
+   }
+
+   r = write_string_file(ap, line);
+   if (r < 0)
+       goto finish;
+
+   log_info("Bumped block_nr parameter of %u:%u to %u. This is a temporary hack and should be removed one
day.", major(d), minor(d), BUMP_REQUEST_NR);
+   r = 1;
+
+finish:
+   free(ap);
+   free(line);
+
+   return r;
+}
+
+int block_get_readahead(const char *p, uint64_t *bytes) {
+   struct stat st;
+   char *ap = NULL, *line = NULL;
+   int r;
+   dev_t d;
+   uint64_t u;
+
+   assert(p);
+   assert(bytes);
+
+   if (stat(p, &st) < 0)

```

```

+         return -errno;
+
+     if (major(st.st_dev) == 0)
+         return 0;
+
+     d = st.st_dev;
+     block_get_whole_disk(d, &d);
+
+     if (asprintf(&ap, "/sys/dev/block/%u:%u/bdi/read_ahead_kb", major(d), minor(d)) < 0) {
+         r = -ENOMEM;
+         goto finish;
+     }
+
+     r = read_one_line_file(ap, &line);
+     if (r < 0)
+         goto finish;
+
+     r = safe_atou64(line, &u);
+     if (r < 0)
+         goto finish;
+
+     *bytes = u * 1024ULL;
+
+finish:
+     free(ap);
+     free(line);
+
+     return r;
+}
+
+int block_set_readahead(const char *p, uint64_t bytes) {
+     struct stat st;
+     char *ap = NULL, *line = NULL;
+     int r;
+     dev_t d;
+
+     assert(p);
+     assert(bytes);
+
+     if (stat(p, &st) < 0)
+         return -errno;
+
+     if (major(st.st_dev) == 0)
+         return 0;
+
+     d = st.st_dev;
+     block_get_whole_disk(d, &d);
+
+

```

```

+   if (asprintf(&ap, "/sys/dev/block/%u:%u/bdi/read_ahead_kb", major(d), minor(d)) < 0) {
+       r = -ENOMEM;
+       goto finish;
+   }
+
+   if (asprintf(&line, "%llu", bytes / 1024ULL) < 0) {
+       r = -ENOMEM;
+       goto finish;
+   }
+
+   r = write_string_file(ap, line);
+   if (r < 0)
+       goto finish;
+
+finish:
+   free(ap);
+   free(line);
+
+   return r;
+}

```

diff --git a/src/readahead/readahead-common.h b/src/readahead/readahead-common.h

new file mode 100644

index 0000000000..b34f3aadd7

--- /dev/null

+++ b/src/readahead/readahead-common.h

@@ -0,0 +1,61 @@

+/\*-\*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -\*-\*/

+

+#pragma once

+

+/\*\*

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+

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+

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+ along with systemd; If not, see <<http://www.gnu.org/licenses/>>.

+\*\*\*/

```

+
+#include <sys/stat.h>
+#include <sys/types.h>
+
+#include "macro.h"
+#include "util.h"
+
+#define READAHEAD_FILE_SIZE_MAX (10*1024*1024)
+
+#define READAHEAD_PACK_FILE_VERSION ";VERSION=2\n"
+
+extern unsigned arg_files_max;
+extern off_t arg_file_size_max;
+extern usec_t arg_timeout;
+
+int file_verify(int fd, const char *fn, off_t file_size_max, struct stat *st);
+
+int fs_on_ssd(const char *p);
+int fs_on_read_only(const char *p);
+
+bool enough_ram(void);
+
+int open_inotify(void);
+
+typedef struct ReadaheadShared {
+    pid_t collect;
+    pid_t replay;
+} _packed_ ReadaheadShared;
+
+ReadaheadShared *shared_get(void);
+
+int block_bump_request_nr(const char *p);
+
+int block_get_readahead(const char *p, uint64_t *bytes);
+int block_set_readahead(const char *p, uint64_t bytes);
+
+int main_collect(const char *root);
+int main_replay(const char *root);
+int main_analyze(const char *pack_path);
diff --git a/src/readahead/readahead-replay.c b/src/readahead/readahead-replay.c
new file mode 100644
index 0000000000..f81e0fe55d
--- /dev/null
+++ b/src/readahead/readahead-replay.c
@@ -0,0 +1,281 @@
+/*-*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*-*/
+
+/**

```

```

+ This file is part of systemd.
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+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License
+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+***/
+
+#include <errno.h>
+#include <inttypes.h>
+#include <fcntl.h>
+#include <linux/limits.h>
+#include <stdbool.h>
+#include <stdio.h>
+#include <stdlib.h>
+#include <string.h>
+#include <sys/select.h>
+#include <sys/time.h>
+#include <sys/types.h>
+#include <sys/stat.h>
+#include <unistd.h>
+#include <getopt.h>
+#include <sys/inotify.h>
+
+#include "systemd/sd-daemon.h"
+
+#include "missing.h"
+#include "util.h"
+#include "set.h"
+#include "ioprio.h"
+#include "readahead-common.h"
+#include "virt.h"
+
+static ReadaheadShared *shared = NULL;
+
+static int unpack_file(FILE *pack) {
+    _cleanup_close_ int fd = -1;
+    char fn[PATH_MAX];

```

```

+   bool any = false;
+   struct stat st;
+   uint64_t inode;
+
+   assert(pack);
+
+   if (!fgets(fn, sizeof(fn), pack))
+       return 0;
+
+   char_array_0(fn);
+   truncate_nl(fn);
+
+   fd = open(fn, O_RDONLY|O_CLOEXEC|O_NOATIME|O_NOCTTY|O_NOFOLLOW);
+   if (fd < 0) {
+       if (errno != ENOENT && errno != EPERM && errno != EACCES && errno != ELOOP)
+           log_warning("open(%s) failed: %m", fn);
+
+       } else if (file_verify(fd, fn, arg_file_size_max, &st) <= 0)
+           fd = safe_close(fd);
+
+   if (fread(&inode, sizeof(inode), 1, pack) != 1) {
+       log_error("Premature end of pack file.");
+       return -EIO;
+   }
+
+   if (fd >= 0) {
+       /* If the inode changed the file got deleted, so just
+        * ignore this entry */
+       if (st.st_ino != (uint64_t) inode)
+           fd = safe_close(fd);
+   }
+
+   for (;;) {
+       uint32_t b, c;
+
+       if (fread(&b, sizeof(b), 1, pack) != 1 ||
+           fread(&c, sizeof(c), 1, pack) != 1) {
+           log_error("Premature end of pack file.");
+           return -EIO;
+       }
+
+       if (b == 0 && c == 0)
+           break;
+
+       if (c <= b) {
+           log_error("Invalid pack file.");
+           return -EIO;
+       }

```

```

+
+     log_debug("%s: page %u to %u", fn, b, c);
+
+     any = true;
+
+     if (fd >= 0) {
+         if (posix_fadvise(fd, b * page_size(), (c - b) * page_size(), POSIX_FADV_WILLNEED) < 0) {
+             log_warning("posix_fadvise() failed: %m");
+             return -errno;
+         }
+     }
+
+     if (!any && fd >= 0) {
+         /* if no range is encoded in the pack file this is
+          * intended to mean that the whole file shall be
+          * read */
+
+         if (posix_fadvise(fd, 0, st.st_size, POSIX_FADV_WILLNEED) < 0) {
+             log_warning("posix_fadvise() failed: %m");
+             return -errno;
+         }
+     }
+
+     return 0;
+ }
+
+static int replay(const char *root) {
+     _cleanup_close_ int inotify_fd = -1;
+     _cleanup_free_ char *pack_fn = NULL;
+     _cleanup_fclose_ FILE *pack = NULL;
+     bool on_ssd, ready = false;
+     char line[LINE_MAX];
+     int prio, c;
+
+     assert(root);
+
+     block_bump_request_nr(root);
+
+     if (asprintf(&pack_fn, "%s/.readahead", root) < 0)
+         return log_oom();
+
+     pack = fopen(pack_fn, "re");
+     if (!pack) {
+         if (errno == ENOENT) {
+             log_debug("No pack file found.");
+             return 0;
+         }
+     }

```

```

+
+     log_error("Failed to open pack file: %m");
+     return -errno;
+ }
+
+ posix_fadvise(fileno(pack), 0, 0, POSIX_FADV_WILLNEED);
+
+ inotify_fd = open_inotify();
+ if (inotify_fd < 0)
+     return inotify_fd;
+
+ if (!fgets(line, sizeof(line), pack)) {
+     log_error("Premature end of pack file.");
+     return -EIO;
+ }
+
+ char_array_0(line);
+
+ if (!streq(line, CANONICAL_HOST_READAHEAD_PACK_FILE_VERSION)) {
+     log_debug("Pack file host or version type mismatch.");
+     goto done;
+ }
+
+ c = getc(pack);
+ if (c == EOF) {
+     log_debug("Premature end of pack file.");
+     return -EIO;
+ }
+
+ /* We do not retest SSD here, so that we can start replaying
+  * before udev is up. */
+ on_ssd = c == 'S';
+ log_debug("On SSD: %s", yes_no(on_ssd));
+
+ if (on_ssd)
+     prio = IOPRIO_PRIO_VALUE(IOPRIO_CLASS_IDLE, 0);
+ else
+     /* We are not using RT here, since we'd starve IO that
+     * we didn't record (which is for example blkid, since
+     * its disk accesses go directly to the block device and
+     * are thus not visible in fallocate) to death. However,
+     * we do ask for an IO prio that is slightly higher than
+     * the default (which is BE. 4) */
+     prio = IOPRIO_PRIO_VALUE(IOPRIO_CLASS_BE, 2);
+
+ if (ioprio_set(IOPRIO_WHO_PROCESS, getpid(), prio) < 0)
+     log_warning("Failed to set IDLE IO priority class: %m");
+
+

```



```

+ sd_notify(0, "STATUS=Replaying readahead data");
+
+ log_debug("Replaying...");
+
+ if (access("/run/systemd/readahead/noreplay", F_OK) >= 0) {
+     log_debug("Got termination request");
+     goto done;
+ }
+
+ while (!feof(pack) && !ferror(pack)) {
+     uint8_t inotify_buffer[sizeof(struct inotify_event) + FILENAME_MAX];
+     int k;
+     ssize_t n;
+
+     n = read(inotify_fd, &inotify_buffer, sizeof(inotify_buffer));
+     if (n < 0) {
+         if (errno != EINTR && errno != EAGAIN) {
+             log_error("Failed to read inotify event: %m");
+             return -errno;
+         }
+     } else {
+         struct inotify_event *e = (struct inotify_event*) inotify_buffer;
+
+         while (n > 0) {
+             size_t step;
+
+             if ((e->mask & IN_CREATE) && streq(e->name, "noreplay")) {
+                 log_debug("Got termination request");
+                 goto done;
+             }
+
+             step = sizeof(struct inotify_event) + e->len;
+             assert(step <= (size_t) n);
+
+             e = (struct inotify_event*) ((uint8_t*) e + step);
+             n -= step;
+         }
+     }
+
+     k = unpack_file(pack);
+     if (k < 0)
+         return k;
+
+     if (!ready) {
+         /* We delay the ready notification until we
+          * queued at least one read */
+         sd_notify(0, "READY=1");
+         ready = true;
+     }
+ }

```

```

+     }
+ }
+
+done:
+   if (ferror(pack)) {
+       log_error("Failed to read pack file.");
+       return -EIO;
+   }
+
+   if (!ready)
+       sd_notify(0, "READY=1");
+
+   log_debug("Done.");
+   return 0;
+}
+
+int main_replay(const char *root) {
+
+   if (!root)
+       root = "/";
+
+   if (!enough_ram()) {
+       log_info("Disabling readahead replay due to low memory.");
+       return EXIT_SUCCESS;
+   }
+
+   shared = shared_get();
+   if (!shared)
+       return EXIT_FAILURE;
+
+   shared->replay = getpid();
+   __sync_synchronize();
+
+   if (replay(root) < 0)
+       return EXIT_FAILURE;
+
+   return EXIT_SUCCESS;
+}

```

```
diff --git a/src/readahead/readahead.c b/src/readahead/readahead.c
```

```
new file mode 100644
```

```
index 0000000000..35176e9379
```

```
--- /dev/null
```

```
+++ b/src/readahead/readahead.c
```

```
@@ -0,0 +1,163 @@
```

```
+/*-*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*-*/
```

```
+
```

```
+/**
```

```
+ This file is part of systemd.
```

```

+
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+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+***/
+
+#include <stdio.h>
+#include <getopt.h>
+#include <stddef.h>
+#include <stdlib.h>
+#include <unistd.h>
+#include <errno.h>
+#include <string.h>
+
+#include "util.h"
+#include "def.h"
+#include "build.h"
+#include "readahead-common.h"
+
+unsigned arg_files_max = 16*1024;
+off_t arg_file_size_max = READAHEAD_FILE_SIZE_MAX;
+usec_t arg_timeout = 2*USEC_PER_MINUTE;
+
+static void help(void) {
+    printf("%1$s [OPTIONS...] collect [DIRECTORY]\n\n"
+           "Collect read-ahead data on early boot.\n\n"
+           "  -h --help          Show this help\n"
+           "  --version         Show package version\n"
+           "  --files-max=INT   Maximum number of files to read ahead\n"
+           "  --file-size-max=BYTES Maximum size of files to read ahead\n"
+           "  --timeout=USEC    Maximum time to spend collecting data\n"
+           "\n\n"
+           "%1$s [OPTIONS...] replay [DIRECTORY]\n\n"
+           "Replay collected read-ahead data on early boot.\n\n"
+           "  -h --help          Show this help\n"
+           "  --version         Show package version\n"
+           "  --file-size-max=BYTES Maximum size of files to read ahead\n"

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```

+     "\n\n"
+     "% 1$s [OPTIONS...] analyze [PACK-FILE]\n\n"
+     "Analyze collected read-ahead data.\n\n"
+     " -h --help          Show this help\n"
+     "  --version          Show package version\n",
+     program_invocation_short_name);
+ }
+
+ static int parse_argv(int argc, char *argv[]) {
+     enum {
+         ARG_VERSION = 0x100,
+         ARG_FILES_MAX,
+         ARG_FILE_SIZE_MAX,
+         ARG_TIMEOUT
+     };
+
+     static const struct option options[] = {
+         { "help",      no_argument,  NULL, 'h'      },
+         { "version",  no_argument,  NULL, ARG_VERSION  },
+         { "files-max", required_argument, NULL, ARG_FILES_MAX  },
+         { "file-size-max", required_argument, NULL, ARG_FILE_SIZE_MAX  },
+         { "timeout",  required_argument, NULL, ARG_TIMEOUT  },
+         {}
+     };
+
+     int c;
+
+     assert(argc >= 0);
+     assert(argv);
+
+     while ((c = getopt_long(argc, argv, "h", options, NULL)) >= 0)
+
+         switch (c) {
+
+         case 'h':
+             help();
+             return 0;
+
+         case ARG_VERSION:
+             puts(PACKAGE_STRING);
+             puts(SYSTEMD_FEATURES);
+             return 0;
+
+         case ARG_FILES_MAX:
+             if (safe_atou(optarg, &arg_files_max) < 0 || arg_files_max <= 0) {
+                 log_error("Failed to parse maximum number of files %s.", optarg);
+                 return -EINVAL;
+             }
+
+

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+         }
+         break;
+
+     case ARG_FILE_SIZE_MAX: {
+         unsigned long long ull;
+
+         if (safe_atollu(optarg, &ull) < 0 || ull <= 0) {
+             log_error("Failed to parse maximum file size %s.", optarg);
+             return -EINVAL;
+         }
+
+         arg_file_size_max = (off_t) ull;
+         break;
+     }
+
+     case ARG_TIMEOUT:
+         if (parse_sec(optarg, &arg_timeout) < 0 || arg_timeout <= 0) {
+             log_error("Failed to parse timeout %s.", optarg);
+             return -EINVAL;
+         }
+
+         break;
+
+     case '?':
+         return -EINVAL;
+
+     default:
+         assert_not_reached("Unhandled option");
+     }
+
+ if (optind != argc-1 &&
+     optind != argc-2) {
+     log_error("%s: wrong number of arguments.",
+             program_invocation_short_name);
+     return -EINVAL;
+ }
+
+ return 1;
+}
+
+int main(int argc, char *argv[]) {
+    int r;
+
+    log_set_target(LOG_TARGET_SAFE);
+    log_parse_environment();
+    log_open();
+
+    umask(0022);

```

```

+
+   r = parse_argv(argc, argv);
+   if (r <= 0)
+       return r < 0 ? EXIT_FAILURE : EXIT_SUCCESS;
+
+   if (streq(argv[optind], "collect"))
+       return main_collect(argv[optind+1]);
+   else if (streq(argv[optind], "replay"))
+       return main_replay(argv[optind+1]);
+   else if (streq(argv[optind], "analyze"))
+       return main_analyze(argv[optind+1]);
+
+   log_error("Unknown verb %s.", argv[optind]);
+   return EXIT_FAILURE;
+}
diff --git a/src/readahead/sd-readahead.c b/src/readahead/sd-readahead.c
new file mode 100644
index 0000000000..675d82cdd1
--- /dev/null
+++ b/src/readahead/sd-readahead.c
@@ -0,0 +1,89 @@
+/*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*/
+
+/**
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+ ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN
+ CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE
+ SOFTWARE.
+*/
+
+#ifndef _GNU_SOURCE

```

```

+# define _GNU_SOURCE
+#endif
+
+#include <unistd.h>
+#include <errno.h>
+#include <sys/stat.h>
+#include <sys/types.h>
+#include <fcntl.h>
+#include <string.h>
+
+#include "sd-readahead.h"
+
+#if (__GNUC__ >= 4)
+# ifdef SD_EXPORT_SYMBOLS
+/* Export symbols */
+# define _sd_export__attribute__ ((visibility("default")))
+# else
+/* Don't export the symbols */
+# define _sd_export__attribute__ ((visibility("hidden")))
+# endif
+#else
+# define _sd_export_
+#endif
+
+static int touch(const char *path) {
+
+#if !defined(DISABLE_SYSTEMD) && defined(__linux__)
+    int fd;
+
+    mkdir("/run/systemd", 0755);
+    mkdir("/run/systemd/readahead", 0755);
+
+    fd = open(path, O_WRONLY|O_CREAT|O_CLOEXEC|O_NOCTTY, 0666);
+    if (fd < 0)
+        return -errno;
+
+    for (;;) {
+        if (close(fd) >= 0)
+            break;
+
+        if (errno != EINTR)
+            return -errno;
+    }
+
+#endif
+    return 0;
+}
+

```

```

+_sd_export_ int sd_readahead(const char *action) {
+
+   if (!action)
+       return -EINVAL;
+
+   if (strcmp(action, "cancel") == 0)
+       return touch("/run/systemd/readahead/cancel");
+   else if (strcmp(action, "done") == 0)
+       return touch("/run/systemd/readahead/done");
+   else if (strcmp(action, "noreplay") == 0)
+       return touch("/run/systemd/readahead/noreplay");
+
+   return -EINVAL;
+}
diff --git a/src/readahead/test-ssd.c b/src/readahead/test-ssd.c
new file mode 100644
index 0000000000..808faf359c
--- /dev/null
+++ b/src/readahead/test-ssd.c
@@ -0,0 +1,41 @@
+/*-*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*-*/
+
+/**
+ This file is part of systemd.
+
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+
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+ under the terms of the GNU Lesser General Public License as published by
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+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License
+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+***/
+
+#include "readahead-common.h"
+
+int main(int argc, char *argv[]) {
+   int i;
+
+   for (i = 1; i < argc; i++) {
+       char *name = argv[i];

```



```

+     int r;
+
+     r = fs_on_ssd(name);
+     if (r < 0) {
+         log_error("%s: %s", name, strerror(-r));
+         return EXIT_FAILURE;
+     }
+
+     log_info("%s: %s", name, r ? "SSD" : "---");
+ }
+
+ return EXIT_SUCCESS;
+}
diff --git a/src/systemd/sd-readahead.h b/src/systemd/sd-readahead.h
new file mode 100644
index 0000000000..bb30f9a45e
--- /dev/null
+++ b/src/systemd/sd-readahead.h
@@ -0,0 +1,73 @@
+/*-*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*-*/
+
+#ifndef foosdreadaheadfoo
+#define foosdreadaheadfoo
+
+/**
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+ obtaining a copy of this software and associated documentation files
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+ BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN
+ ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN
+ CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE
+ SOFTWARE.
+***/
+

```

```

+ #ifdef __cplusplus
+ extern "C" {
+ #endif
+
+ /*
+  Reference implementation of a few boot read-ahead-related
+  interfaces. These interfaces are trivial to implement. To simplify
+  porting, we provide this reference implementation. Applications are
+  welcome to reimplement the algorithms described here if they do not
+  want to include these two source files.
+
+  You may compile this with -DDISABLE_SYSTEMD to disable systemd
+  support. This makes all calls NOPs.
+
+  Because this is drop-in code, we don't want any of our symbols to be
+  exported in any case. Hence, we declare hidden visibility for all of
+  them.
+
+  You may find an up-to-date version of these source files online:
+
+  http://cgit.freedesktop.org/systemd/systemd/plain/src/systemd/sd-readahead.h
+  http://cgit.freedesktop.org/systemd/systemd/plain/src/readahead/sd-readahead.c
+
+  This should compile on non-Linux systems too, but all functions
+  will become NOPs.
+
+  See sd-readahead(3) for more information.
+ */
+
+ /*
+  Controls on-going disk read-ahead operations during boot-up. The argument
+  must be one of the following strings: "cancel", "done", or "noreplay".
+
+  cancel = terminate read-ahead data collection, and drop collected information
+  done = terminate read-ahead data collection, and keep collected information
+  noreplay = terminate read-ahead replay
+ */
+ int sd_readahead(const char *action);
+
+ #ifdef __cplusplus
+ }
+ #endif
+
+ #endif
diff --git a/systemd-preset/90-systemd.preset b/systemd-preset/90-systemd.preset
index ee1b864bcf..24963f0623 100644
--- a/systemd-preset/90-systemd.preset
+++ b/systemd-preset/90-systemd.preset

```

@@ -12,6 +12,7 @@ enable remote-fs.target  
enable machines.target

enable getty@.service  
+enable systemd-readahead-  
enable systemd-timesyncd.service  
enable systemd-networkd.service  
enable systemd-resolved.service  
diff --git a/units/.gitignore b/units/.gitignore  
index 6fdb629c3d..638a7abc4c 100644

--- a/units/.gitignore

+++ b/units/.gitignore

@@ -52,6 +52,9 @@

/systemd-poweroff.service

/systemd-quotacheck.service

/systemd-random-seed.service

+/systemd-readahead-collect.service

+/systemd-readahead-done.service

+/systemd-readahead-replay.service

/systemd-reboot.service

/systemd-remount-fs.service

/systemd-resolved.service

diff --git a/units/ldconfig.service b/units/ldconfig.service

index f9691e2f2d..43c145b726 100644

--- a/units/ldconfig.service

+++ b/units/ldconfig.service

@@ -10,7 +10,7 @@ Description=Rebuild Dynamic Linker Cache

Documentation=man:ldconfig(8)

DefaultDependencies=no

Conflicts=shutdown.target

-After=systemd-remount-fs.service

+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service

Before=sysinit.target shutdown.target systemd-update-done.service

ConditionNeedsUpdate=/etc

diff --git a/units/quotaon.service.in b/units/quotaon.service.in

index 7d59a40195..49a50a7feb 100644

--- a/units/quotaon.service.in

+++ b/units/quotaon.service.in

@@ -9,7 +9,7 @@

Description=Enable File System Quotas

Documentation=man:quotaon(8)

DefaultDependencies=no

-After=systemd-quotacheck.service

+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-quotacheck.service

Before=local-fs.target shutdown.target

ConditionPathExists=@QUOTAON@

```

diff --git a/units/system-update.target b/units/system-update.target
index 48d46fcbda..d0f847f957 100644
--- a/units/system-update.target
+++ b/units/system-update.target
@@ -10,7 +10,7 @@ Description=System Update
Documentation=http://freedesktop.org/wiki/Software/systemd/SystemUpdates
Documentation=man:systemd.special(7) man:systemd-system-update-generator(8)
Requires=sysinit.target
-Conflicts=shutdown.target
+Conflicts=shutdown.target systemd-readahead-collect.service systemd-readahead-replay.service
After=sysinit.target
Before=shutdown.target
AllowIsolate=yes
diff --git a/units/systemd-backlight@.service.in b/units/systemd-backlight@.service.in
index 5e6706c11c..b146e30f2d 100644
--- a/units/systemd-backlight@.service.in
+++ b/units/systemd-backlight@.service.in
@@ -11,7 +11,7 @@ Documentation=man:systemd-backlight@.service(8)
DefaultDependencies=no
RequiresMountsFor=/var/lib/systemd/backlight
Conflicts=shutdown.target
-After=systemd-remount-fs.service
+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service
Before=sysinit.target shutdown.target

```

[Service]

```

diff --git a/units/systemd-binfmt.service.in b/units/systemd-binfmt.service.in
index 34a5d5237b..02dfe774df 100644
--- a/units/systemd-binfmt.service.in
+++ b/units/systemd-binfmt.service.in
@@ -11,7 +11,7 @@ Documentation=man:systemd-binfmt.service(8) man:binfmt.d(5)
Documentation=https://www.kernel.org/doc/Documentation/binfmt_misc.txt
DefaultDependencies=no
Conflicts=shutdown.target
-After=proc-sys-fs-binfmt_misc.automount
+After=systemd-readahead-collect.service systemd-readahead-replay.service proc-sys-fs-binfmt_misc.automount
Before=sysinit.target shutdown.target
ConditionPathIsReadWrite=/proc/sys/
ConditionDirectoryNotEmpty=/lib/binfmt.d

```

```

diff --git a/units/systemd-firstboot.service.in b/units/systemd-firstboot.service.in

```

```

index 405c6f3fd2..89fa7e1dd7 100644
--- a/units/systemd-firstboot.service.in
+++ b/units/systemd-firstboot.service.in
@@ -10,7 +10,7 @@ Description=First Boot Wizard
Documentation=man:systemd-firstboot(1)
DefaultDependencies=no
Conflicts=shutdown.target
-After=systemd-remount-fs.service

```

```
+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service
Before=systemd-sysusers.service sysinit.target shutdown.target
ConditionPathIsReadWrite=/etc
ConditionFirstBoot=yes
diff --git a/units/systemd-fsck-root.service.in b/units/systemd-fsck-root.service.in
index 6d7657853e..26cce5131e 100644
--- a/units/systemd-fsck-root.service.in
+++ b/units/systemd-fsck-root.service.in
@@ -9,6 +9,7 @@
Description=File System Check on Root Device
Documentation=man:systemd-fsck-root.service(8)
DefaultDependencies=no
+After=systemd-readahead-collect.service systemd-readahead-replay.service
Before=local-fs.target shutdown.target
ConditionPathIsReadWrite=!
```

```
diff --git a/units/systemd-fsck@.service.in b/units/systemd-fsck@.service.in
index 857e625679..d2cda6a466 100644
--- a/units/systemd-fsck@.service.in
+++ b/units/systemd-fsck@.service.in
@@ -10,7 +10,7 @@ Description=File System Check on %f
Documentation=man:systemd-fsck@.service(8)
DefaultDependencies=no
BindsTo=%i.device
-After=%i.device systemd-fsck-root.service local-fs-pre.target
+After=systemd-readahead-collect.service systemd-readahead-replay.service %i.device systemd-fsck-root.service
local-fs-pre.target
Before=shutdown.target
```

[Service]

```
diff --git a/units/systemd-hwdb-update.service.in b/units/systemd-hwdb-update.service.in
index 791528e2b2..4bed482f8c 100644
--- a/units/systemd-hwdb-update.service.in
+++ b/units/systemd-hwdb-update.service.in
@@ -10,7 +10,7 @@ Description=Rebuild Hardware Database
Documentation=man:hwdb(7) man:systemd-hwdb(8)
DefaultDependencies=no
Conflicts=shutdown.target
-After=systemd-remount-fs.service
+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service
Before=sysinit.target shutdown.target systemd-update-done.service
ConditionNeedsUpdate=/etc
ConditionPathExists=!@udevlibexecdir@/hwdb.bin
diff --git a/units/systemd-journal-catalog-update.service.in b/units/systemd-journal-catalog-update.service.in
index 6370dd478f..5b85889dda 100644
--- a/units/systemd-journal-catalog-update.service.in
+++ b/units/systemd-journal-catalog-update.service.in
@@ -10,7 +10,7 @@ Description=Rebuild Journal Catalog
```

```
Documentation=man:systemd-journald.service(8) man:journald.conf(5)
DefaultDependencies=no
Conflicts=shutdown.target
-After=local-fs.target
+After=systemd-readahead-collect.service systemd-readahead-replay.service local-fs.target
Before=sysinit.target shutdown.target systemd-update-done.service
ConditionNeedsUpdate=/etc
```

```
diff --git a/units/systemd-modules-load.service.in b/units/systemd-modules-load.service.in
index 040a0febe8..32deb52e26 100644
```

```
--- a/units/systemd-modules-load.service.in
+++ b/units/systemd-modules-load.service.in
@@ -10,6 +10,7 @@ Description=Load Kernel Modules
Documentation=man:systemd-modules-load.service(8) man:modules-load.d(5)
DefaultDependencies=no
Conflicts=shutdown.target
+After=systemd-readahead-collect.service systemd-readahead-replay.service
Before=sysinit.target shutdown.target
ConditionCapability=CAP_SYS_MODULE
ConditionDirectoryNotEmpty=/lib/modules-load.d
```

```
diff --git a/units/systemd-quotacheck.service.in b/units/systemd-quotacheck.service.in
index 5cb9bc3bc9..f726ea1bcd 100644
```

```
--- a/units/systemd-quotacheck.service.in
+++ b/units/systemd-quotacheck.service.in
@@ -9,7 +9,7 @@
Description=File System Quota Check
Documentation=man:systemd-quotacheck.service(8)
DefaultDependencies=no
-After=systemd-remount-fs.service
+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service
Before=local-fs.target shutdown.target
ConditionPathExists=@QUOTACHECK@
```

```
diff --git a/units/systemd-random-seed.service.in b/units/systemd-random-seed.service.in
index b55844b36f..1879b2f24c 100644
```

```
--- a/units/systemd-random-seed.service.in
+++ b/units/systemd-random-seed.service.in
@@ -11,7 +11,7 @@ Documentation=man:systemd-random-seed.service(8) man:random(4)
DefaultDependencies=no
RequiresMountsFor=@RANDOM_SEED@
Conflicts=shutdown.target
-After=systemd-remount-fs.service
+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service
Before=sysinit.target shutdown.target
```

[Service]

```
diff --git a/units/systemd-readahead-collect.service.in b/units/systemd-readahead-collect.service.in
new file mode 100644
```

```

index 0000000000..d4b8e67932
--- /dev/null
+++ b/units/systemd-readahead-collect.service.in
@@ -0,0 +1,28 @@
+# This file is part of systemd.
+#
+# systemd is free software; you can redistribute it and/or modify it
+# under the terms of the GNU Lesser General Public License as published by
+# the Free Software Foundation; either version 2.1 of the License, or
+# (at your option) any later version.
+
+[Unit]
+Description=Collect Read-Ahead Data
+Documentation=man:systemd-readahead-replay.service(8)
+DefaultDependencies=no
+Wants=systemd-readahead-done.timer
+Conflicts=shutdown.target
+Before=sysinit.target shutdown.target
+ConditionPathExists=!/run/systemd/readahead/cancel
+ConditionPathExists=!/run/systemd/readahead/done
+ConditionVirtualization=no
+
+[Service]
+Type=notify
+ExecStart=@rootlibexecdir@/systemd-readahead collect
+RemainAfterExit=yes
+StandardOutput=null
+OOMScoreAdjust=1000
+
+[Install]
+WantedBy=default.target
+Also=systemd-readahead-drop.service
diff --git a/units/systemd-readahead-done.service.in b/units/systemd-readahead-done.service.in
new file mode 100644
index 0000000000..e0d9579449
--- /dev/null
+++ b/units/systemd-readahead-done.service.in
@@ -0,0 +1,22 @@
+# This file is part of systemd.
+#
+# systemd is free software; you can redistribute it and/or modify it
+# under the terms of the GNU Lesser General Public License as published by
+# the Free Software Foundation; either version 2.1 of the License, or
+# (at your option) any later version.
+
+[Unit]
+Description=Stop Read-Ahead Data Collection
+Documentation=man:systemd-readahead-replay.service(8)

```

```

+DefaultDependencies=no
+Conflicts=shutdown.target
+After=default.target
+Before=shutdown.target
+ConditionVirtualization=no
+
+[Service]
+Type=oneshot
+ExecStart=@SYSTEMD_NOTIFY@ --readahead=done
+
+[Install]
+Also=systemd-readahead-collect.service
diff --git a/units/systemd-readahead-done.timer b/units/systemd-readahead-done.timer
new file mode 100644
index 0000000000..c58e09616e
--- /dev/null
+++ b/units/systemd-readahead-done.timer
@@ -0,0 +1,22 @@
+# This file is part of systemd.
+#
+# systemd is free software; you can redistribute it and/or modify it
+# under the terms of the GNU Lesser General Public License as published by
+# the Free Software Foundation; either version 2.1 of the License, or
+# (at your option) any later version.
+
+[Unit]
+Description=Stop Read-Ahead Data Collection 10s After Completed Startup
+Documentation=man:systemd-readahead-replay.service(8)
+DefaultDependencies=no
+Conflicts=shutdown.target
+After=default.target
+Before=shutdown.target
+ConditionVirtualization=no
+
+[Timer]
+OnActiveSec=30s
+AccuracySec=1s
+
+[Install]
+Also=systemd-readahead-collect.service
diff --git a/units/systemd-readahead-drop.service b/units/systemd-readahead-drop.service
new file mode 100644
index 0000000000..d9d12bc533
--- /dev/null
+++ b/units/systemd-readahead-drop.service
@@ -0,0 +1,19 @@
+# This file is part of systemd.
+#

```



```

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+# under the terms of the GNU Lesser General Public License as published by
+# the Free Software Foundation; either version 2.1 of the License, or
+# (at your option) any later version.
+
+[Unit]
+Description=Drop Read-Ahead Data
+Documentation=man:systemd-readahead-replay.service(8)
+ConditionPathExists=/.readahead
+
+[Service]
+Type=oneshot
+ExecStart=/bin/rm -f /.readahead
+
+[Install]
+WantedBy=system-update.target
+Also=systemd-readahead-collect.service
diff --git a/units/systemd-readahead-replay.service.in b/units/systemd-readahead-replay.service.in
new file mode 100644
index 0000000000..c64a533e4e
--- /dev/null
+++ b/units/systemd-readahead-replay.service.in
@@ -0,0 +1,26 @@
+# This file is part of systemd.
+#
+# systemd is free software; you can redistribute it and/or modify it
+# under the terms of the GNU Lesser General Public License as published by
+# the Free Software Foundation; either version 2.1 of the License, or
+# (at your option) any later version.
+
+[Unit]
+Description=Replay Read-Ahead Data
+Documentation=man:systemd-readahead-replay.service(8)
+DefaultDependencies=no
+Conflicts=shutdown.target
+Before=sysinit.target shutdown.target
+ConditionPathExists=!/run/systemd/readahead/noreplay
+ConditionPathExists=/.readahead
+ConditionVirtualization=no
+
+[Service]
+Type=notify
+ExecStart=@rootlibexecdir@/systemd-readahead replay
+RemainAfterExit=yes
+StandardOutput=null
+OOMScoreAdjust=1000
+
+[Install]

```

```

+WantedBy=default.target
diff --git a/units/systemd-remount-fs.service.in b/units/systemd-remount-fs.service.in
index 8d9daacaa5..70e1a8680a 100644
--- a/units/systemd-remount-fs.service.in
+++ b/units/systemd-remount-fs.service.in
@@ -11,7 +11,7 @@ Documentation=man:systemd-remount-fs.service(8)
Documentation=http://www.freedesktop.org/wiki/Software/systemd/APIFileSystems
DefaultDependencies=no
Conflicts=shutdown.target
-After=systemd-fsck-root.service
+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-fsck-root.service
Before=local-fs-pre.target local-fs.target shutdown.target
Wants=local-fs-pre.target
ConditionPathExists=/etc/fstab
diff --git a/units/systemd-rfkill@.service.in b/units/systemd-rfkill@.service.in
index b48efe5d99..0d2757d61c 100644
--- a/units/systemd-rfkill@.service.in
+++ b/units/systemd-rfkill@.service.in
@@ -12,7 +12,7 @@ DefaultDependencies=no
BindsTo=sys-subsystem-rfkill-devices-%i.device
RequiresMountsFor=/var/lib/systemd/rfkill
Conflicts=shutdown.target
-After=systemd-remount-fs.service
+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service
Before=sysinit.target shutdown.target

```

[Service]

```

diff --git a/units/systemd-sysctl.service.in b/units/systemd-sysctl.service.in
index fa72085f9e..ade9dc3007 100644
--- a/units/systemd-sysctl.service.in
+++ b/units/systemd-sysctl.service.in
@@ -10,6 +10,7 @@ Description=Apply Kernel Variables
Documentation=man:systemd-sysctl.service(8) man:sysctl.d(5)
DefaultDependencies=no
Conflicts=shutdown.target
+After=systemd-readahead-collect.service systemd-readahead-replay.service
After=systemd-modules-load.service
Before=sysinit.target shutdown.target
ConditionPathIsReadWrite=/proc/sys/
diff --git a/units/systemd-sysusers.service.in b/units/systemd-sysusers.service.in
index ffd6d7747b..69fea11fb1 100644
--- a/units/systemd-sysusers.service.in
+++ b/units/systemd-sysusers.service.in
@@ -10,7 +10,7 @@ Description=Create System Users
Documentation=man:sysusers.d(5) man:systemd-sysusers.service(8)
DefaultDependencies=no
Conflicts=shutdown.target
-After=systemd-remount-fs.service

```

+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service  
Before=sysinit.target shutdown.target systemd-update-done.service  
ConditionNeedsUpdate=/etc

diff --git a/units/systemd-tmpfiles-clean.service.in b/units/systemd-tmpfiles-clean.service.in  
index 133c8c94c4..31b2378410 100644

--- a/units/systemd-tmpfiles-clean.service.in

+++ b/units/systemd-tmpfiles-clean.service.in

@@ -10,7 +10,7 @@ Description=Cleanup of Temporary Directories

Documentation=man:tmpfiles.d(5) man:systemd-tmpfiles(8)

DefaultDependencies=no

Conflicts=shutdown.target

-After=local-fs.target time-sync.target

+After=systemd-readahead-collect.service systemd-readahead-replay.service local-fs.target time-sync.target

Before=shutdown.target

[Service]

diff --git a/units/systemd-tmpfiles-setup-dev.service.in b/units/systemd-tmpfiles-setup-dev.service.in

index 0123a030e4..0b66c53fe0 100644

--- a/units/systemd-tmpfiles-setup-dev.service.in

+++ b/units/systemd-tmpfiles-setup-dev.service.in

@@ -10,7 +10,7 @@ Description=Create Static Device Nodes in /dev

Documentation=man:tmpfiles.d(5) man:systemd-tmpfiles(8)

DefaultDependencies=no

Conflicts=shutdown.target

-After=systemd-sysusers.service

+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-sysusers.service

Before=sysinit.target local-fs-pre.target systemd-udev.service shutdown.target

ConditionCapability=CAP\_SYS\_MODULE

diff --git a/units/systemd-tmpfiles-setup.service.in b/units/systemd-tmpfiles-setup.service.in

index e895cda0e6..72ab083d54 100644

--- a/units/systemd-tmpfiles-setup.service.in

+++ b/units/systemd-tmpfiles-setup.service.in

@@ -10,7 +10,7 @@ Description=Create Volatile Files and Directories

Documentation=man:tmpfiles.d(5) man:systemd-tmpfiles(8)

DefaultDependencies=no

Conflicts=shutdown.target

-After=local-fs.target systemd-sysusers.service

+After=systemd-readahead-collect.service systemd-readahead-replay.service local-fs.target systemd-sysusers.service

Before=sysinit.target shutdown.target

RefuseManualStop=yes

diff --git a/units/systemd-update-done.service.in b/units/systemd-update-done.service.in

index ec7d906392..7031bff614 100644

--- a/units/systemd-update-done.service.in

+++ b/units/systemd-update-done.service.in

```
@@ -10,7 +10,7 @@ Description=Update is Completed
Documentation=man:systemd-update-done.service(8)
DefaultDependencies=no
Conflicts=shutdown.target
-After=local-fs.target
+After=systemd-readahead-collect.service systemd-readahead-replay.service local-fs.target
Before=sysinit.target shutdown.target
ConditionNeedsUpdate=/etc
ConditionNeedsUpdate=/var
diff --git a/units/systemd-update-utmp.service.in b/units/systemd-update-utmp.service.in
index 163eccd91f..da7dda76ba 100644
--- a/units/systemd-update-utmp.service.in
+++ b/units/systemd-update-utmp.service.in
@@ -11,7 +11,7 @@ Documentation=man:systemd-update-utmp.service(8) man:utmp(5)
DefaultDependencies=no
RequiresMountsFor=/var/log/wtmp
Conflicts=shutdown.target
-After=systemd-remount-fs.service systemd-tmpfiles-setup.service auditd.service
+After=systemd-readahead-collect.service systemd-readahead-replay.service systemd-remount-fs.service systemd-
tmpfiles-setup.service auditd.service
Before=sysinit.target shutdown.target
```

[Service]

```
diff --git a/units/systemd-vconsole-setup.service.in b/units/systemd-vconsole-setup.service.in
index 6160361871..18faa63f28 100644
--- a/units/systemd-vconsole-setup.service.in
+++ b/units/systemd-vconsole-setup.service.in
@@ -10,6 +10,7 @@ Description=Setup Virtual Console
Documentation=man:systemd-vconsole-setup.service(8) man:vconsole.conf(5)
DefaultDependencies=no
Conflicts=shutdown.target
+After=systemd-readahead-collect.service systemd-readahead-replay.service
Before=sysinit.target shutdown.target
ConditionPathExists=/dev/tty0
```

Found in path(s):

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-
78.el7.src.rpm.download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0010-Revert-readahead-wipe-
out-readahead.patch
```

No license file was found, but licenses were detected in source scan.

From b4bfb025f7ab0878e8e7e980dbad5b0a5bed1555 Mon Sep 17 00:00:00 2001

From: Lennart Poettering <lennart@poettering.net>

Date: Thu, 10 Dec 2015 12:40:04 +0100

Subject: [PATCH] importd: drop dkr support

The current code is not compatible with current dkr protocols anyway,  
and dkr has a different focus ("microservices") than nspawn anyway

("whole machine containers"), hence drop support for it, we cannot reasonably keep this up to date, and it creates the impression we'd actually care for the microservices usecase.

Cherry-picked from: b43d75c

Related: #1284974

```
---
Makefile.am          | 2 -
TODO                 | 4 -
configure.ac         | 9 -
man/machinectl.xml   | 58 --
src/import/import-dkr.c | 891 -----
src/import/import-dkr.h | 36 -
src/import/importd.c | 111 +--
src/import/org.freedesktop.import1.conf | 4 -
src/import/pull.c     | 119 +---
src/machine/machinectl.c | 90 +--
src/shared/import-util.c | 31 -
src/shared/import-util.h | 4 -
12 files changed, 5 insertions(+), 1354 deletions(-)
delete mode 100644 src/import/import-dkr.c
delete mode 100644 src/import/import-dkr.h
```

```
diff --git a/Makefile.am b/Makefile.am
index 3a09e0a62b..b0a34b212d 100644
--- a/Makefile.am
+++ b/Makefile.am
@@ -5369,8 +5369,6 @@ systemd_pull_SOURCES = \
 src/import/import-raw.h \
 src/import/import-tar.c \
 src/import/import-tar.h \
 - src/import/import-dkr.c \
 - src/import/import-dkr.h \
 src/import/import-job.c \
 src/import/import-job.h \
 src/import/import-common.c \
```

```
diff --git a/TODO b/TODO
index 90b2c4b30a..d96d2bf0ee 100644
--- a/TODO
+++ b/TODO
@@ -126,10 +126,6 @@ Features:
```

\* rework journald sigbus stuff to use mutex

-\* import-dkr: support tarsum checksum verification, if it becomes reality one day...

-

-\* import-dkr: convert json bits to nspawn configuration

-

\* import: support import from local files, and export to local files

\* core/cgroup: support net\_cls modules, and support automatically allocating class ids, then add support for making firewall changes depending on it, to implement a per-service firewall

```
diff --git a/configure.ac b/configure.ac
```

```
index 9103f9b923..2734368dc0 100644
```

```
--- a/configure.ac
```

```
+++ b/configure.ac
```

```
@@ -1389,14 +1389,6 @@ AC_ARG_ENABLE([split-usr],  
    enable_split_usr=no  
    )])
```

```
-AC_ARG_WITH([dkr-index-url],
```

```
- [AS_HELP_STRING([--dkr-index-url=URL], [Specify the default index URL to use for image downloads]),
```

```
- [DEFAULT_DKR_INDEX_URL="\${withval}"],
```

```
- [DEFAULT_DKR_INDEX_URL="NULL"])
```

```
-
```

```
-AC_DEFINE_UNQUOTED(DEFAULT_DKR_INDEX_URL, [DEFAULT_DKR_INDEX_URL], [Default index  
URL to use for image downloads])
```

```
-AC_SUBST(DEFAULT_DKR_INDEX_URL)
```

```
-
```

```
AS_IF([test "x${enable_split_usr}" = "xyes"], [
```

```
    AC_DEFINE(HAVE_SPLIT_USR, 1, [Define if /bin, /sbin aren't symlinks into /usr])
```

```
])
```

```
@@ -1564,7 +1556,6 @@ AC_MSG_RESULT([
```

```
    Maximum System UID:    ${SYSTEM_UID_MAX}
```

```
    Maximum System GID:    ${SYSTEM_GID_MAX}
```

```
    Certificate root:      ${CERTIFICATEROOT}
```

```
-    Default dkr Index      ${DEFAULT_DKR_INDEX_URL}
```

```
    CFLAGS:                ${OUR_CFLAGS} ${CFLAGS}
```

```
    CPPFLAGS:              ${OUR_CPPFLAGS} ${CPPFLAGS}
```

```
diff --git a/man/machinectl.xml b/man/machinectl.xml
```

```
index 640cb8b7d6..b0a7f2ae49 100644
```

```
--- a/man/machinectl.xml
```

```
+++ b/man/machinectl.xml
```

```
@@ -204,16 +204,6 @@
```

```
    image.</para></listitem>
```

```
</varlistentry>
```

```
- <varlistentry>
```

```
- <term><option>--dkr-index-url</option></term>
```

```
-
```

```
- <listitem><para>Specifies the index server to use for  
- downloading <literal>dkr</literal> images with the
```

```
- <command>pull-dkr</command>. Takes a
```

```
- <literal>http://</literal>, <literal>https://</literal>
```

```
- URL.</para></listitem>
```

```

- </varlistentry>
-
<xi:include href="user-system-options.xml" xpointer="host" />
<xi:include href="user-system-options.xml" xpointer="machine" />

@@ -602,42 +592,6 @@
    below.</para></listitem>
</varlistentry>

- <varlistentry>
-   <term><command>pull-dkr</command> <replaceable>REMOTE</replaceable>
-   [<replaceable>NAME</replaceable>]</term>
-
-   <listitem><para>Downloads a <literal>dkr</literal> container
-   image and makes it available locally. The remote name refers
-   to a <literal>dkr</literal> container name. If omitted, the
-   local machine name is derived from the <literal>dkr</literal>
-   container name.</para>
-
-   <para>Image verification is not available for
-   <literal>dkr</literal> containers, and thus
-   <option>--verify=no</option> must always be specified with
-   this command.</para>
-
-   <para>This command downloads all (missing) layers for the
-   specified container and places them in read-only subvolumes in
-   <filename>/var/lib/machines/</filename>. A writable snapshot
-   of the newest layer is then created under the specified local
-   machine name. To omit creation of this writable snapshot, pass
-   <literal>-</literal> as local machine name.</para>
-
-   <para>The read-only layer subvolumes are prefixed with
-   <filename>.dkr-</filename>, and thus now shown by
-   <command>list-images</command>, unless <option>--all</option>
-   is passed.</para>
-
-   <para>To specify the <literal>dkr</literal> index server to
-   use for looking up the specified container, use
-   <option>--dkr-index-url=</option>.</para>
-
-   <para>Note that pressing C-c during execution of this command
-   will not abort the download. Use
-   <command>cancel-transfer</command>, described
-   below.</para></listitem>
- </varlistentry>
-
</varlistentry>
    <term><command>list-transfers</command></term>

```

@@ -728,18 +682,6 @@

the machine started as system service. With the last command a login prompt into the container is requested.</para>

</example>

-

- <example>

- <title>Download a Fedora <literal>dkr</literal> image</title>

-

- <programlisting># machinectl pull-dkr --verify=no mattdm/fedora  
-# systemd-nspawn -M fedora</programlisting>

-

- <para>Downloads a <literal>dkr</literal> image and opens a shell  
- in it. Note that the specified download command might require an  
- index server to be specified with the

- <literal>--dkr-index-url=</literal>.</para>

- </example>

</refsect1>

<refsect1>

diff --git a/src/import/import-dkr.c b/src/import/import-dkr.c

deleted file mode 100644

index fb72f6cee3..0000000000

--- a/src/import/import-dkr.c

+++ /dev/null

@@ -1,891 +0,0 @@

/\*-\*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -\*-\*/

-

./\*\*\*

- This file is part of systemd.

-

- Copyright 2014 Lennart Poettering

-

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- (at your option) any later version.

-

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- Lesser General Public License for more details.

-

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- along with systemd; If not, see <<http://www.gnu.org/licenses/>>.

./\*\*\*/  
-

##include <curl/curl.h>



```

#include <sys/prctl.h>
-
#include "sd-daemon.h"
#include "json.h"
#include "strv.h"
#include "btrfs-util.h"
#include "utf8.h"
#include "mkdir.h"
#include "import-util.h"
#include "curl-util.h"
#include "aufs-util.h"
#include "import-job.h"
#include "import-common.h"
#include "import-dkr.h"
-
typedef enum DkrProgress {
-   DKR_SEARCHING,
-   DKR_RESOLVING,
-   DKR_METADATA,
-   DKR_DOWNLOADING,
-   DKR_COPYING,
-} DkrProgress;
-
struct DkrImport {
-   sd_event *event;
-   CurlGlue *glue;
-
-   char *index_url;
-   char *image_root;
-
-   ImportJob *images_job;
-   ImportJob *tags_job;
-   ImportJob *ancestry_job;
-   ImportJob *json_job;
-   ImportJob *layer_job;
-
-   char *name;
-   char *tag;
-   char *id;
-
-   char *response_token;
-   char **response_registries;
-
-   char **ancestry;
-   unsigned n_ancestry;
-   unsigned current_ancestry;
-
-   DkrImportFinished on_finished;

```

```

- void *userdata;
-
- char *local;
- bool force_local;
-
- char *temp_path;
- char *final_path;
-
- pid_t tar_pid;
-};
-
-#define PROTOCOL_PREFIX "https://"
-
-#define HEADER_TOKEN "X-Do" /* the HTTP header for the auth token */ "cker-Token:"
-#define HEADER_REGISTRY "X-Do" /*the HTTP header for the registry */ "cker-Endpoints:"
-
-#define LAYERS_MAX 2048
-
-static void dkr_import_job_on_finished(ImportJob *j);
-
-DkrImport* dkr_import_unref(DkrImport *i) {
-    if (!i)
-        return NULL;
-
-    if (i->tar_pid > 1) {
-        (void) kill_and_sigcont(i->tar_pid, SIGKILL);
-        (void) wait_for_terminate(i->tar_pid, NULL);
-    }
-
-    import_job_unref(i->images_job);
-    import_job_unref(i->tags_job);
-    import_job_unref(i->ancestry_job);
-    import_job_unref(i->json_job);
-    import_job_unref(i->layer_job);
-
-    curl_glue_unref(i->glue);
-    sd_event_unref(i->event);
-
-    if (i->temp_path) {
-        (void) btrfs_subvol_remove(i->temp_path);
-        (void) rm_rf_dangerous(i->temp_path, false, true, false);
-        free(i->temp_path);
-    }
-
-    free(i->name);
-    free(i->tag);
-    free(i->id);
-    free(i->response_token);

```

```

-   free(i->response_registries);
-   strv_free(i->ancestry);
-   free(i->final_path);
-   free(i->index_url);
-   free(i->image_root);
-   free(i->local);
-   free(i);
-
-   return NULL;
-}
-
-int dkr_import_new(
-   DkrImport **ret,
-   sd_event *event,
-   const char *index_url,
-   const char *image_root,
-   DkrImportFinished on_finished,
-   void *userdata) {
-
-   _cleanup_(dkr_import_unrefp) DkrImport *i = NULL;
-   char *e;
-   int r;
-
-   assert(ret);
-   assert(index_url);
-
-   if (!http_url_is_valid(index_url))
-       return -EINVAL;
-
-   i = new0(DkrImport, 1);
-   if (!i)
-       return -ENOMEM;
-
-   i->on_finished = on_finished;
-   i->userdata = userdata;
-
-   i->image_root = strdup(image_root ? "/var/lib/machines");
-   if (!i->image_root)
-       return -ENOMEM;
-
-   i->index_url = strdup(index_url);
-   if (!i->index_url)
-       return -ENOMEM;
-
-   e = endswith(i->index_url, "/");
-   if (e)
-       *e = 0;
-
-}

```

```

-   if (event)
-       i->event = sd_event_ref(event);
-   else {
-       r = sd_event_default(&i->event);
-       if (r < 0)
-           return r;
-   }
-
-   r = curl_glue_new(&i->glue, i->event);
-   if (r < 0)
-       return r;
-
-   i->glue->on_finished = import_job_curl_on_finished;
-   i->glue->userdata = i;
-
-   *ret = i;
-   i = NULL;
-
-   return 0;
-}
-
-static void dkr_import_report_progress(DkrImport *i, DkrProgress p) {
-   unsigned percent;
-
-   assert(i);
-
-   switch (p) {
-
-   case DKR_SEARCHING:
-       percent = 0;
-       if (i->images_job)
-           percent += i->images_job->progress_percent * 5 / 100;
-       break;
-
-   case DKR_RESOLVING:
-       percent = 5;
-       if (i->tags_job)
-           percent += i->tags_job->progress_percent * 5 / 100;
-       break;
-
-   case DKR_METADATA:
-       percent = 10;
-       if (i->ancestry_job)
-           percent += i->ancestry_job->progress_percent * 5 / 100;
-       if (i->json_job)
-           percent += i->json_job->progress_percent * 5 / 100;
-       break;
-
-   }
-}

```

```

- case DKR_DOWNLOADING:
-     percent = 20;
-     percent += 75 * i->current_ancestry / MAX(1U, i->n_ancestry);
-     if (i->layer_job)
-         percent += i->layer_job->progress_percent * 75 / MAX(1U, i->n_ancestry) / 100;
-
-     break;
-
- case DKR_COPYING:
-     percent = 95;
-     break;
-
- default:
-     assert_not_reached("Unknown progress state");
- }
-
- sd_notify(false, "X_IMPORT_PROGRESS=%u", percent);
- log_debug("Combined progress %u%%", percent);
-}
-
-static int parse_id(const void *payload, size_t size, char **ret) {
-     _cleanup_free_ char *buf = NULL, *id = NULL, *other = NULL;
-     union json_value v = {};
-     void *json_state = NULL;
-     const char *p;
-     int t;
-
-     assert(payload);
-     assert(ret);
-
-     if (size <= 0)
-         return -EBADMSG;
-
-     if (memchr(payload, 0, size))
-         return -EBADMSG;
-
-     buf = strndup(payload, size);
-     if (!buf)
-         return -ENOMEM;
-
-     p = buf;
-     t = json_tokenize(&p, &id, &v, &json_state, NULL);
-     if (t < 0)
-         return t;
-     if (t != JSON_STRING)
-         return -EBADMSG;
-
-     t = json_tokenize(&p, &other, &v, &json_state, NULL);

```

```

-   if (t < 0)
-       return t;
-   if (t != JSON_END)
-       return -EBADMSG;
-
-   if (!dkr_id_is_valid(id))
-       return -EBADMSG;
-
-   *ret = id;
-   id = NULL;
-
-   return 0;
-}
-
-static int parse_ancestry(const void *payload, size_t size, char ***ret) {
-   _cleanup_free_ char *buf = NULL;
-   void *json_state = NULL;
-   const char *p;
-   enum {
-       STATE_BEGIN,
-       STATE_ITEM,
-       STATE_COMMA,
-       STATE_END,
-   } state = STATE_BEGIN;
-   _cleanup_strv_free_ char **l = NULL;
-   size_t n = 0, allocated = 0;
-
-   if (size <= 0)
-       return -EBADMSG;
-
-   if (memchr(payload, 0, size))
-       return -EBADMSG;
-
-   buf = strndup(payload, size);
-   if (!buf)
-       return -ENOMEM;
-
-   p = buf;
-   for (;;) {
-       _cleanup_free_ char *str;
-       union json_value v = {};
-       int t;
-
-       t = json_tokenize(&p, &str, &v, &json_state, NULL);
-       if (t < 0)
-           return t;
-
-       switch (state) {

```

```

-
- case STATE_BEGIN:
-     if (t == JSON_ARRAY_OPEN)
-         state = STATE_ITEM;
-     else
-         return -EBADMSG;
-
-     break;
-
- case STATE_ITEM:
-     if (t == JSON_STRING) {
-         if (!dkr_id_is_valid(str))
-             return -EBADMSG;
-
-         if (n+1 > LAYERS_MAX)
-             return -EFBIG;
-
-         if (!GREEDY_REALLOC(1, allocated, n + 2))
-             return -ENOMEM;
-
-         l[n++] = str;
-         str = NULL;
-         l[n] = NULL;
-
-         state = STATE_COMMA;
-
-     } else if (t == JSON_ARRAY_CLOSE)
-         state = STATE_END;
-     else
-         return -EBADMSG;
-
-     break;
-
- case STATE_COMMA:
-     if (t == JSON_COMMA)
-         state = STATE_ITEM;
-     else if (t == JSON_ARRAY_CLOSE)
-         state = STATE_END;
-     else
-         return -EBADMSG;
-
-     break;
-
- case STATE_END:
-     if (t == JSON_END) {
-
-         if (strv_isempty(l))
-             return -EBADMSG;
-
-     }
-
-

```

```

-         if (!strv_is_uniq(l))
-             return -EBADMSG;
-
-         l = strv_reverse(l);
-
-         *ret = l;
-         l = NULL;
-         return 0;
-     } else
-         return -EBADMSG;
- }
-
- }
-}
-
-static const char *dkr_import_current_layer(DkrImport *i) {
-    assert(i);
-
-    if (strv_isempty(i->ancestry))
-        return NULL;
-
-    return i->ancestry[i->current_ancestry];
-}
-
-static const char *dkr_import_current_base_layer(DkrImport *i) {
-    assert(i);
-
-    if (strv_isempty(i->ancestry))
-        return NULL;
-
-    if (i->current_ancestry <= 0)
-        return NULL;
-
-    return i->ancestry[i->current_ancestry-1];
-}
-
-static int dkr_import_add_token(DkrImport *i, ImportJob *j) {
-    const char *t;
-
-    assert(i);
-    assert(j);
-
-    if (i->response_token)
-        t = strjoina("Authorization: Token ", i->response_token);
-    else
-        t = HEADER_TOKEN " true";
-
-    j->request_header = curl_slist_new("Accept: application/json", t, NULL);

```



```

-     if (!j->request_header)
-         return -ENOMEM;
-
-     return 0;
-}
-
-static bool dkr_import_is_done(DkrImport *i) {
-     assert(i);
-     assert(i->images_job);
-
-     if (i->images_job->state != IMPORT_JOB_DONE)
-         return false;
-
-     if (!i->tags_job || i->tags_job->state != IMPORT_JOB_DONE)
-         return false;
-
-     if (!i->ancestry_job || i->ancestry_job->state != IMPORT_JOB_DONE)
-         return false;
-
-     if (!i->json_job || i->json_job->state != IMPORT_JOB_DONE)
-         return false;
-
-     if (i->layer_job && i->layer_job->state != IMPORT_JOB_DONE)
-         return false;
-
-     if (dkr_import_current_layer(i))
-         return false;
-
-     return true;
-}
-
-static int dkr_import_make_local_copy(DkrImport *i) {
-     int r;
-
-     assert(i);
-
-     if (!i->local)
-         return 0;
-
-     if (!i->final_path) {
-         i->final_path = strjoin(i->image_root, ".dkr-", i->id, NULL);
-         if (!i->final_path)
-             return log_oom();
-     }
-
-     r = import_make_local_copy(i->final_path, i->image_root, i->local, i->force_local);
-     if (r < 0)
-         return r;

```

```

-
-   return 0;
-}
-
-static int dkr_import_job_on_open_disk(ImportJob *j) {
-   const char *base;
-   DkrImport *i;
-   int r;
-
-   assert(j);
-   assert(j->userdata);
-
-   i = j->userdata;
-   assert(i->layer_job == j);
-   assert(i->final_path);
-   assert(i->temp_path);
-   assert(i->tar_pid <= 0);
-
-   r = tempfn_random(i->final_path, &i->temp_path);
-   if (r < 0)
-       return log_oom();
-
-   mkdir_parents_label(i->temp_path, 0700);
-
-   base = dkr_import_current_base_layer(i);
-   if (base) {
-       const char *base_path;
-
-       base_path = strjoina(i->image_root, "/.dkr-", base);
-       r = btrfs_subvol_snapshot(base_path, i->temp_path, false, true);
-   } else
-       r = btrfs_subvol_make(i->temp_path);
-   if (r < 0)
-       return log_error_errno(r, "Failed to make btrfs subvolume %s: %m", i->temp_path);
-
-   j->disk_fd = import_fork_tar(i->temp_path, &i->tar_pid);
-   if (j->disk_fd < 0)
-       return j->disk_fd;
-
-   return 0;
-}
-
-static void dkr_import_job_on_progress(ImportJob *j) {
-   DkrImport *i;
-
-   assert(j);
-   assert(j->userdata);
-}

```

```

- i = j->userdata;
-
- dkr_import_report_progress(
-     i,
-     j == i->images_job           ? DKR_SEARCHING :
-     j == i->tags_job             ? DKR_RESOLVING :
-     j == i->ancestry_job || j == i->json_job ? DKR_METADATA :
-                                     DKR_DOWNLOADING);
-}
-
-static int dkr_import_pull_layer(DkrImport *i) {
-     _cleanup_free_ char *path = NULL;
-     const char *url, *layer = NULL;
-     int r;
-
-     assert(i);
-     assert(!i->layer_job);
-     assert(!i->temp_path);
-     assert(!i->final_path);
-
-     for (;;) {
-         layer = dkr_import_current_layer(i);
-         if (!layer)
-             return 0; /* no more layers */
-
-         path = strjoin(i->image_root, "/.dkr-", layer, NULL);
-         if (!path)
-             return log_oom();
-
-         if (laccess(path, F_OK) < 0) {
-             if (errno == ENOENT)
-                 break;
-
-             return log_error_errno(errno, "Failed to check for container: %m");
-         }
-
-         log_info("Layer %s already exists, skipping.", layer);
-
-         i->current_ancestry++;
-
-         free(path);
-         path = NULL;
-     }
-
-     log_info("Pulling layer %s...", layer);
-
-     i->final_path = path;
-     path = NULL;

```

```

-
- url = strjoina(PROTOCOL_PREFIX, i->response_registries[0], "/v1/images/", layer, "/layer");
- r = import_job_new(&i->layer_job, url, i->glue, i);
- if (r < 0)
-     return log_error_errno(r, "Failed to allocate layer job: %m");
-
- r = dkr_import_add_token(i, i->layer_job);
- if (r < 0)
-     return log_oom();
-
- i->layer_job->on_finished = dkr_import_job_on_finished;
- i->layer_job->on_open_disk = dkr_import_job_on_open_disk;
- i->layer_job->on_progress = dkr_import_job_on_progress;
-
- r = import_job_begin(i->layer_job);
- if (r < 0)
-     return log_error_errno(r, "Failed to start layer job: %m");
-
- return 0;
-}
-
-static void dkr_import_job_on_finished(ImportJob *j) {
-    DkrImport *i;
-    int r;
-
-    assert(j);
-    assert(j->userdata);
-
-    i = j->userdata;
-    if (j->error != 0) {
-        if (j == i->images_job)
-            log_error_errno(j->error, "Failed to retrieve images list. (Wrong index URL?)");
-        else if (j == i->tags_job)
-            log_error_errno(j->error, "Failed to retrieve tags list.");
-        else if (j == i->ancestry_job)
-            log_error_errno(j->error, "Failed to retrieve ancestry list.");
-        else if (j == i->json_job)
-            log_error_errno(j->error, "Failed to retrieve json data.");
-        else
-            log_error_errno(j->error, "Failed to retrieve layer data.");
-
-        r = j->error;
-        goto finish;
-    }
-
-    if (i->images_job == j) {
-        const char *url;
-
-

```

```

-     assert(!i->tags_job);
-     assert(!i->ancestry_job);
-     assert(!i->json_job);
-     assert(!i->layer_job);
-
-     if (strv_isempty(i->response_registries)) {
-         r = -EBADMSG;
-         log_error("Didn't get registry information.");
-         goto finish;
-     }
-
-     log_info("Index lookup succeeded, directed to registry %s.", i->response_registries[0]);
-     dkr_import_report_progress(i, DKR_RESOLVING);
-
-     url = strjoina(PROTOCOL_PREFIX, i->response_registries[0], "/v1/repositories/", i->name, "/tags/", i-
>tag);
-     r = import_job_new(&i->tags_job, url, i->glue, i);
-     if (r < 0) {
-         log_error_errno(r, "Failed to allocate tags job: %m");
-         goto finish;
-     }
-
-     r = dkr_import_add_token(i, i->tags_job);
-     if (r < 0) {
-         log_oom();
-         goto finish;
-     }
-
-     i->tags_job->on_finished = dkr_import_job_on_finished;
-     i->tags_job->on_progress = dkr_import_job_on_progress;
-
-     r = import_job_begin(i->tags_job);
-     if (r < 0) {
-         log_error_errno(r, "Failed to start tags job: %m");
-         goto finish;
-     }
-
- } else if (i->tags_job == j) {
-     const char *url;
-     char *id = NULL;
-
-     assert(!i->ancestry_job);
-     assert(!i->json_job);
-     assert(!i->layer_job);
-
-     r = parse_id(j->payload, j->payload_size, &id);
-     if (r < 0) {
-         log_error_errno(r, "Failed to parse JSON id.");

```

```

-         goto finish;
-     }
-
-     free(i->id);
-     i->id = id;
-
-     log_info("Tag lookup succeeded, resolved to layer %s.", i->id);
-     dkr_import_report_progress(i, DKR_METADATA);
-
-     url = strjoina(PROTOCOL_PREFIX, i->response_registries[0], "/v1/images/", i->id, "/ancestry");
-     r = import_job_new(&i->ancestry_job, url, i->glue, i);
-     if (r < 0) {
-         log_error_errno(r, "Failed to allocate ancestry job: %m");
-         goto finish;
-     }
-
-     r = dkr_import_add_token(i, i->ancestry_job);
-     if (r < 0) {
-         log_oom();
-         goto finish;
-     }
-
-     i->ancestry_job->on_finished = dkr_import_job_on_finished;
-     i->ancestry_job->on_progress = dkr_import_job_on_progress;
-
-     url = strjoina(PROTOCOL_PREFIX, i->response_registries[0], "/v1/images/", i->id, "/json");
-     r = import_job_new(&i->json_job, url, i->glue, i);
-     if (r < 0) {
-         log_error_errno(r, "Failed to allocate json job: %m");
-         goto finish;
-     }
-
-     r = dkr_import_add_token(i, i->json_job);
-     if (r < 0) {
-         log_oom();
-         goto finish;
-     }
-
-     i->json_job->on_finished = dkr_import_job_on_finished;
-     i->json_job->on_progress = dkr_import_job_on_progress;
-
-     r = import_job_begin(i->ancestry_job);
-     if (r < 0) {
-         log_error_errno(r, "Failed to start ancestry job: %m");
-         goto finish;
-     }
-
-     r = import_job_begin(i->json_job);

```

```

-     if (r < 0) {
-         log_error_errno(r, "Failed to start json job: %m");
-         goto finish;
-     }
-
- } else if (i->ancestry_job == j) {
-     char **ancestry = NULL, **k;
-     unsigned n;
-
-     assert(!i->layer_job);
-
-     r = parse_ancestry(j->payload, j->payload_size, &ancestry);
-     if (r < 0) {
-         log_error_errno(r, "Failed to parse JSON id.");
-         goto finish;
-     }
-
-     n = strv_length(ancestry);
-     if (n <= 0 || !streq(ancestry[n-1], i->id)) {
-         log_error("Ancestry doesn't end in main layer.");
-         strv_free(ancestry);
-         r = -EBADMSG;
-         goto finish;
-     }
-
-     log_info("Ancestor lookup succeeded, requires layers:\n");
-     STRV_FOREACH(k, ancestry)
-         log_info("\t%s", *k);
-
-     strv_free(i->ancestry);
-     i->ancestry = ancestry;
-     i->n_ancestry = n;
-     i->current_ancestry = 0;
-
-     dkr_import_report_progress(i, DKR_DOWNLOADING);
-
-     r = dkr_import_pull_layer(i);
-     if (r < 0)
-         goto finish;
-
- } else if (i->layer_job == j) {
-     assert(i->temp_path);
-     assert(i->final_path);
-
-     j->disk_fd = safe_close(j->disk_fd);
-
-     if (i->tar_pid > 0) {
-         r = wait_for_terminate_and_warn("tar", i->tar_pid, true);

```

```

-         i->tar_pid = 0;
-         if (r < 0)
-             goto finish;
-     }
-
-     r = aufs_resolve(i->temp_path);
-     if (r < 0) {
-         log_error_errno(r, "Failed to resolve aufs whiteouts: %m");
-         goto finish;
-     }
-
-     r = btrfs_subvol_set_read_only(i->temp_path, true);
-     if (r < 0) {
-         log_error_errno(r, "Failed to mark snapshot read-only: %m");
-         goto finish;
-     }
-
-     if (rename(i->temp_path, i->final_path) < 0) {
-         log_error_errno(errno, "Failed to rename snapshot: %m");
-         goto finish;
-     }
-
-     log_info("Completed writing to layer %s.", i->final_path);
-
-     i->layer_job = import_job_unref(i->layer_job);
-     free(i->temp_path);
-     i->temp_path = NULL;
-     free(i->final_path);
-     i->final_path = NULL;
-
-     i->current_ancestry++;
-     r = dkr_import_pull_layer(i);
-     if (r < 0)
-         goto finish;
-
- } else if (i->json_job != j)
-     assert_not_reached("Got finished event for unknown curl object");
-
- if (!dkr_import_is_done(i))
-     return;
-
- dkr_import_report_progress(i, DKR_COPYING);
-
- r = dkr_import_make_local_copy(i);
- if (r < 0)
-     goto finish;
-
- r = 0;

```



```

-
-finish:
-   if (i->on_finished)
-       i->on_finished(i, r, i->userdata);
-   else
-       sd_event_exit(i->event, r);
-}
-
-static int dkr_import_job_on_header(ImportJob *j, const char *header, size_t sz) {
-   _cleanup_free_ char *registry = NULL;
-   char *token;
-   DkrImport *i;
-   int r;
-
-   assert(j);
-   assert(j->userdata);
-
-   i = j->userdata;
-
-   r = curl_header_strdup(header, sz, HEADER_TOKEN, &token);
-   if (r < 0)
-       return log_oom();
-   if (r > 0) {
-       free(i->response_token);
-       i->response_token = token;
-       return 0;
-   }
-
-   r = curl_header_strdup(header, sz, HEADER_REGISTRY, &registry);
-   if (r < 0)
-       return log_oom();
-   if (r > 0) {
-       char **l, **k;
-
-       l = strv_split(registry, ",");
-       if (!l)
-           return log_oom();
-
-       STRV_FOREACH(k, l) {
-           if (!hostname_is_valid(*k)) {
-               log_error("Registry hostname is not valid.");
-               strv_free(l);
-               return -EBADMSG;
-           }
-       }
-
-       strv_free(i->response_registries);
-       i->response_registries = l;
-   }
-}

```

```

-     }
-
-     return 0;
-}
-
-int dkr_import_pull(DkrImport *i, const char *name, const char *tag, const char *local, bool force_local) {
-     const char *url;
-     int r;
-
-     assert(i);
-
-     if (!dkr_name_is_valid(name))
-         return -EINVAL;
-
-     if (tag && !dkr_tag_is_valid(tag))
-         return -EINVAL;
-
-     if (local && !machine_name_is_valid(local))
-         return -EINVAL;
-
-     if (i->images_job)
-         return -EBUSY;
-
-     if (!tag)
-         tag = "latest";
-
-     r = free_and_strdup(&i->local, local);
-     if (r < 0)
-         return r;
-     i->force_local = force_local;
-
-     r = free_and_strdup(&i->name, name);
-     if (r < 0)
-         return r;
-     r = free_and_strdup(&i->tag, tag);
-     if (r < 0)
-         return r;
-
-     url = strjoina(i->index_url, "/v1/repositories/", name, "/images");
-
-     r = import_job_new(&i->images_job, url, i->glue, i);
-     if (r < 0)
-         return r;
-
-     r = dkr_import_add_token(i, i->images_job);
-     if (r < 0)
-         return r;
-
-}

```

```

-   i->images_job->on_finished = dkr_import_job_on_finished;
-   i->images_job->on_header = dkr_import_job_on_header;
-   i->images_job->on_progress = dkr_import_job_on_progress;
-
-   return import_job_begin(i->images_job);
-}
diff --git a/src/import/import-dkr.h b/src/import/import-dkr.h
deleted file mode 100644
index 633c767965..0000000000
--- a/src/import/import-dkr.h
+++ /dev/null
@@ -1,36 +0,0 @@
-/*- Mode: C; c-basic-offset: 8; indent-tabs-mode: nil -*/
-
-/**
- This file is part of systemd.
-
- Copyright 2014 Lennart Poettering
-
- systemd is free software; you can redistribute it and/or modify it
- under the terms of the GNU Lesser General Public License as published by
- the Free Software Foundation; either version 2.1 of the License, or
- (at your option) any later version.
-
- systemd is distributed in the hope that it will be useful, but
- WITHOUT ANY WARRANTY; without even the implied warranty of
- MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
- Lesser General Public License for more details.
-
- You should have received a copy of the GNU Lesser General Public License
- along with systemd; If not, see <http://www.gnu.org/licenses/>.
-*/
-
-#pragma once
-
-#include "sd-event.h"
-#include "util.h"
-
-#ifndef DkrImport
-#define DkrImport struct DkrImport
-#endif
-
-#ifndef DkrImportFinished
-#define DkrImportFinished void (*DkrImportFinished)(DkrImport *import, int error, void *userdata);
-#endif
-
-#ifndef dkr_import_new
-#define dkr_import_new(DkrImport **import, sd_event *event, const char *index_url, const char *image_root,
DkrImportFinished on_finished, void *userdata);
-#endif
-
-#ifndef dkr_import_unref
-#define dkr_import_unref(DkrImport *import);
-#endif
-
-#ifndef DkrImportCleanupFunc
-#define DkrImportCleanupFunc(DkrImport*, dkr_import_unref);
-#endif

```

```

-int dkr_import_pull(DkrImport *import, const char *name, const char *tag, const char *local, bool force_local);
diff --git a/src/import/importd.c b/src/import/importd.c
index 1222bf3cd2..9aaf991f83 100644
--- a/src/import/importd.c
+++ b/src/import/importd.c
@@ -38,7 +38,6 @@ typedef struct Manager Manager;
typedef enum TransferType {
    TRANSFER_TAR,
    TRANSFER_RAW,
-   TRANSFER_DKR,
    _TRANSFER_TYPE_MAX,
    _TRANSFER_TYPE_INVALID = -1,
} TransferType;
@@ -56,8 +55,6 @@ struct Transfer {
    char *local;
    bool force_local;

-   char *dkr_index_url;
-
    pid_t pid;

    int log_fd;
@@ -91,7 +88,6 @@ struct Manager {
static const char* const transfer_type_table[_TRANSFER_TYPE_MAX] = {
    [TRANSFER_TAR] = "tar",
    [TRANSFER_RAW] = "raw",
-   [TRANSFER_DKR] = "dkr",
};

DEFINE_PRIVATE_STRING_TABLE_LOOKUP_TO_STRING(transfer_type, TransferType);
@@ -108,7 +104,6 @@ static Transfer *transfer_unref(Transfer *t) {

    free(t->remote);
    free(t->local);
-   free(t->dkr_index_url);
    free(t->object_path);

    if (t->pid > 0) {
@@ -355,7 +350,6 @@ static int transfer_start(Transfer *t) {
    "--verify",
    NULL, /* verify argument */
    NULL, /* maybe --force */
-   NULL, /* maybe --dkr-index-url */
    NULL, /* the actual URL */
    NULL, /* remote */
    NULL, /* local */
@@ -410,11 +404,6 @@ static int transfer_start(Transfer *t) {
    if (t->force_local)

```

```

        cmd[k++] = "--force";

-       if (t->dkr_index_url) {
-           cmd[k++] = "--dkr-index-url";
-           cmd[k++] = t->dkr_index_url;
-       }
-
        cmd[k++] = t->remote;
        if (t->local)
            cmd[k++] = t->local;
@@ -624,7 +613,7 @@ static int manager_new(Manager **ret) {
    return 0;
}

-static Transfer *manager_find(Manager *m, TransferType type, const char *dkr_index_url, const char *remote) {
+static Transfer *manager_find(Manager *m, TransferType type, const char *remote) {
    Transfer *t;
    Iterator i;

@@ -635,8 +624,7 @@ static Transfer *manager_find(Manager *m, TransferType type, const char *dkr_ind
    HASHMAP_FOREACH(t, m->transfers, i) {

        if (t->type == type &&
-           streq_ptr(t->remote, remote) &&
-           streq_ptr(t->dkr_index_url, dkr_index_url))
+           streq_ptr(t->remote, remote))
            return t;
    }

@@ -689,7 +677,7 @@ static int method_pull_tar_or_raw(sd_bus *bus, sd_bus_message *msg, void *userda

    type = streq_ptr(sd_bus_message_get_member(msg), "PullTar") ? TRANSFER_TAR : TRANSFER_RAW;

-   if (manager_find(m, type, NULL, remote))
+   if (manager_find(m, type, remote))
        return sd_bus_error_setf(error, BUS_ERROR_TRANSFER_IN_PROGRESS, "Transfer for %s already in
progress.", remote);

    r = transfer_new(m, &t);
@@ -719,98 +707,6 @@ static int method_pull_tar_or_raw(sd_bus *bus, sd_bus_message *msg, void *userda
    return sd_bus_reply_method_return(msg, "uo", id, object);
}

-static int method_pull_dkr(sd_bus *bus, sd_bus_message *msg, void *userdata, sd_bus_error *error) {
-   _cleanup_(transfer_unrefp) Transfer *t = NULL;
-   const char *index_url, *remote, *tag, *local, *verify, *object;
-   Manager *m = userdata;
-   ImportVerify v;

```

```

-   int force, r;
-   uint32_t id;
-
-   assert(bus);
-   assert(msg);
-   assert(m);
-
-   r = bus_verify_polkit_async(
-       msg,
-       CAP_SYS_ADMIN,
-       "org.freedesktop.import1.pull",
-       false,
-       &m->polkit_registry,
-       error);
-   if (r < 0)
-       return r;
-   if (r == 0)
-       return 1; /* Will call us back */
-
-   r = sd_bus_message_read(msg, "ssssb", &index_url, &remote, &tag, &local, &verify, &force);
-   if (r < 0)
-       return r;
-
-   if (isempty(index_url))
-       index_url = DEFAULT_DKR_INDEX_URL;
-   if (!index_url)
-       return sd_bus_error_setf(error, SD_BUS_ERROR_INVALID_ARGS, "Index URL must be specified.");
-   if (!http_url_is_valid(index_url))
-       return sd_bus_error_setf(error, SD_BUS_ERROR_INVALID_ARGS, "Index URL %s is invalid",
index_url);
-
-   if (!dkr_name_is_valid(remote))
-       return sd_bus_error_setf(error, SD_BUS_ERROR_INVALID_ARGS, "Remote name %s is not valid",
remote);
-
-   if (isempty(tag))
-       tag = "latest";
-   else if (!dkr_tag_is_valid(tag))
-       return sd_bus_error_setf(error, SD_BUS_ERROR_INVALID_ARGS, "Tag %s is not valid", tag);
-
-   if (isempty(local))
-       local = NULL;
-   else if (!machine_name_is_valid(local))
-       return sd_bus_error_setf(error, SD_BUS_ERROR_INVALID_ARGS, "Local name %s is invalid", local);
-
-   if (isempty(verify))
-       v = IMPORT_VERIFY_SIGNATURE;
-   else

```

```

-     v = import_verify_from_string(verify);
-     if (v < 0)
-         return sd_bus_error_setf(error, SD_BUS_ERROR_INVALID_ARGS, "Unknown verification mode %s",
verify);
-
-     if (v != IMPORT_VERIFY_NO)
-         return sd_bus_error_setf(error, SD_BUS_ERROR_NOT_SUPPORTED, "DKR does not support
verification.");
-
-     if (manager_find(m, TRANSFER_DKR, index_url, remote))
-         return sd_bus_error_setf(error, BUS_ERROR_TRANSFER_IN_PROGRESS, "Transfer for %s already
in progress.", remote);
-
-     r = transfer_new(m, &t);
-     if (r < 0)
-         return r;
-
-     t->type = TRANSFER_DKR;
-     t->verify = v;
-     t->force_local = force;
-
-     t->dkr_index_url = strdup(index_url);
-     if (!t->dkr_index_url)
-         return -ENOMEM;
-
-     t->remote = strjoin(remote, ":", tag, NULL);
-     if (!t->remote)
-         return -ENOMEM;
-
-     t->local = strdup(local);
-     if (!t->local)
-         return -ENOMEM;
-
-     r = transfer_start(t);
-     if (r < 0)
-         return r;
-
-     object = t->object_path;
-     id = t->id;
-     t = NULL;
-
-     return sd_bus_reply_method_return(msg, "uo", id, object);
-}
-
static int method_list_transfers(sd_bus *bus, sd_bus_message *msg, void *userdata, sd_bus_error *error) {
    _cleanup_bus_message_unref_ sd_bus_message *reply = NULL;
    Manager *m = userdata;
    @@ -956,7 +852,6 @@ static const sd_bus_vtable manager_vtable[] = {

```

```

        SD_BUS_VTABLE_START(0),
        SD_BUS_METHOD("PullTar", "sss", "uo", method_pull_tar_or_raw,
SD_BUS_VTABLE_UNPRIVILEGED),
        SD_BUS_METHOD("PullRaw", "sss", "uo", method_pull_tar_or_raw,
SD_BUS_VTABLE_UNPRIVILEGED),
-       SD_BUS_METHOD("PullDkr", "ssss", "uo", method_pull_dkr, SD_BUS_VTABLE_UNPRIVILEGED),
        SD_BUS_METHOD("ListTransfers", NULL, "a(usssdo)", method_list_transfers,
SD_BUS_VTABLE_UNPRIVILEGED),
        SD_BUS_METHOD("CancelTransfer", "u", NULL, method_cancel_transfer,
SD_BUS_VTABLE_UNPRIVILEGED),
        SD_BUS_SIGNAL("TransferNew", "uo", 0),
diff --git a/src/import/org.freedesktop.import1.conf b/src/import/org.freedesktop.import1.conf
index ae36af422f..ed2539a03b 100644
--- a/src/import/org.freedesktop.import1.conf
+++ b/src/import/org.freedesktop.import1.conf
@@ -52,10 +52,6 @@
        send_interface="org.freedesktop.import1.Manager"
        send_member="PullRaw"/>

-       <allow send_destination="org.freedesktop.import1"
-       send_interface="org.freedesktop.import1.Manager"
-       send_member="PullDkr"/>
-
        <allow send_destination="org.freedesktop.import1"
        send_interface="org.freedesktop.import1.Transfer"
        send_member="Cancel"/>
diff --git a/src/import/pull.c b/src/import/pull.c
index ee3ff68036..9cb10880fa 100644
--- a/src/import/pull.c
+++ b/src/import/pull.c
@@ -28,13 +28,11 @@
#include "machine-image.h"
#include "import-tar.h"
#include "import-raw.h"
-#include "import-dkr.h"
#include "import-util.h"

static bool arg_force = false;
static const char *arg_image_root = "/var/lib/machines";
static ImportVerify arg_verify = IMPORT_VERIFY_SIGNATURE;
-static const char* arg_dkr_index_url = DEFAULT_DKR_INDEX_URL;

static int interrupt_signal_handler(sd_event_source *s, const struct signalfd_siginfo *si, void *userdata) {
    log_notice("Transfer aborted.");
@@ -214,107 +212,6 @@ static int pull_raw(int argc, char *argv[], void *userdata) {
    return -r;
}

```



```

-static void on_dkr_finished(DkrImport *import, int error, void *userdata) {
-    sd_event *event = userdata;
-    assert(import);
-
-    if (error == 0)
-        log_info("Operation completed successfully.");
-
-    sd_event_exit(event, abs(error));
-}
-
-static int pull_dkr(int argc, char *argv[], void *userdata) {
-    _cleanup_(dkr_import_unrefp) DkrImport *import = NULL;
-    _cleanup_event_unref_ sd_event *event = NULL;
-    const char *name, *tag, *local;
-    int r;
-
-    if (!arg_dkr_index_url) {
-        log_error("Please specify an index URL with --dkr-index-url=");
-        return -EINVAL;
-    }
-
-    if (arg_verify != IMPORT_VERIFY_NO) {
-        log_error("Imports from dkr do not support image verification, please pass --verify=no.");
-        return -EINVAL;
-    }
-
-    tag = strchr(argv[1], ':');
-    if (tag) {
-        name = strndupa(argv[1], tag - argv[1]);
-        tag++;
-    } else {
-        name = argv[1];
-        tag = "latest";
-    }
-
-    if (!dkr_name_is_valid(name)) {
-        log_error("Remote name '%s' is not valid.", name);
-        return -EINVAL;
-    }
-
-    if (!dkr_tag_is_valid(tag)) {
-        log_error("Tag name '%s' is not valid.", tag);
-        return -EINVAL;
-    }
-
-    if (argc >= 3)
-        local = argv[2];
-    else {

```

```

-     local = strchr(name, '/');
-     if (local)
-         local++;
-     else
-         local = name;
- }
-
- if (isempty(local) || streq(local, "-"))
-     local = NULL;
-
- if (local) {
-     if (!machine_name_is_valid(local)) {
-         log_error("Local image name '%s' is not valid.", local);
-         return -EINVAL;
-     }
-
-     if (!arg_force) {
-         r = image_find(local, NULL);
-         if (r < 0)
-             return log_error_errno(r, "Failed to check whether image '%s' exists: %m", local);
-         else if (r > 0) {
-             log_error_errno(EEXIST, "Image '%s' already exists.", local);
-             return -EEXIST;
-         }
-     }
-
-     log_info("Pulling '%s' with tag '%s', saving as '%s'.", name, tag, local);
- } else
-     log_info("Pulling '%s' with tag '%s'.", name, tag);
-
- r = sd_event_default(&event);
- if (r < 0)
-     return log_error_errno(r, "Failed to allocate event loop: %m");
-
- assert_se(sigprocmask_many(SIG_BLOCK, SIGTERM, SIGINT, -1) == 0);
- sd_event_add_signal(event, NULL, SIGTERM, interrupt_signal_handler, NULL);
- sd_event_add_signal(event, NULL, SIGINT, interrupt_signal_handler, NULL);
-
- r = dkr_import_new(&import, event, arg_dkr_index_url, arg_image_root, on_dkr_finished, event);
- if (r < 0)
-     return log_error_errno(r, "Failed to allocate importer: %m");
-
- r = dkr_import_pull(import, name, tag, local, arg_force);
- if (r < 0)
-     return log_error_errno(r, "Failed to pull image: %m");
-
- r = sd_event_loop(event);
- if (r < 0)

```

```

-         return log_error_errno(r, "Failed to run event loop: %m");
-
-     log_info("Exiting.");
-     return -r;
-}

static int help(int argc, char *argv[], void *userdata) {

@@ -326,11 +223,9 @@ static int help(int argc, char *argv[], void *userdata) {
    " --verify=          Verify downloaded image, one of: 'no',\n"
    "                   'checksum', 'signature'.\n"
    " --image-root=      Image root directory\n"
-   " --dkr-index-url=URL  Specify index URL to use for downloads\n\n"
    "Commands:\n"
    " tar URL [NAME]      Download a TAR image\n"
-   " raw URL [NAME]      Download a RAW image\n"
-   " dkr REMOTE [NAME]   Download a DKR image\n",
+   " raw URL [NAME]      Download a RAW image\n",
    program_invocation_short_name);

    return 0;
@@ -341,7 +236,6 @@ static int parse_argv(int argc, char *argv[]) {
    enum {
        ARG_VERSION = 0x100,
        ARG_FORCE,
-       ARG_DKR_INDEX_URL,
        ARG_IMAGE_ROOT,
        ARG_VERIFY,
    };
@@ -350,7 +244,6 @@ static int parse_argv(int argc, char *argv[]) {
    { "help",      no_argument,  NULL, 'h'      },
    { "version",   no_argument,  NULL, ARG_VERSION  },
    { "force",     no_argument,  NULL, ARG_FORCE    },
-   { "dkr-index-url", required_argument, NULL, ARG_DKR_INDEX_URL },
    { "image-root", required_argument, NULL, ARG_IMAGE_ROOT  },
    { "verify",    required_argument, NULL, ARG_VERIFY     },
    {}
@@ -377,15 +270,6 @@ static int parse_argv(int argc, char *argv[]) {
        arg_force = true;
        break;

-       case ARG_DKR_INDEX_URL:
-           if (!http_url_is_valid(optarg)) {
-               log_error("Index URL is not valid: %s", optarg);
-               return -EINVAL;
-           }
-
-           arg_dkr_index_url = optarg;

```

```

-         break;
-
-     case ARG_IMAGE_ROOT:
-         arg_image_root = optarg;
-         break;
@@ -415,7 +299,6 @@ static int import_main(int argc, char *argv[]) {
    { "help", VERB_ANY, VERB_ANY, 0, help },
    { "tar", 2, 3, 0, pull_tar },
    { "raw", 2, 3, 0, pull_raw },
-    { "dkr", 2, 3, 0, pull_dkr },
    {}
};

```

diff --git a/src/machine/machinectl.c b/src/machine/machinectl.c

index ef1214a666..cfd3162fb7 100644

--- a/src/machine/machinectl.c

+++ b/src/machine/machinectl.c

```

@@ -77,7 +77,6 @@ static unsigned arg_lines = 10;
static OutputMode arg_output = OUTPUT_SHORT;
static bool arg_force = false;
static ImportVerify arg_verify = IMPORT_VERIFY_SIGNATURE;
-static const char* arg_dkr_index_url = NULL;

```

```

static void pager_open_if_enabled(void) {

```

```

@@ -1998,78 +1997,6 @@ static int pull_raw(int argc, char *argv[], void *userdata) {
    return pull_image_common(bus, m);
}

```

```

-static int pull_dkr(int argc, char *argv[], void *userdata) {
-    _cleanup_bus_message_unref_sd_bus_message *m = NULL;
-    const char *local, *remote, *tag;
-    sd_bus *bus = userdata;
-    int r;
-
-    if (arg_verify != IMPORT_VERIFY_NO) {
-        log_error("Imports from DKR do not support image verification, please pass --verify=no.");
-        return -EINVAL;
-    }
-
-    remote = argv[1];
-    tag = strchr(remote, ':');
-    if (tag) {
-        remote = strndupa(remote, tag - remote);
-        tag++;
-    }
-
-    if (!dkr_name_is_valid(remote)) {

```

```

-     log_error("DKR name '%s' is invalid.", remote);
-     return -EINVAL;
- }
- if (tag && !dkr_tag_is_valid(tag)) {
-     log_error("DKR tag '%s' is invalid.", remote);
-     return -EINVAL;
- }
-
- if (argc >= 3)
-     local = argv[2];
- else {
-     local = strchr(remote, '/');
-     if (local)
-         local++;
-     else
-         local = remote;
- }
-
- if (isempty(local) || streq(local, "-"))
-     local = NULL;
-
- if (local) {
-     if (!machine_name_is_valid(local)) {
-         log_error("Local name %s is not a suitable machine name.", local);
-         return -EINVAL;
-     }
- }
-
- r = sd_bus_message_new_method_call(
-     bus,
-     &m,
-     "org.freedesktop.import1",
-     "/org/freedesktop/import1",
-     "org.freedesktop.import1.Manager",
-     "PullDkr");
- if (r < 0)
-     return bus_log_create_error(r);
-
- r = sd_bus_message_append(
-     m,
-     "sssss",
-     arg_dkr_index_url,
-     remote,
-     tag,
-     local,
-     import_verify_to_string(arg_verify),
-     arg_force);
- if (r < 0)

```

```

-         return bus_log_create_error(r);
-
-     return pull_image_common(bus, m);
-}
-
typedef struct TransferInfo {
    uint32_t id;
    const char *type;
@@ -2237,8 +2164,6 @@ static int help(int argc, char *argv[], void *userdata) {
    " --verify=MODE      Verification mode for downloaded images (no,\n"
    "                    checksum, signature)\n"
    " --force            Download image even if already exists\n"
-   " --dkr-index-url=URL  Specify the index URL to use for DKR image\n"
-   "                    downloads\n\n"
    "Machine Commands:\n"
    " list              List running VMs and containers\n"
    " status NAME...    Show VM/container details\n"
@@ -2265,7 +2190,6 @@ static int help(int argc, char *argv[], void *userdata) {
    "Image Transfer Commands:\n"
    " pull-tar URL [NAME]  Download a TAR container image\n"
    " pull-raw URL [NAME]  Download a RAW container or VM image\n"
-   " pull-dkr REMOTE [NAME]  Download a DKR container image\n"
    " list-transfers      Show list of downloads in progress\n"
    " cancel-transfer     Cancel a download\n"
    , program_invocation_short_name);
@@ -2284,8 +2208,7 @@ static int parse_argv(int argc, char *argv[]) {
    ARG_MKDIR,
    ARG_NO_ASK_PASSWORD,
    ARG_VERIFY,
-   ARG_FORCE,
-   ARG_DKR_INDEX_URL,
+   ARG_FORCE
    };

    static const struct option options[] = {
@@ -2308,7 +2231,6 @@ static int parse_argv(int argc, char *argv[]) {
    { "no-ask-password", no_argument, NULL, ARG_NO_ASK_PASSWORD },
    { "verify", required_argument, NULL, ARG_VERIFY },
    { "force", no_argument, NULL, ARG_FORCE },
-   { "dkr-index-url", required_argument, NULL, ARG_DKR_INDEX_URL },
    {}
    };

@@ -2421,15 +2343,6 @@ static int parse_argv(int argc, char *argv[]) {
    arg_force = true;
    break;

-   case ARG_DKR_INDEX_URL:

```

```

-         if (!http_url_is_valid(optarg)) {
-             log_error("Index URL is invalid: %s", optarg);
-             return -EINVAL;
-         }
-
-         arg_dkr_index_url = optarg;
-         break;
-
-     case '?':
-         return -EINVAL;
-
@@ -2467,7 +2380,6 @@ static int machinectl_main(int argc, char *argv[], sd_bus *bus) {
    { "disable", 2, VERB_ANY, 0, enable_machine },
    { "pull-tar", 2, 3, 0, pull_tar },
    { "pull-raw", 2, 3, 0, pull_raw },
-   { "pull-dkr", 2, 3, 0, pull_dkr },
    { "list-transfers", VERB_ANY, 1, 0, list_transfers },
    { "cancel-transfer", 2, VERB_ANY, 0, cancel_transfer },
    {}
diff --git a/src/shared/import-util.c b/src/shared/import-util.c
index 660d92ac5d..c0aba30a98 100644
--- a/src/shared/import-util.c
+++ b/src/shared/import-util.c
@@ -149,34 +149,3 @@ int raw_strip_suffixes(const char *p, char **ret) {

    return 0;
}
-
-bool dkr_name_is_valid(const char *name) {
-    const char *slash, *p;
-
-    if (isempty(name))
-        return false;
-
-    slash = strchr(name, '/');
-    if (!slash)
-        return false;
-
-    if (!filename_is_valid(slash + 1))
-        return false;
-
-    p = strndupa(name, slash - name);
-    if (!filename_is_valid(p))
-        return false;
-
-    return true;
-}

```

```

-bool dkr_id_is_valid(const char *id) {
-
-    if (!filename_is_valid(id))
-        return false;
-
-    if (!in_charset(id, "0123456789abcdef"))
-        return false;
-
-    return true;
-}
diff --git a/src/shared/import-util.h b/src/shared/import-util.h
index ff155b0ff2..22773c58e9 100644
--- a/src/shared/import-util.h
+++ b/src/shared/import-util.h
@@ -41,7 +41,3 @@ ImportVerify import_verify_from_string(const char *s) _pure_;

```

```

int tar_strip_suffixes(const char *name, char **ret);
int raw_strip_suffixes(const char *name, char **ret);
-
-bool dkr_name_is_valid(const char *name);
-bool dkr_id_is_valid(const char *id);
-#define dkr_tag_is_valid(tag) filename_is_valid(tag)

```

Found in path(s):

```

* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm.download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0324-importd-drop-dkr-support.patch

```

No license file was found, but licenses were detected in source scan.

From 825d40b7ccdde8b4b9a5299d6e6747c80b9519e2 Mon Sep 17 00:00:00 2001

From: Chris Morgan <chmorgan@gmail.com>

Date: Sat, 21 Mar 2015 20:47:46 -0400

Subject: [PATCH] man: add journal-remote.conf(5)

(cherry picked from commit eaa5251d9167027275d8275862e23e0b7dc8866e)

Cherry-picked from: 90d2614

Resolves: #1222517

---

```

Makefile-man.am          | 7 ++
man/journal-remote.conf.xml | 114 +++++++++++++++++++++++++++++++++++++
man/systemd-journal-remote.xml | 1 +
3 files changed, 122 insertions(+)
create mode 100644 man/journal-remote.conf.xml

```

```

diff --git a/Makefile-man.am b/Makefile-man.am

```

```

index ac6f69af70..084df754a2 100644

```

```

--- a/Makefile-man.am

```



```

+++ b/Makefile-man.am
@@ -1358,14 +1358,20 @@ endif

if HAVE_MICROHTTPD
MANPAGES += \
+ man/journal-remote.conf.5 \
man/systemd-journal-gatewayd.service.8 \
man/systemd-journal-remote.8 \
man/systemd-journal-upload.8
MANPAGES_ALIAS += \
+ man/journal-remote.conf.d.5 \
man/systemd-journal-gatewayd.8 \
man/systemd-journal-gatewayd.socket.8
+man/journal-remote.conf.d.5: man/journal-remote.conf.5
man/systemd-journal-gatewayd.8: man/systemd-journal-gatewayd.service.8
man/systemd-journal-gatewayd.socket.8: man/systemd-journal-gatewayd.service.8
+man/journal-remote.conf.d.html: man/journal-remote.conf.html
+ $(html-alias)
+
man/systemd-journal-gatewayd.html: man/systemd-journal-gatewayd.service.html
$(html-alias)

@@ -1662,6 +1668,7 @@ EXTRA_DIST += \
man/hostname.xml \
man/hostnamed.xml \
man/hwdb.xml \
+ man/journal-remote.conf.xml \
man/journalctl.xml \
man/journaled.conf.xml \
man/kernel-command-line.xml \
diff --git a/man/journal-remote.conf.xml b/man/journal-remote.conf.xml
new file mode 100644
index 0000000000..a7b2227182
--- /dev/null
+++ b/man/journal-remote.conf.xml
@@ -0,0 +1,114 @@
+<?xml version='1.0'?> <!--*-nxml*-->
+<!DOCTYPE refentry PUBLIC "-//OASIS//DTD DocBook XML V4.2//EN"
+ "http://www.oasis-open.org/docbook/xml/4.2/docbookx.dtd">
+
+
+<!--
+ This file is part of systemd.
+
+ Copyright 2015 Chris Morgan
+
+ systemd is free software; you can redistribute it and/or modify it
+ under the terms of the GNU Lesser General Public License as published by
+ the Free Software Foundation; either version 2.1 of the License, or

```

```

+ (at your option) any later version.
+
+ systemd is distributed in the hope that it will be useful, but
+ WITHOUT ANY WARRANTY; without even the implied warranty of
+ MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
+ Lesser General Public License for more details.
+
+ You should have received a copy of the GNU Lesser General Public License
+ along with systemd; If not, see <http://www.gnu.org/licenses/>.
+-->
+
+<refentry id="journal-remote.conf" conditional='HAVE_MICROHTTPD'
+  xmlns:xi="http://www.w3.org/2001/XInclude">
+ <refentryinfo>
+ <title>journal-remote.conf</title>
+ <productname>systemd</productname>
+
+ <authorgroup>
+ <author>
+ <contrib>Developer</contrib>
+ <firstname>Chris</firstname>
+ <surname>Morgan</surname>
+ <email>chmorgan@gmail.com</email>
+ </author>
+ </authorgroup>
+ </refentryinfo>
+
+ <refmeta>
+ <refentrytitle>journal-remote.conf</refentrytitle>
+ <manvolnum>5</manvolnum>
+ </refmeta>
+
+ <refnamediv>
+ <refname>journal-remote.conf</refname>
+ <refname>journal-remote.conf.d</refname>
+ <refpurpose>Journal remote service configuration files</refpurpose>
+ </refnamediv>
+
+ <refsynopsisdiv>
+ <para><filename>/etc/systemd/journal-remote.conf</filename></para>
+ <para><filename>/etc/systemd/journald.conf.d/*.conf</filename></para>
+ <para><filename>/run/systemd/journald.conf.d/*.conf</filename></para>
+ <para><filename>/usr/lib/systemd/journald.conf.d/*.conf</filename></para>
+ </refsynopsisdiv>
+
+ <refsect1>
+ <title>Description</title>
+

```

```

+ <para>These files configure various parameters of the systemd-remote-journal
+ application,
+ <citerefentry><refentrytitle>systemd-journal-
remote</refentrytitle><manvolnum>8</manvolnum></citerefentry>.</para>
+ </refsect1>
+
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
+
+ <refsect1>
+ <title>Options</title>
+
+ <para>All options are configured in the
+ <literal>[Remote]</literal> section:</para>
+
+ <variablelist>
+
+ <varlistentry>
+ <term><varname>SplitMode=</varname></term>
+
+ <listitem><para>One of <literal>host</literal> or <literal>none</literal>.
+ </para></listitem>
+ </varlistentry>
+
+ <varlistentry>
+ <term><varname>ServerKeyFile=</varname></term>
+
+ <listitem><para>SSL key in PEM format</para></listitem>
+ </varlistentry>
+
+ <varlistentry>
+ <term><varname>ServerCertificateFile=</varname></term>
+
+ <listitem><para>SSL CA certificate in PEM format.</para></listitem>
+ </varlistentry>
+
+ <varlistentry>
+ <term><varname>TrustedCertificateFile=</varname></term>
+
+ <listitem><para>SSL CA certificate.</para></listitem>
+ </varlistentry>
+
+ </variablelist>
+
+ </refsect1>
+
+ <refsect1>
+ <title>See Also</title>
+ <para>

```

```

+ <citerefentry><refentrytitle>systemd-journal-
remote</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+ <citerefentry><refentrytitle>systemd</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
+ <citerefentry><refentrytitle>systemd-
journald.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+ </para>
+ </refsect1>
+
+</refentry>
diff --git a/man/systemd-journal-remote.xml b/man/systemd-journal-remote.xml
index 2687662a14..d5bda635c4 100644
--- a/man/systemd-journal-remote.xml
+++ b/man/systemd-journal-remote.xml
@@ -310,6 +310,7 @@ @ systemd-journal-remote --url http://some.host:19531/
    <citerefentry><refentrytitle>journalctl</refentrytitle><manvolnum>1</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-
journald.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>,
    <citerefentry><refentrytitle>systemd-journal-
gatewayd.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>
+ <citerefentry><refentrytitle>journal-remote.conf</refentrytitle><manvolnum>5</manvolnum></citerefentry>
  </para>
</refsect1>
</refentry>

```

Found in path(s):

```

* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-
78.el7.src.rpm.download/systemd-219-78.el7.src.rpm.cosi-expand-archive-AelyEoeN/0152-man-add-journal-
remote.conf-5.patch

```

No license file was found, but licenses were detected in source scan.

From b72201257216f687bf3462ad7539612cccbbce75 Mon Sep 17 00:00:00 2001

From: =?UTF-8?q?Zbigniew=20J=C4=99drzejewski-Szmek?= <zbyszek@in.waw.pl>

Date: Tue, 3 Mar 2015 19:10:21 -0500

Subject: [PATCH] Do not advertise .d snippets over main config file

For daemons which have a main configuration file, there's little reason for the administrator to use configuration snippets. They are useful for packagers which need to override settings, but we shouldn't advertise that as the main way of configuring those services.

[https://bugs.freedesktop.org/show\\_bug.cgi?id=89397](https://bugs.freedesktop.org/show_bug.cgi?id=89397)

(cherry picked from commit e93549ef29c4123d9ee45acb5815048390201e49)

---

```

man/bootchart.conf.xml      | 3 +--
man/coredump.conf.xml      | 3 +--
man/journald.conf.xml      | 3 +--
man/logind.conf.xml        | 8 ++++---

```

```
man/resolved.conf.xml      | 3 +--
man/standard-conf.xml      | 42 ++++++-----
man/systemd-sleep.conf.xml | 3 +--
man/systemd-system.conf.xml | 3 +--
man/timesyncd.conf.xml     | 3 +--
src/bootchart/bootchart.conf | 7 +----
src/core/system.conf       | 7 +----
src/journal/coredump.conf  | 7 +----
src/journal/journald.conf  | 7 +----
src/login/logind.conf      | 7 +----
src/resolve/resolved.conf.in | 5 +--
src/timesync/timesyncd.conf.in | 7 +----
16 files changed, 73 insertions(+), 45 deletions(-)
```

```
diff --git a/man/bootchart.conf.xml b/man/bootchart.conf.xml
```

```
index 8d9700d300..bf6ca0bf9e 100644
```

```
--- a/man/bootchart.conf.xml
```

```
+++ b/man/bootchart.conf.xml
```

```
@@ -68,8 +68,7 @@
```

```
    parameters and graph output.</para>
```

```
</refsect1>
```

```
- <xi:include href="standard-conf.xml" xpointer="confd" />
```

```
- <xi:include href="standard-conf.xml" xpointer="conf" />
```

```
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
```

```
<refsect1>
```

```
  <title>Options</title>
```

```
diff --git a/man/coredump.conf.xml b/man/coredump.conf.xml
```

```
index 3d325e6ad7..0b7329bf55 100644
```

```
--- a/man/coredump.conf.xml
```

```
+++ b/man/coredump.conf.xml
```

```
@@ -63,8 +63,7 @@
```

```
    a handler for core dumps invoked by the kernel.</para>
```

```
</refsect1>
```

```
- <xi:include href="standard-conf.xml" xpointer="confd" />
```

```
- <xi:include href="standard-conf.xml" xpointer="conf" />
```

```
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
```

```
<refsect1>
```

```
  <title>Options</title>
```

```
diff --git a/man/journald.conf.xml b/man/journald.conf.xml
```

```
index 364b58f07e..85146b0d82 100644
```

```
--- a/man/journald.conf.xml
```

```
+++ b/man/journald.conf.xml
```

```
@@ -64,8 +64,7 @@
```

</refsect1>

```
- <xi:include href="standard-conf.xml" xpointer="confd" />
- <xi:include href="standard-conf.xml" xpointer="conf" />
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
```

<refsect1>

<title>Options</title>

diff --git a/man/logind.conf.xml b/man/logind.conf.xml

index ffaec50351..ca2b18783c 100644

--- a/man/logind.conf.xml

+++ b/man/logind.conf.xml

@@ -58,11 +58,13 @@

<refsect1>

<title>Description</title>

```
- <para>These files configure various parameters of the systemd login manager,
<citerefentry><refentrytitle>systemd-
logind.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>.</para>
```

```
+ <para>These files configure various parameters of the systemd
+ login manager,
```

```
+ <citerefentry><refentrytitle>systemd-
logind.service</refentrytitle><manvolnum>8</manvolnum></citerefentry>.
```

```
+ </para>
```

</refsect1>

```
- <xi:include href="standard-conf.xml" xpointer="confd" />
- <xi:include href="standard-conf.xml" xpointer="conf" />
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
```

<refsect1>

<title>Options</title>

diff --git a/man/resolved.conf.xml b/man/resolved.conf.xml

index 36cae2706c..8047a4ea75 100644

--- a/man/resolved.conf.xml

+++ b/man/resolved.conf.xml

@@ -63,8 +63,7 @@

</refsect1>

```
- <xi:include href="standard-conf.xml" xpointer="confd" />
```

```
- <xi:include href="standard-conf.xml" xpointer="conf" />
```

```
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
```

<refsect1>

<title>Options</title>

diff --git a/man/standard-conf.xml b/man/standard-conf.xml

index b87d7e955b..36af45927d 100644

```

--- a/man/standard-conf.xml
+++ b/man/standard-conf.xml
@@ -33,13 +33,39 @@
    configuration file.</para>
</refsection>

- <refsection id='conf'>
- <title>Configuration File</title>
-
- <para>Configuration is also read from a single configuration file in
- <filename>/etc/</filename>. This file is read before any of the
- configuration directories, and has the lowest precedence; entries in a file
- in any configuration directory override entries in the single configuration
- file.</para>
+ <refsection id='main-conf'>
+ <title>Configuration Directories and Precedence</title>
+
+ <para>Default configuration is defined during compilation, so a
+ configuration file is only needed when it is necessary to deviate
+ from those defaults. By default the configuration file in
+ <filename>/etc/systemd/</filename> contains commented out entries
+ showing the defaults as a guide to the administrator. This file
+ can be edited to create local overrides.
+ </para>
+
+ <para>When packages need to customize the configuration, they can
+ install configuration snippets in
+ <filename>/usr/lib/systemd/*.conf.d/</filename>. Files in
+ <filename>/etc/</filename> are reserved for the local
+ administrator, who may use this logic to override the
+ configuration files installed by vendor packages. The main
+ configuration file is read before any of the configuration
+ directories, and has the lowest precedence; entries in a file in
+ any configuration directory override entries in the single
+ configuration file. Files in the
+ <filename>logind.conf.d/</filename> configuration subdirectories
+ are sorted by their filename in lexicographic order, regardless of
+ which of the subdirectories they reside in. If multiple files
+ specify the same option, the entry in the file with the
+ lexicographically latest name takes precedence. It is recommended
+ to prefix all filenames in those subdirectories with a two-digit
+ number and a dash, to simplify the ordering of the files.</para>
+
+ <para>To disable a configuration file supplied by the vendor, the
+ recommended way is to place a symlink to
+ <filename>/dev/null</filename> in the configuration directory in
+ <filename>/etc/</filename>, with the same filename as the vendor
+ configuration file.</para>

```

```
</refsection>
</refsection>
diff --git a/man/systemd-sleep.conf.xml b/man/systemd-sleep.conf.xml
index 433f2f83a0..bb17ec8669 100644
--- a/man/systemd-sleep.conf.xml
+++ b/man/systemd-sleep.conf.xml
@@ -112,8 +112,7 @@ along with systemd; If not, see <http://www.gnu.org/licenses/>.
    attempts to suspend or hibernate the machine.</para>
</refsect1>
```

```
- <xi:include href="standard-conf.xml" xpointer="confd" />
- <xi:include href="standard-conf.xml" xpointer="conf" />
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
```

```
<refsect1>
  <title>Options</title>
diff --git a/man/systemd-system.conf.xml b/man/systemd-system.conf.xml
index 7c3f237567..c7bcfaee4d 100644
--- a/man/systemd-system.conf.xml
+++ b/man/systemd-system.conf.xml
@@ -74,8 +74,7 @@
    operations.</para>
</refsect1>
```

```
- <xi:include href="standard-conf.xml" xpointer="confd" />
- <xi:include href="standard-conf.xml" xpointer="conf" />
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
```

```
<refsect1>
  <title>Options</title>
diff --git a/man/timesyncd.conf.xml b/man/timesyncd.conf.xml
index 1127970a18..89a651c662 100644
--- a/man/timesyncd.conf.xml
+++ b/man/timesyncd.conf.xml
@@ -63,8 +63,7 @@
```

```
</refsect1>

- <xi:include href="standard-conf.xml" xpointer="confd" />
- <xi:include href="standard-conf.xml" xpointer="conf" />
+ <xi:include href="standard-conf.xml" xpointer="main-conf" />
```

```
<refsect1>
  <title>Options</title>
diff --git a/src/bootchart/bootchart.conf b/src/bootchart/bootchart.conf
index 2d7cb61217..4f5e50936e 100644
--- a/src/bootchart/bootchart.conf
+++ b/src/bootchart/bootchart.conf
```



```
@@ -5,10 +5,11 @@
# the Free Software Foundation; either version 2.1 of the License, or
# (at your option) any later version.
#
-# You can override the directives in this file by creating files in
-# /etc/systemd/bootchart.conf.d/*.conf.
+# Entries in this file show the compile time defaults.
+# You can change settings by editing this file.
+# Defaults can be restored by simply deleting this file.
#
-# See bootchart.conf(5) for details
+# See bootchart.conf(5) for details.
```

#### [Bootchart]

```
#Samples=500
diff --git a/src/core/system.conf b/src/core/system.conf
index a3727200df..231609033b 100644
--- a/src/core/system.conf
+++ b/src/core/system.conf
@@ -5,10 +5,11 @@
# the Free Software Foundation; either version 2.1 of the License, or
# (at your option) any later version.
#
-# You can override the directives in this file by creating files in
-# /etc/systemd/system.conf.d/*.conf.
+# Entries in this file show the compile time defaults.
+# You can change settings by editing this file.
+# Defaults can be restored by simply deleting this file.
#
-# See systemd-system.conf(5) for details
+# See systemd-system.conf(5) for details.
```

#### [Manager]

```
#LogLevel=info
diff --git a/src/journal/coredump.conf b/src/journal/coredump.conf
index 0fe9fe801a..c2f0643e03 100644
--- a/src/journal/coredump.conf
+++ b/src/journal/coredump.conf
@@ -5,10 +5,11 @@
# the Free Software Foundation; either version 2.1 of the License, or
# (at your option) any later version.
#
-# You can override the directives in this file by creating files in
-# /etc/systemd/coredump.conf.d/*.conf.
+# Entries in this file show the compile time defaults.
+# You can change settings by editing this file.
+# Defaults can be restored by simply deleting this file.
#
```

```
-# See coredump.conf(5) for details
+# See coredump.conf(5) for details.
```

#### [Coredump]

```
#Storage=external
diff --git a/src/journal/journald.conf b/src/journal/journald.conf
index 29bdf8f183..47eefe91c1 100644
--- a/src/journal/journald.conf
+++ b/src/journal/journald.conf
@@ -5,10 +5,11 @@
# the Free Software Foundation; either version 2.1 of the License, or
# (at your option) any later version.
#
-# You can override the directives in this file by creating files in
-# /etc/systemd/journald.conf.d/*.conf.
+# Entries in this file show the compile time defaults.
+# You can change settings by editing this file.
+# Defaults can be restored by simply deleting this file.
#
-# See journald.conf(5) for details
+# See journald.conf(5) for details.
```

#### [Journal]

```
#Storage=auto
diff --git a/src/login/logind.conf b/src/login/logind.conf
index 6b1943a2d1..834c4c2ebf 100644
--- a/src/login/logind.conf
+++ b/src/login/logind.conf
@@ -5,10 +5,11 @@
# the Free Software Foundation; either version 2.1 of the License, or
# (at your option) any later version.
#
-# You can override the directives in this file by creating files in
-# /etc/systemd/logind.conf.d/*.conf.
+# Entries in this file show the compile time defaults.
+# You can change settings by editing this file.
+# Defaults can be restored by simply deleting this file.
#
-# See logind.conf(5) for details
+# See logind.conf(5) for details.
```

#### [Login]

```
#NAutoVTs=6
diff --git a/src/resolve/resolved.conf.in b/src/resolve/resolved.conf.in
index e5a19ee474..3eb19e42b7 100644
--- a/src/resolve/resolved.conf.in
+++ b/src/resolve/resolved.conf.in
@@ -5,8 +5,9 @@
```

```
# the Free Software Foundation; either version 2.1 of the License, or
# (at your option) any later version.
#
-# You can override the directives in this file by creating files in
-# /etc/systemd/resolved.conf.d/*.conf.
+# Entries in this file show the compile time defaults.
+# You can change settings by editing this file.
+# Defaults can be restored by simply deleting this file.
#
# See resolved.conf(5) for details
```

```
diff --git a/src/timesync/timesyncd.conf.in b/src/timesync/timesyncd.conf.in
index fc3c6c49cf..b6a2ada273 100644
```

```
--- a/src/timesync/timesyncd.conf.in
+++ b/src/timesync/timesyncd.conf.in
@@ -5,10 +5,11 @@
# the Free Software Foundation; either version 2.1 of the License, or
# (at your option) any later version.
#
-# You can override the directives in this file by creating files in
-# /etc/systemd/timesyncd.conf.d/*.conf.
+# Entries in this file show the compile time defaults.
+# You can change settings by editing this file.
+# Defaults can be restored by simply deleting this file.
#
-# See timesyncd.conf(5) for details
+# See timesyncd.conf(5) for details.
```

```
[Time]
#NTP=
```

Found in path(s):

```
* /opt/cola/permits/1168560137_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm/download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0067-Do-not-advertise-.d-snippets-over-main-config-file.patch
```

No license file was found, but licenses were detected in source scan.

```
From 5e6503d0d2efb5cbff945df42423640ffb138073 Mon Sep 17 00:00:00 2001
From: Jan Engelhardt <jengelh@inai.de>
Date: Tue, 24 Feb 2015 17:49:02 +0100
Subject: [PATCH] vconsole: match on vtcon events, not fbcon ones
```

I observe that upon loading of framebuffer drivers, I do not get the desired system font, but the kernel-level defaults (usually lib/fonts/font\_8x16.c, but your mileage may vary depending on kernel config and boot options).

The fbcon driver may be loaded at a time way before the first

framebuffer device is active, such that the vconsole setup helper runs too early.

The existing rule is non-fitting. The going live of the fbcon kernel component does not indicate the proper time at which to load the visuals, which really ought to be done when a new vtcon object comes into existence. (The font table is a per-vtcon property.)

(cherry picked from commit a52750d1483ff139df33149afc0b675531e9cd79)

---

src/vconsole/90-vconsole.rules.in | 7 +++----

1 file changed, 3 insertions(+), 4 deletions(-)

diff --git a/src/vconsole/90-vconsole.rules.in b/src/vconsole/90-vconsole.rules.in

index 062009640c..35b9ad5151 100644

--- a/src/vconsole/90-vconsole.rules.in

+++ b/src/vconsole/90-vconsole.rules.in

@@ -5,7 +5,6 @@

# the Free Software Foundation; either version 2.1 of the License, or

# (at your option) any later version.

## Kernel resets vconsole state when changing console drivers so run

## systemd-vconsole-setup when fbcon loads

-

-ACTION=="add", SUBSYSTEM=="graphics", KERNEL=="fbcon", RUN+= "@rootlibexecdir@/systemd-vconsole-setup"

## Each vtcon keeps its own state of fonts.

##

+ACTION=="add", SUBSYSTEM=="vtconsole", KERNEL=="vtcon\*", RUN+= "@rootlibexecdir@/systemd-vconsole-setup"

Found in path(s):

\* /opt/cola/permits/1168560137\_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm/download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0078-vconsole-match-on-vtcon-events-not-fbcon-ones.patch

No license file was found, but licenses were detected in source scan.

From 4a1723115afea68db4cbe4f7f2d97c4f5663403d Mon Sep 17 00:00:00 2001

From: Lukas Nykryn <lnykryn@redhat.com>

Date: Thu, 6 Aug 2015 11:30:19 +0200

Subject: [PATCH] Revert "journal: move /dev/log socket to /run"

This reverts commit 03ee5c38cb0da193dd08733fb4c0c2809cee6a99.

rhel-only

Resolves: #1249968

---

```

Makefile-man.am          | 5 ----
Makefile.am              | 7 +++--
man/systemd-journald.service.xml | 2 --
src/core/namespace.c     | 3 ++-
src/journal/journald-server.c | 3 +-
src/journal/journald-syslog.c | 2 +-
units/systemd-journald-dev-log.socket | 32 -----
units/systemd-journald.service.in | 4 +++-
units/systemd-journald.socket | 2 +-
9 files changed, 9 insertions(+), 51 deletions(-)
delete mode 100644 units/systemd-journald-dev-log.socket

```

```

diff --git a/Makefile-man.am b/Makefile-man.am
index 084df754a2..497be6612c 100644
--- a/Makefile-man.am
+++ b/Makefile-man.am
@@ -214,7 +214,6 @@ MANPAGES_ALIAS += \
 man/systemd-hybrid-sleep.service.8 \
 man/systemd-initctl.8 \
 man/systemd-initctl.socket.8 \
-man/systemd-journald-dev-log.socket.8 \
 man/systemd-journald.8 \
 man/systemd-journald.socket.8 \
 man/systemd-kexec.service.8 \
@@ -326,7 +325,6 @@ man/systemd-hibernate.service.8: man/systemd-suspend.service.8
 man/systemd-hybrid-sleep.service.8: man/systemd-suspend.service.8
 man/systemd-initctl.8: man/systemd-initctl.service.8
 man/systemd-initctl.socket.8: man/systemd-initctl.service.8
-man/systemd-journald-dev-log.socket.8: man/systemd-journald.service.8
 man/systemd-journald.8: man/systemd-journald.service.8
 man/systemd-journald.socket.8: man/systemd-journald.service.8
 man/systemd-kexec.service.8: man/systemd-halt.service.8
@@ -616,9 +614,6 @@ man/systemd-initctl.html: man/systemd-initctl.service.html
 man/systemd-initctl.socket.html: man/systemd-initctl.service.html
 $(html-alias)

-man/systemd-journald-dev-log.socket.html: man/systemd-journald.service.html
- $(html-alias)
-
 man/systemd-journald.html: man/systemd-journald.service.html
 $(html-alias)

```

```

diff --git a/Makefile.am b/Makefile.am
index a81d3c131e..58bcc2c429 100644
--- a/Makefile.am
+++ b/Makefile.am
@@ -4518,8 +4518,7 @@ bin_PROGRAMS += \
 systemd-cat

```

```

dist_systemunit_DATA += \
- units/systemd-journald.socket \
- units/systemd-journald-dev-log.socket
+ units/systemd-journald.socket

nodist_systemunit_DATA += \
units/systemd-journald.service \
@@ -4538,9 +4537,7 @@ dist_catalog_DATA = \
catalog/systemd.catalog

SOCKETS_TARGET_WANTS += \
- systemd-journald.socket \
- systemd-journald-dev-log.socket
-
+ systemd-journald.socket
SYSINIT_TARGET_WANTS += \
systemd-journald.service \
systemd-journal-flush.service \
diff --git a/man/systemd-journald.service.xml b/man/systemd-journald.service.xml
index 8280d6c874..fe99ce9bc6 100644
--- a/man/systemd-journald.service.xml
+++ b/man/systemd-journald.service.xml
@@ -45,7 +45,6 @@
<refnamediv>
  <refname>systemd-journald.service</refname>
  <refname>systemd-journald.socket</refname>
- <refname>systemd-journald-dev-log.socket</refname>
  <refname>systemd-journald</refname>
  <refpurpose>Journal service</refpurpose>
</refnamediv>
@@ -53,7 +52,6 @@
<refsynopsisdiv>
  <para><filename>systemd-journald.service</filename></para>
  <para><filename>systemd-journald.socket</filename></para>
- <para><filename>systemd-journald-dev-log.socket</filename></para>
  <para><filename>/usr/lib/systemd/systemd-journald</filename></para>
</refsynopsisdiv>

diff --git a/src/core/namespace.c b/src/core/namespace.c
index d4f1c86211..ebd5fb3347 100644
--- a/src/core/namespace.c
+++ b/src/core/namespace.c
@@ -187,7 +187,8 @@ static int mount_dev(BindMount *m) {
    mount("/dev/hugepages", devhugepages, NULL, MS_BIND, NULL);

    devlog = strjoina(temporary_mount, "/dev/log");
-    symlink("/run/systemd/journal/dev-log", devlog);

```

```

+ (void)touch(devlog);
+ mount("/dev/log", devlog, NULL, MS_BIND, NULL);

    NULSTR_FOREACH(d, devnodes) {
        _cleanup_free_ char *dn = NULL;
diff --git a/src/journal/journald-server.c b/src/journal/journald-server.c
index d692c06ef7..fb7aae3096 100644
--- a/src/journal/journald-server.c
+++ b/src/journal/journald-server.c
@@ -1531,8 +1531,7 @@ int server_init(Server *s) {

    s->stdout_fd = fd;

-    } else if (sd_is_socket_unix(fd, SOCK_DGRAM, -1, "/dev/log", 0) > 0 ||
-    sd_is_socket_unix(fd, SOCK_DGRAM, -1, "/run/systemd/journal/dev-log", 0) > 0) {
+    } else if (sd_is_socket_unix(fd, SOCK_DGRAM, -1, "/dev/log", 0) > 0) {

        if (s->syslog_fd >= 0) {
            log_error("Too many /dev/log sockets passed.");
diff --git a/src/journal/journald-syslog.c b/src/journal/journald-syslog.c
index ba80941d7b..4e118aabc0 100644
--- a/src/journal/journald-syslog.c
+++ b/src/journal/journald-syslog.c
@@ -384,7 +384,7 @@ int server_open_syslog_socket(Server *s) {
    if (s->syslog_fd < 0) {
        static const union sockaddr_union sa = {
            .un.sun_family = AF_UNIX,
-            .un.sun_path = "/run/systemd/journal/dev-log",
+            .un.sun_path = "/dev/log",
        };

        s->syslog_fd = socket(AF_UNIX, SOCK_DGRAM|SOCK_CLOEXEC|SOCK_NONBLOCK, 0);
diff --git a/units/systemd-journald-dev-log.socket b/units/systemd-journald-dev-log.socket
deleted file mode 100644
index ffd44bb507..0000000000
--- a/units/systemd-journald-dev-log.socket
+++ /dev/null
@@ -1,32 +0,0 @@
-# This file is part of systemd.
-#
-# systemd is free software; you can redistribute it and/or modify it
-# under the terms of the GNU Lesser General Public License as published by
-# the Free Software Foundation; either version 2.1 of the License, or
-# (at your option) any later version.
-
-[Unit]
-Description=Journal Socket (/dev/log)
-Documentation=man:systemd-journald.service(8) man:journal.conf(5)

```

```

-DefaultDependencies=no
-Before=sockets.target
-
-# Mount and swap units need this. If this socket unit is removed by an
-# isolate request the mount and swap units would be removed too,
-# hence let's exclude this from isolate requests.
-IgnoreOnIsolate=yes
-
-[Socket]
-Service=systemd-journald.service
-ListenDatagram=/run/systemd/journal/dev-log
-Symlinks=/dev/log
-SocketMode=0666
-PassCredentials=yes
-PassSecurity=yes
-
-# Increase both the send and receive buffer, so that things don't
-# block early. Note that journald internally uses the this socket both
-# for receiving syslog messages, and for forwarding them to any other
-# syslog, hence we bump both values.
-ReceiveBuffer=8M
-SendBuffer=8M
diff --git a/units/systemd-journald.service.in b/units/systemd-journald.service.in
index 1bcc290ec4..9d44622837 100644
--- a/units/systemd-journald.service.in
+++ b/units/systemd-journald.service.in
@@ -10,12 +10,12 @@ Description=Journal Service
Documentation=man:systemd-journald.service(8) man:journald.conf(5)
DefaultDependencies=no
Requires=systemd-journald.socket
-After=systemd-journald.socket systemd-journald-dev-log.socket syslog.socket
+After=systemd-journald.socket syslog.socket
Before=sysinit.target

[Service]
Type=notify
-Sockets=systemd-journald.socket systemd-journald-dev-log.socket
+Sockets=systemd-journald.socket
ExecStart=@rootlibexecdir@/systemd-journald
Restart=always
RestartSec=0
diff --git a/units/systemd-journald.socket b/units/systemd-journald.socket
index 71737014ca..fbeb10baae 100644
--- a/units/systemd-journald.socket
+++ b/units/systemd-journald.socket
@@ -19,8 +19,8 @@ IgnoreOnIsolate=yes
[Socket]
ListenStream=/run/systemd/journal/stdout

```



ListenDatagram=/run/systemd/journal/socket  
+ListenDatagram=/dev/log  
SocketMode=0666  
PassCredentials=yes  
PassSecurity=yes  
ReceiveBuffer=8M  
-Service=systemd-journald.service

Found in path(s):

\* /opt/cola/permits/1168560137\_1661579735.3036313/0/systemd-219-78-el7-src-rpm-download-zip/systemd-219-78.el7.src.rpm/download/systemd-219-78.el7.src.rpm-cosi-expand-archive-AelyEoeN/0238-Revert-journald-move-dev-log-socket-to-run.patch

# 1.448 perl-uri 1.73-3.el8

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```
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```

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```
Yoyodyne, Inc., hereby disclaims all copyright interest in the
program `Gnomovision' (a program to direct compilers to make passes
at assemblers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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## 1.449 procps 3.3.15-6.el8

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```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

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```
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```

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If distribution of object code is made by offering access to copy

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<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

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## 1.450 libyami 0.2.5

### 1.450.1 Available under license :

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# 1.451 gpgme 1.13.1-11.el8

## 1.451.1 Available under license :

```
hkp4py
requests
\input texinfo @c -*- texinfo -*-
@c %**start of header
@setfilename what-was-new.info
@settitle What Was New in the GPGME Python Bindings and Documentation
@documentencoding utf-8
@documentlanguage en
@c %**end of header

@finalout
@titlepage
@title What Was New in the GPGME Python Bindings and Documentation
@author Ben McGinnes
@end titlepage

@contents

@ifnottex
@node Top
@top What Was New in the GPGME Python Bindings and Documentation
@end ifnottex

@menu
* What Was New::

@detailmenu
--- The Detailed Node Listing ---

What Was New

* What Was New in GPGME 1120::

What Was New in GPGME 1120

* New in GPGME 1120::

@end detailmenu
@end menu

@node What Was New
@chapter What Was New

@multitable {aaaaaaaaaaaaaaaa} {aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa}
```

@item Version:  
@tab 0.0.1  
@item GPGME Version:  
@tab 1.13.0  
@item Author:  
@tab Ben McGinnes <ben@gnupg.org>  
@item Author GPG Key:  
@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D  
@item Language:  
@tab Australian English, British English  
@item xml:lang:  
@tab en-AU, en-GB, en  
@end multitable

The following are all the past `@emph{What's New}` sections for the Python Bindings HOWTO and other documentation.

@menu  
\* What Was New in GPGME 1120::  
@end menu

@node What Was New in GPGME 1120  
@section What Was New in GPGME 1120

The most obviously new point for those reading this guide is this section on other new things, but that's hardly important. Not given all the other things which spurred the need for adding this section and its subsections.

@menu  
\* New in GPGME 1120::  
@end menu

@node New in GPGME 1120  
@subsection New in GPGME 1120

There have been quite a number of additions to GPGME and the Python bindings to it since the last release of GPGME with versions 1.11.0 and 1.11.1 in April, 2018.

The bullet points of new additions are:

@itemize  
@item  
an expanded section on `@uref{gpgme-python-howto#installation, installing}` and `@uref{gpgme-python-howto#snafu, troubleshooting}` the Python bindings.  
@item

The release of Python 3.7.0; which appears to be working just fine with our bindings, in spite of intermittent reports of problems for many other Python projects with that new release.

@item

Python 3.7 has been moved to the head of the specified python versions list in the build process.

@item

In order to fix some other issues, there are certain underlying functions which are more exposed through the @uref{gpgme-python-howto#howto-get-context, gpg.Context()}, but ongoing documentation ought to clarify that or otherwise provide the best means of using the bindings. Some additions to @samp{gpg.core} and the @samp{Context()}, however, were intended (see below).

@item

Continuing work in identifying and confirming the cause of oft-reported @uref{gpgme-python-howto#snafu-runtime-not-funtime, problems installing the Python bindings on Windows}.

@item

GSOC: Google's Surreptitiously Ordered Conscriptio@dots{ } erm @dots{ } oh, right; Google's Summer of Code. Though there were two hopeful candidates this year; only one ended up involved with the GnuPG Project directly, the other concentrated on an unrelated third party project with closer ties to one of the GNU/Linux distributions than to the GnuPG Project. Thus the Python bindings benefited from GSOC participant Jacob Adams, who added the key@math{ \_import } function; building on prior work by Tobias Mueller.

@item

Several new methods functions were added to the gpg.Context(), including: @uref{gpgme-python-howto#howto-import-key, key@math{ \_import }}, @uref{gpgme-python-howto#howto-export-key, key@math{ \_export }}, @uref{gpgme-python-howto#howto-export-public-key, key@math{ \_export }@math{ \_minimal } } and @uref{gpgme-python-howto#howto-export-secret-key, key@math{ \_export }@math{ \_secret } }.

@item

Importing and exporting examples include versions integrated with Marcel Fest's recently released @uref{https://github.com/Selfnet/hkp4py, HKP for Python} module. Some @uref{gpgme-python-howto#hkp4py, additional notes on this module} are included at the end of the HOWTO.

@item

Instructions for dealing with semi-walled garden implementations like ProtonMail are also included. This is intended to make things a little easier when communicating with users of ProtonMail's services and should not be construed as an endorsement of said service. The GnuPG Project neither favours, nor disfavors ProtonMail and the majority of this deals with interacting with the ProtonMail keyservers.

@item

Semi-formalised the location where @uref{gpgme-python-howto#draft-editions, draft versions} of this HOWTO may periodically be accessible. This is both for the reference of others and testing the publishing of the document itself. Renamed

this file at around the same time.

@item

The Texinfo documentation build configuration has been replicated from the parent project in order to make to maintain consistency with that project (and actually ship with each release).

@item

a reStructuredText (@samp{.rst}) version is also generated for Python developers more used to and comfortable with that format as it is the standard Python documentation format and Python developers may wish to use it with Sphinx. Please note that there has been no testing of the reStructuredText version with Sphinx at all. The reST file was generated by the simple expedient of using @uref{https://pandoc.org/, Pandoc}.

@item

Added a new section for @uref{gpgme-python-howto#advanced-use, advanced or experimental use}.

@item

Began the advanced use cases with @uref{gpgme-python-howto#cython, a section} on using the module with @uref{https://cython.org/, Cython}.

@item

Added a number of new scripts to the @samp{example/howto/} directory; some of which may be in advance of their planned sections of the HOWTO (and some are just there because it seemed like a good idea at the time).

@item

Cleaned up a lot of things under the hood.

@end itemize

@bye

This is gpgme.info, produced by makeinfo version 6.3 from gpgme.texi.

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INFO-DIR-SECTION GNU Libraries

START-INFO-DIR-ENTRY

\* GPGME: (gpgme). Adding support for cryptography to your program.

END-INFO-DIR-ENTRY

This file documents the GPGME library.

This is Edition 1.12.1-beta100, last updated 3 December 2018, of The GnuPG Made Easy Reference Manual, for Version 1.12.1-beta100.

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File: gpgme.info, Node: Top, Next: Introduction, Up: (dir)

## Main Menu

\*\*\*\*\*

This is Edition 1.12.1-beta100, last updated 3 December 2018, of The GnuPG Made Easy Reference Manual, for Version 1.12.1-beta100 of the GPGME library.

### \* Menu:

- \* Introduction:: How to use this manual.
- \* Preparation:: What you should do before using the library.
- \* Protocols and Engines:: Supported crypto protocols.
- \* Algorithms:: Supported algorithms.
- \* Error Handling:: Error numbers and their meanings.
- \* Exchanging Data:: Passing data to and from GPGME.
- \* Contexts:: Handling GPGME contexts.

### Appendices

- \* UI Server Protocol:: The GnuPG UI Server Protocol.
- \* Debugging:: How to solve problems.
- \* Deprecated Functions:: Documentation of deprecated functions.
  
- \* Library Copying:: The GNU Lesser General Public License says how you can copy and share GnuPG Made Easy.
- \* Copying:: The GNU General Public License says how you can copy and share this manual.

### Indices

- \* Concept Index:: Index of concepts and programs.
- \* Function and Data Index:: Index of functions, variables and data types.

## The Detailed Node Listing

### Introduction

- \* Getting Started:: Purpose of the manual, and how to use it.
- \* Features:: Reasons to install and use GPGME.
- \* Overview:: Basic architecture of the GPGME library.

### Preparation

- \* Header:: What header file you need to include.
- \* Building the Source:: Compiler options to be used.
- \* Largefile Support (LFS):: How to use GPGME with LFS.
- \* Using Automake:: Compiler options to be used the easy way.
- \* Using Libtool:: Avoiding compiler options entirely.
- \* Library Version Check:: Getting and verifying the library version.
- \* Signal Handling:: How GPGME affects signal handling.
- \* Multi-Threading:: How GPGME can be used in an MT environment.

### Protocols and Engines

- \* Engine Version Check:: Verifying the engine version.
- \* Engine Information:: Obtaining more information about the engines.
- \* Engine Configuration:: Changing the engine configuration.
- \* OpenPGP:: Support for the OpenPGP protocol.
- \* Cryptographic Message Syntax:: Support for the CMS.

### Algorithms

- \* Public Key Algorithms:: A list of all public key algorithms.
- \* Hash Algorithms:: A list of all hash algorithms.

### Error Handling

- \* Error Values:: The error value and what it means.
- \* Error Codes:: A list of important error codes.
- \* Error Sources:: A list of important error sources.
- \* Error Strings:: How to get a descriptive string from a value.

### Exchanging Data

- \* Creating Data Buffers:: Creating new data buffers.
- \* Destroying Data Buffers:: Releasing data buffers.
- \* Manipulating Data Buffers:: Operations on data buffers.



## Creating Data Buffers

- \* Memory Based Data Buffers:: Creating memory based data buffers.
- \* File Based Data Buffers:: Creating file based data buffers.
- \* Callback Based Data Buffers:: Creating callback based data buffers.

## Manipulating Data Buffers

- \* Data Buffer I/O Operations:: I/O operations on data buffers.
- \* Data Buffer Meta-Data:: Meta-data manipulation of data buffers.
- \* Data Buffer Convenience:: Convenience function for data buffers.

## Contexts

- \* Creating Contexts:: Creating new GPGME contexts.
- \* Destroying Contexts:: Releasing GPGME contexts.
- \* Result Management:: Managing the result of crypto operations.
- \* Context Attributes:: Setting properties of a context.
- \* Key Management:: Managing keys with GPGME.
- \* Trust Item Management:: Managing trust items with GPGME.
- \* Crypto Operations:: Using a context for cryptography.
- \* Miscellaneous:: Miscellaneous operations.
- \* Run Control:: Controlling how operations are run.

## Context Attributes

- \* Protocol Selection:: Selecting the protocol used by a context.
- \* Crypto Engine:: Configuring the crypto engine.
- \* Setting the Sender:: How to tell the engine the sender.
- \* ASCII Armor:: Requesting ASCII armored output.
- \* Text Mode:: Choosing canonical text mode.
- \* Offline Mode:: Choosing offline mode.
- \* Included Certificates:: Including a number of certificates.
- \* Key Listing Mode:: Selecting key listing mode.
- \* Passphrase Callback:: Getting the passphrase from the user.
- \* Progress Meter Callback:: Being informed about the progress.
- \* Status Message Callback:: Status messages received from gpg.
- \* Locale:: Setting the locale of a context.

## Key Management

- \* Key objects:: Description of the key structures.
- \* Listing Keys:: Browsing the list of available keys.
- \* Information About Keys:: Requesting detailed information about keys.
- \* Manipulating Keys:: Operations on keys.
- \* Generating Keys:: Creating new key pairs.
- \* Signing Keys:: Adding key signatures to public keys.

- \* Exporting Keys:: Retrieving key data from the key ring.
- \* Importing Keys:: Adding keys to the key ring.
- \* Deleting Keys:: Removing keys from the key ring.
- \* Changing Passphrases:: Change the passphrase of a key.
- \* Changing TOFU Data:: Changing data pertaining to TOFU.
- \* Advanced Key Editing:: Advanced key edit operation.

### Trust Item Management

- \* Listing Trust Items:: Browsing the list of available trust items.
- \* Manipulating Trust Items:: Operations on trust items.

### Crypto Operations

- \* Decrypt:: Decrypting a ciphertext.
- \* Verify:: Verifying a signature.
- \* Decrypt and Verify:: Decrypting a signed ciphertext.
- \* Sign:: Creating a signature.
- \* Encrypt:: Encrypting a plaintext.

### Sign

- \* Selecting Signers:: How to choose the keys to sign with.
- \* Creating a Signature:: How to create a signature.
- \* Signature Notation Data:: How to add notation data to a signature.

### Encrypt

- \* Encrypting a Plaintext:: How to encrypt a plaintext.

### Miscellaneous

- \* Running other Programs:: Running other Programs.
- \* Using the Assuan protocol:: Using the Assuan protocol.
- \* Checking for updates:: How to check for software updates.

### Run Control

- \* Waiting For Completion:: Waiting until an operation is completed.
- \* Using External Event Loops:: Advanced control over what happens when.
- \* Cancellation:: How to end pending operations prematurely.

### Using External Event Loops

- \* I/O Callback Interface:: How I/O callbacks are registered.
- \* Registering I/O Callbacks:: How to use I/O callbacks for a context.
- \* I/O Callback Example:: An example how to use I/O callbacks.
- \* I/O Callback Example GTK+:: How to integrate GPGME in GTK+.

\* I/O Callback Example GDK:: How to integrate GPGME in GDK.

\* I/O Callback Example Qt:: How to integrate GPGME in Qt.

File: gpgme.info, Node: Introduction, Next: Preparation, Prev: Top, Up: Top

## 1 Introduction

\*\*\*\*\*

GnuPG Made Easy (GPGME) is a C language library that allows to add support for cryptography to a program. It is designed to make access to public key crypto engines like GnuPG or GpgSM easier for applications. GPGME provides a high-level crypto API for encryption, decryption, signing, signature verification and key management.

GPGME uses GnuPG and GpgSM as its backends to support OpenPGP and the Cryptographic Message Syntax (CMS).

\* Menu:

\* Getting Started:: Purpose of the manual, and how to use it.

\* Features:: Reasons to install and use GPGME.

\* Overview:: Basic architecture of the GPGME library.

File: gpgme.info, Node: Getting Started, Next: Features, Up: Introduction

### 1.1 Getting Started

=====

This manual documents the GPGME library programming interface. All functions and data types provided by the library are explained.

The reader is assumed to possess basic knowledge about cryptography in general, and public key cryptography in particular. The underlying cryptographic engines that are used by the library are not explained, but where necessary, special features or requirements by an engine are mentioned as far as they are relevant to GPGME or its users.

This manual can be used in several ways. If read from the beginning to the end, it gives a good introduction into the library and how it can be used in an application. Forward references are included where necessary. Later on, the manual can be used as a reference manual to get just the information needed about any particular interface of the library. Experienced programmers might want to start looking at the examples at the end of the manual, and then only read up those parts of the interface which are unclear.

The documentation for the language bindings is currently not included in this manual. Those languages bindings follow the general programming model of GPGME but may provide some extra high level abstraction on top of the GPGME style API. For now please see the README files in the lang/ directory of the source distribution.

File: gpgme.info, Node: Features, Next: Overview, Prev: Getting Started, Up: Introduction

## 1.2 Features

=====

GPGME has a couple of advantages over other libraries doing a similar job, and over implementing support for GnuPG or other crypto engines into your application directly.

its free software

Anybody can use, modify, and redistribute it under the terms of the GNU Lesser General Public License (\*note Library Copying:).

its flexible

GPGME provides transparent support for several cryptographic protocols by different engines. Currently, GPGME supports the OpenPGP protocol using GnuPG as the backend, and the Cryptographic Message Syntax using GpgSM as the backend.

its easy

GPGME hides the differences between the protocols and engines from the programmer behind an easy-to-use interface. This way the programmer can focus on the other parts of the program, and still integrate strong cryptography in his application. Once support for GPGME has been added to a program, it is easy to add support for other crypto protocols once GPGME backends provide them.

its language friendly

GPGME comes with languages bindings for several common programming languages: Common Lisp, C++, Python 2, and Python 3.

File: gpgme.info, Node: Overview, Prev: Features, Up: Introduction

## 1.3 Overview

=====

GPGME provides a data abstraction that is used to pass data to the crypto engine, and receive returned data from it. Data can be read from memory or from files, but it can also be provided by a callback

function.

The actual cryptographic operations are always set within a context. A context provides configuration parameters that define the behaviour of all operations performed within it. Only one operation per context is allowed at any time, but when one operation is finished, you can run the next operation in the same context. There can be more than one context, and all can run different operations at the same time.

Furthermore, GPGME has rich key management facilities including listing keys, querying their attributes, generating, importing, exporting and deleting keys, and acquiring information about the trust path.

With some precautions, GPGME can be used in a multi-threaded environment, although it is not completely thread safe and thus needs the support of the application.

File: gpgme.info, Node: Preparation, Next: Protocols and Engines, Prev: Introduction, Up: Top

## 2 Preparation

\*\*\*\*\*

To use GPGME, you have to perform some changes to your sources and the build system. The necessary changes are small and explained in the following sections. At the end of this chapter, it is described how the library is initialized, and how the requirements of the library are verified.

\* Menu:

- \* Header::                   What header file you need to include.
- \* Building the Source::     Compiler options to be used.
- \* Largefile Support (LFS)::   How to use GPGME with LFS.
- \* Using Automake::         Compiler options to be used the easy way.
- \* Using Libtool::         Avoiding compiler options entirely.
- \* Library Version Check::   Getting and verifying the library version.
- \* Signal Handling::         How GPGME affects signal handling.
- \* Multi-Threading::         How GPGME can be used in an MT environment.

File: gpgme.info, Node: Header, Next: Building the Source, Up: Preparation

### 2.1 Header

=====

All interfaces (data types and functions) of the library are defined in

the header file `gpgme.h`. You must include this in all programs using the library, either directly or through some other header file, like this:

```
#include <gpgme.h>
```

The name space of GPGME is `gpgme_*` for function names and data types and `GPGME_*` for other symbols. Symbols internal to GPGME take the form `_gpgme_*` and `_GPGME_*`.

Because GPGME makes use of the GPG Error library, using GPGME will also use the `GPG_ERR_*` name space directly, and the `gpg_err*`, `gpg_str*`, and `gpgmt_*` name space indirectly.

File: `gpgme.info`, Node: Building the Source, Next: Largefile Support (LFS), Prev: Header, Up: Preparation

## 2.2 Building the Source

=====

If you want to compile a source file including the `gpgme.h` header file, you must make sure that the compiler can find it in the directory hierarchy. This is accomplished by adding the path to the directory in which the header file is located to the compilers include file search path (via the `-I` option).

However, the path to the include file is determined at the time the source is configured. To solve this problem, `gpgme` ships with a small helper program `gpgme-config` that knows about the path to the include file and other configuration options. The options that need to be added to the compiler invocation at compile time are output by the `--cflags` option to `gpgme-config`. The following example shows how it can be used at the command line:

```
gcc -c foo.c `gpgme-config --cflags`
```

Adding the output of `gpgme-config --cflags` to the compiler command line will ensure that the compiler can find the GPGME header file.

A similar problem occurs when linking the program with the library. Again, the compiler has to find the library files. For this to work, the path to the library files has to be added to the library search path (via the `-L` option). For this, the option `--libs` to `gpgme-config` can be used. For convenience, this option also outputs all other options that are required to link the program with GPGME (in particular, the `-lgpgme` option). The example shows how to link `foo.o` with the GPGME library to a program `foo`.

```
gcc -o foo foo.o `gpgme-config --libs`
```

Of course you can also combine both examples to a single command by specifying both options to `gpgme-config`:

```
gcc -o foo foo.c `gpgme-config --cflags --libs`
```

If you need to detect the installed language bindings you can use list them using:

```
gpgme-config --print-lang
```

or test for the availability using

```
gpgme-config --have-lang=python && echo 'Bindings for Pythons available'
```

File: `gpgme.info`, Node: Largefile Support (LFS), Next: Using Automake, Prev: Building the Source, Up: Preparation

### 2.3 Largefile Support (LFS)

=====

GPGME is compiled with largefile support by default, if it is available on the system. This means that GPGME supports files larger than two gigabyte in size, if the underlying operating system can. On some systems, largefile support is already the default. On such systems, nothing special is required. However, some systems provide only support for files up to two gigabyte in size by default. Support for larger file sizes has to be specifically enabled.

To make a difficult situation even more complex, such systems provide two different types of largefile support. You can either get all relevant functions replaced with alternatives that are largefile capable, or you can get new functions and data types for largefile support added. Those new functions have the same name as their smallfile counterparts, but with a suffix of 64.

An example: The data type `off_t` is 32 bit wide on GNU/Linux PC systems. To address offsets in large files, you can either enable largefile support add-on. Then a new data type `off64_t` is provided, which is 64 bit wide. Or you can replace the existing `off_t` data type with its 64 bit wide counterpart. All occurrences of `off_t` are then automatically replaced.

As if matters were not complex enough, there are also two different types of file descriptors in such systems. This is important because if file descriptors are exchanged between programs that use a different

maximum file size, certain errors must be produced on some file descriptors to prevent subtle overflow bugs from occurring.

As you can see, supporting two different maximum file sizes at the same time is not at all an easy task. However, the maximum file size does matter for GPGME, because some data types it uses in its interfaces are affected by that. For example, the `off_t` data type is used in the `gpgme_data_seek` function, to match its POSIX counterpart. This affects the call-frame of the function, and thus the ABI of the library. Furthermore, file descriptors can be exchanged between GPGME and the application.

For you as the user of the library, this means that your program must be compiled in the same file size mode as the library. Luckily, there is absolutely no valid reason for new programs to not enable largefile support by default and just use that. The compatibility modes (small file sizes or dual mode) can be considered an historic artefact, only useful to allow for a transitional period.

On POSIX platforms GPGME is compiled using largefile support by default. This means that your application must do the same, at least as far as it is relevant for using the `gpgme.h` header file. All types in this header files refer to their largefile counterparts, if they are different from any default types on the system.

On 32 and 64 bit Windows platforms `off_t` is declared as 32 bit signed integer. There is no specific support for LFS in the C library. The recommendation from Microsoft is to use the native interface (`CreateFile` et al.) for large files. Released binary versions of GPGME (`libgpgme-11.dll`) have always been build with a 32 bit `off_t`. To avoid an ABI break we stick to this convention for 32 bit Windows by using `long` there. GPGME versions for 64 bit Windows have never been released and thus we are able to use `int64_t` instead of `off_t` there. For easier migration the typedef `gpgme_off_t` has been defined. The reason we cannot use `off_t` directly is that some toolchains (e.g. `mingw64`) introduce a POSIX compatible hack for `off_t`. Some widely used toolkits make use of this hack and in turn GPGME would need to use it also. However, this would introduce an ABI break and existing software making use of `libgpgme` might suffer from a severe break. Thus with version 1.4.2 we redefined all functions using `off_t` to use `gpgme_off_t` which is defined as explained above. This way we keep the ABI well defined and independent of any toolchain hacks. The bottom line is that LFS support in GPGME is only available on 64 bit versions of Windows.

On POSIX platforms you can enable largefile support, if it is different from the default on the system the application is compiled on, by using the Autoconf macro `AC_SYS_LARGEFILE`. If you do this, then



you dont need to worry about anything else: It will just work. In this case you might also want to use AC\_FUNC\_FSEEKO to take advantage of some new interfaces, and AC\_TYPE\_OFF\_T (just in case).

If you do not use Autoconf, you can define the preprocessor symbol `_FILE_OFFSET_BITS` to 64 before including any header files, for example by specifying the option `-D_FILE_OFFSET_BITS=64` on the compiler command line. You will also want to define the preprocessor symbol `LARGEFILE_SOURCE` to 1 in this case, to take advantage of some new interfaces.

If you do not want to do either of the above, you probably know enough about the issue to invent your own solution. Just keep in mind that the GPGME header file expects that largefile support is enabled, if it is available. In particular, we do not support dual mode (`_LARGEFILE64_SOURCE`).

File: gpgme.info, Node: Using Automake, Next: Using Libtool, Prev: Largefile Support (LFS), Up: Preparation

## 2.4 Using Automake

=====

It is much easier if you use GNU Automake instead of writing your own Makefiles. If you do that you do not have to worry about finding and invoking the gpgme-config script at all. GPGME provides an extension to Automake that does all the work for you.

```
-- Macro: AM_PATH_GPGME ([MINIMUM-VERSION], [ACTION-IF-FOUND],  
    [ACTION-IF-NOT-FOUND])  
-- Macro: AM_PATH_GPGME_PTH ([MINIMUM-VERSION], [ACTION-IF-FOUND],  
    [ACTION-IF-NOT-FOUND])  
-- Macro: AM_PATH_GPGME_PTHREAD ([MINIMUM-VERSION], [ACTION-IF-FOUND],  
    [ACTION-IF-NOT-FOUND])
```

Check whether GPGME (at least version MINIMUM-VERSION, if given) exists on the host system. If it is found, execute ACTION-IF-FOUND, otherwise do ACTION-IF-NOT-FOUND, if given.

Additionally, the function defines `GPGME_CFLAGS` to the flags needed for compilation of the program to find the `gpgme.h` header file, and `GPGME_LIBS` to the linker flags needed to link the program to the GPGME library. If the used helper script does not match the target type you are building for a warning is printed and the string `libgcrypt` is appended to the variable `gpg_config_script_warn`.

`AM_PATH_GPGME_PTH` checks for the version of GPGME that can be used with GNU Pth, and defines `GPGME_PTH_CFLAGS` and

GPGME\_PTH\_LIBS.

AM\_PATH\_GPGME\_PTHREAD checks for the version of GPGME that can be used with the native pthread implementation, and defines GPGME\_PTHREAD\_CFLAGS and GPGME\_PTHREAD\_LIBS. Since version 1.8.0 this is no longer required to GPGME\_PTHREAD as GPGME itself is thread safe.

This macro searches for gpgme-config along the PATH. If you are cross-compiling, it is useful to set the environment variable SYSROOT to the top directory of your target. The macro will then first look for the helper program in the bin directory below that top directory. An absolute directory name must be used for SYSROOT. Finally, if the configure command line option --with-gpgme-prefix is used, only its value is used for the top directory below which the helper script is expected.

You can use the defined Autoconf variables like this in your Makefile.am:

```
AM_CPPFLAGS = $(GPGME_CFLAGS)
LDADD = $(GPGME_LIBS)
```

File: gpgme.info, Node: Using Libtool, Next: Library Version Check, Prev: Using Automake, Up: Preparation

## 2.5 Using Libtool

=====

The easiest way is to just use GNU Libtool. If you use libtool, and link to libgpgme.la, libgpgme-pth.la or libgpgme-pthread.la respectively, everything will be done automatically by Libtool.

File: gpgme.info, Node: Library Version Check, Next: Signal Handling, Prev: Using Libtool, Up: Preparation

## 2.6 Library Version Check

=====

-- Function: const char \* gpgme\_check\_version  
(const char \*REQUIRED\_VERSION)

The function gpgme\_check\_version has four purposes. It can be used to retrieve the version number of the library. In addition it can verify that the version number is higher than a certain required version number. In either case, the function initializes some sub-systems, and for this reason alone it must be invoked early in your program, before you make use of the other functions in GPGME. The last purpose is to run selftests.

As a side effect for W32 based systems, the socket layer will get initialized.

If `REQUIRED_VERSION` is `NULL`, the function returns a pointer to a statically allocated string containing the version number of the library.

If `REQUIRED_VERSION` is not `NULL`, it should point to a string containing a version number, and the function checks that the version of the library is at least as high as the version number provided. In this case, the function returns a pointer to a statically allocated string containing the version number of the library. If `REQUIRED_VERSION` is not a valid version number, or if the version requirement is not met, the function returns `NULL`.

If you use a version of a library that is backwards compatible with older releases, but contains additional interfaces which your program uses, this function provides a run-time check if the necessary features are provided by the installed version of the library.

If a selftest fails, the function may still succeed. Selftest errors are returned later when invoking `gpgme_new` or `gpgme_data_new`, so that a detailed error code can be returned (historically, `gpgme_check_version` does not return a detailed error code).

-- Function: `int gpgme_set_global_flag (const char *NAME, const char *VALUE)`

SINCE: 1.4.0

On some systems it is not easy to set environment variables and thus hard to use GPGMEs internal trace facility for debugging. This function has been introduced as an alternative way to enable debugging and for a couple of other rarely used tweaks. It is important to assure that only one thread accesses GPGME functions between a call to this function and after the return from the call to `gpgme_check_version`.

All currently supported features require that this function is called as early as possible even before `gpgme_check_version`. The features are identified by the following values for `NAME`:

`debug`

To enable debugging use the string `debug` for `NAME` and `VALUE` identical to the value used with the environment variable

GPGME\_DEBUG.

#### disable-gpgconf

Using this feature with any VALUE disables the detection of the gpgconf program and thus forces GPGME to fallback into the simple OpenPGP only mode. It may be used to force the use of GnuPG-1 on systems which have both GPG versions installed.

Note that in general the use of gpgme\_set\_engine\_info is a better way to select a specific engine version.

#### gpgconf-name

##### gpg-name

Set the name of the gpgconf respective gpg binary. The defaults are GNU/GnuPG/gpgconf and GNU/GnuPG/gpg. Under Unix the leading directory part is ignored. Under Windows the leading directory part is used as the default installation directory; the .exe suffix is added by GPGME. Use forward slashed even under Windows.

#### require-gnupg

Set the minimum version of the required GnuPG engine. If that version is not met, GPGME fails early instead of trying to use the existent version. The given version must be a string with major, minor, and micro number. Example: "2.1.0".

#### w32-inst-dir

On Windows GPGME needs to know its installation directory to find its spawn helper. This is in general no problem because a DLL has this information. Some applications however link statically to GPGME and thus GPGME can only figure out the installation directory of this application which may be wrong in certain cases. By supplying an installation directory as value to this flag, GPGME will assume that that directory is the installation directory. This flag has no effect on non-Windows platforms.

This function returns 0 on success. In contrast to other functions the non-zero return value on failure does not convey any error code. For setting debug the only possible error cause is an out of memory condition; which would exhibit itself later anyway. Thus the return value may be ignored.

After initializing GPGME, you should set the locale information to the locale required for your output terminal. This locale information is needed for example for the curses and Gtk pinentry. Here is an example of a complete initialization:

```
#include <locale.h>
```

```

#include <gpgme.h>

void
init_gpgme (void)
{
    /* Initialize the locale environment. */
    setlocale (LC_ALL, "");
    gpgme_check_version (NULL);
    gpgme_set_locale (NULL, LC_CTYPE, setlocale (LC_CTYPE, NULL));
#ifdef LC_MESSAGES
    gpgme_set_locale (NULL, LC_MESSAGES, setlocale (LC_MESSAGES, NULL));
#endif
}

```

Note that you are highly recommended to initialize the locale settings like this. GPGME can not do this for you because it would not be thread safe. The conditional on LC\_MESSAGES is only necessary for portability to W32 systems.

File: gpgme.info, Node: Signal Handling, Next: Multi-Threading, Prev: Library Version Check, Up: Preparation

## 2.7 Signal Handling

=====

The GPGME library communicates with child processes (the crypto engines). If a child process dies unexpectedly, for example due to a bug, or system problem, a SIGPIPE signal will be delivered to the application. The default action is to abort the program. To protect against this, gpgme\_check\_version sets the SIGPIPE signal action to SIG\_IGN, which means that the signal will be ignored.

GPGME will only do that if the signal action for SIGPIPE is SIG\_DEF at the time gpgme\_check\_version is called. If it is something different, GPGME will take no action.

This means that if your application does not install any signal handler for SIGPIPE, you dont need to take any precautions. If you do install a signal handler for SIGPIPE, you must be prepared to handle any SIGPIPE events that occur due to GPGME writing to a defunct pipe. Furthermore, if your application is multi-threaded, and you install a signal action for SIGPIPE, you must make sure you do this either before gpgme\_check\_version is called or afterwards.

File: gpgme.info, Node: Multi-Threading, Prev: Signal Handling, Up: Preparation

## 2.8 Multi-Threading

=====

The GPGME library is mostly thread-safe, and can be used in a multi-threaded environment but there are some requirements for multi-threaded use:

The function `gpgme_check_version` must be called before any other function in the library, because it initializes the thread support subsystem in GPGME. To achieve this in multi-threaded programs, you must synchronize the memory with respect to other threads that also want to use GPGME. For this, it is sufficient to call `gpgme_check_version` before creating the other threads using `GPGME(1)`.

Any `gpgme_data_t` and `gpgme_ctx_t` object must only be accessed by one thread at a time. If multiple threads want to deal with the same object, the caller has to make sure that operations on that object are fully synchronized.

Only one thread at any time is allowed to call `gpgme_wait`. If multiple threads call this function, the caller must make sure that all invocations are fully synchronized. It is safe to start asynchronous operations while a thread is running in `gpgme_wait`.

The function `gpgme_strerror` is not thread safe. You have to use `gpgme_strerror_r` instead.

----- Footnotes -----

(1) At least this is true for POSIX threads, as `pthread_create` is a function that synchronizes memory with respects to other threads. There are many functions which have this property, a complete list can be found in POSIX, IEEE Std 1003.1-2003, Base Definitions, Issue 6, in the definition of the term Memory Synchronization. For other thread packages other, more relaxed or more strict rules may apply.

File: [gpgme.info](#), Node: [Protocols and Engines](#), Next: [Algorithms](#), Prev: [Preparation](#), Up: [Top](#)

### 3 Protocols and Engines

\*\*\*\*\*

GPGME supports several cryptographic protocols, however, it does not implement them. Rather it uses backends (also called engines) which implement the protocol. GPGME uses inter-process communication to pass data back and forth between the application and the backend, but the details of the communication protocol and invocation of the backend is completely hidden by the interface. All complexity is handled by GPGME.

Where an exchange of information between the application and the backend is necessary, GPGME provides the necessary callback function hooks and further interfaces.

-- Data type: enum gpgme\_protocol\_t

The gpgme\_protocol\_t type specifies the set of possible protocol values that are supported by GPGME. The following protocols are supported:

GPGME\_PROTOCOL\_OpenPGP

GPGME\_PROTOCOL\_OPENPGP

This specifies the OpenPGP protocol.

GPGME\_PROTOCOL\_CMS

This specifies the Cryptographic Message Syntax.

GPGME\_PROTOCOL\_GPGCONF

Under development. Please ask on <gnupg-devel@gnupg.org> for help.

GPGME\_PROTOCOL\_ASSUAN

SINCE: 1.2.0

This specifies the raw Assuan protocol.

GPGME\_PROTOCOL\_G13

SINCE: 1.3.0

Under development. Please ask on <gnupg-devel@gnupg.org> for help.

GPGME\_PROTOCOL\_UISERVER

Under development. Please ask on <gnupg-devel@gnupg.org> for help.

GPGME\_PROTOCOL\_SPAWN

SINCE: 1.5.0

Special protocol for use with gpgme\_op\_spawn.

GPGME\_PROTOCOL\_UNKNOWN

Reserved for future extension. You may use this to indicate that the used protocol is not known to the application.

Currently, GPGME does not accept this value in any operation, though, except for gpgme\_get\_protocol\_name.

-- Function: const char \* gpgme\_get\_protocol\_name

(gpgme\_protocol\_t PROTOCOL)

The function `gpgme_get_protocol_name` returns a statically allocated string describing the protocol `PROTOCOL`, or `NULL` if the protocol number is not valid.

\* Menu:

- \* Engine Version Check:: Verifying the engine version.
- \* Engine Information:: Obtaining more information about the engines.
- \* Engine Configuration:: Changing the engine configuration.
- \* OpenPGP:: Support for the OpenPGP protocol.
- \* Cryptographic Message Syntax:: Support for the CMS.
- \* Assuan:: Support for the raw Assuan protocol.

File: `gpgme.info`, Node: Engine Version Check, Next: Engine Information, Up: Protocols and Engines

### 3.1 Engine Version Check

=====

-- Function: `const char * gpgme_get_dirinfo (const char *WHAT)`  
SINCE: 1.5.0

The function `gpgme_get_dirinfo` returns a statically allocated string with the value associated to `WHAT`. The returned values are the defaults and wont change even after `gpgme_set_engine_info` has been used to configure a different engine. `NULL` is returned if no value is available. Commonly supported values for `WHAT` are:

`homedir`

Return the default home directory.

`sysconfdir`

Return the name of the system configuration directory

`bindir`

Return the name of the directory with GnuPG program files.

`libdir`

Return the name of the directory with GnuPG related library files.

`libexecdir`

Return the name of the directory with GnuPG helper program files.

`datadir`

Return the name of the directory with GnuPG shared data.



localedir

Return the name of the directory with GnuPG locale data.

agent-socket

Return the name of the socket to connect to the gpg-agent.

agent-ssh-socket

Return the name of the socket to connect to the ssh-agent component of gpg-agent.

dirmngr-socket

Return the name of the socket to connect to the dirmngr.

uiserver-socket

Return the name of the socket to connect to the user interface server.

gpgconf-name

Return the file name of the engine configuration tool.

gpg-name

Return the file name of the OpenPGP engine.

gpgsm-name

Return the file name of the CMS engine.

g13-name

Return the name of the file container encryption engine.

gpg-wks-client-name

Return the name of the Web Key Service tool.

-- Function: `gpgme_error_t gpgme_engine_check_version(gpgme_protocol_t PROTOCOL)`

The function `gpgme_engine_check_version` verifies that the engine implementing the protocol `PROTOCOL` is installed in the expected path and meets the version requirement of GPGME.

This function returns the error code `GPG_ERR_NO_ERROR` if the engine is available and `GPG_ERR_INV_ENGINE` if it is not.

File: `gpgme.info`, Node: Engine Information, Next: Engine Configuration, Prev: Engine Version Check, Up: Protocols and Engines

### 3.2 Engine Information

=====

-- Data type: `gpgme_engine_info_t`

The `gpgme_engine_info_t` type specifies a pointer to a structure describing a crypto engine. The structure contains the following elements:

`gpgme_engine_info_t next`

This is a pointer to the next engine info structure in the linked list, or `NULL` if this is the last element.

`gpgme_protocol_t protocol`

This is the protocol for which the crypto engine is used. You can convert this to a string with `gpgme_get_protocol_name` for printing.

`const char *file_name`

This is a string holding the file name of the executable of the crypto engine. Currently, it is never `NULL`, but using `NULL` is reserved for future use, so always check before you use it.

`const char *home_dir`

This is a string holding the directory name of the crypto engines configuration directory. If it is `NULL`, then the default directory is used. See `gpgme_get_dirinfo` on how to get the default directory.

`const char *version`

This is a string containing the version number of the crypto engine. It might be `NULL` if the version number can not be determined, for example because the executable doesn't exist or is invalid.

`const char *req_version`

This is a string containing the minimum required version number of the crypto engine for GPGME to work correctly. This is the version number that `gpgme_engine_check_version` verifies against. Currently, it is never `NULL`, but using `NULL` is reserved for future use, so always check before you use it.

-- Function: `gpgme_error_t gpgme_get_engine_info`

(`gpgme_engine_info_t *INFO`)

The function `gpgme_get_engine_info` returns a linked list of engine info structures in `INFO`. Each info structure describes the defaults of one configured backend.

The memory for the info structures is allocated the first time this function is invoked, and must not be freed by the caller.

This function returns the error code `GPG_ERR_NO_ERROR` if successful, and a system error if the memory could not be allocated.

Here is an example how you can provide more diagnostics if you receive an error message which indicates that the crypto engine is invalid.

```
gpgme_ctx_t ctx;
gpgme_error_t err;

[...]

if (gpgme_err_code (err) == GPG_ERR_INV_ENGINE)
{
  gpgme_engine_info_t info;
  err = gpgme_get_engine_info (&info);
  if (!err)
  {
    while (info && info->protocol != gpgme_get_protocol (ctx))
      info = info->next;
    if (!info)
      fprintf (stderr, "GPGME compiled without support for protocol %s",
              gpgme_get_protocol_name (info->protocol));
    else if (info->file_name && !info->version)
      fprintf (stderr, "Engine %s not installed properly",
              info->file_name);
    else if (info->file_name && info->version && info->req_version)
      fprintf (stderr, "Engine %s version %s installed, "
              "but at least version %s required", info->file_name,
              info->version, info->req_version);
    else
      fprintf (stderr, "Unknown problem with engine for protocol %s",
              gpgme_get_protocol_name (info->protocol));
  }
}
```

File: `gpgme.info`, Node: Engine Configuration, Next: OpenPGP, Prev: Engine Information, Up: Protocols and Engines

### 3.3 Engine Configuration

=====

You can change the configuration of a backend engine, and thus change the executable program and configuration directory to be used. You can make these changes the default or set them for some contexts

individually.

```
-- Function: gpgme_error_t gpgme_set_engine_info
           (gpgme_protocol_t PROTO, const char *FILE_NAME,
            const char *HOME_DIR)
SINCE: 1.1.0
```

The function `gpgme_set_engine_info` changes the default configuration of the crypto engine implementing the protocol `PROTO`.

`FILE_NAME` is the file name of the executable program implementing this protocol, and `HOME_DIR` is the directory name of the configuration directory for this crypto engine. If `HOME_DIR` is `NULL`, the engines default will be used.

The new defaults are not applied to already created GPGME contexts.

This function returns the error code `GPG_ERR_NO_ERROR` if successful, or an error code on failure.

The functions `gpgme_ctx_get_engine_info` and `gpgme_ctx_set_engine_info` can be used to change the engine configuration per context. \*Note Crypto Engine::.

File: `gpgme.info`, Node: OpenPGP, Next: Cryptographic Message Syntax, Prev: Engine Configuration, Up: Protocols and Engines

### 3.4 OpenPGP

=====

OpenPGP is implemented by GnuPG, the GNU Privacy Guard. This is the first protocol that was supported by GPGME.

The OpenPGP protocol is specified by `GPGME_PROTOCOL_OpenPGP`.

File: `gpgme.info`, Node: Cryptographic Message Syntax, Next: Assuan, Prev: OpenPGP, Up: Protocols and Engines

### 3.5 Cryptographic Message Syntax

=====

CMS is implemented by GpgSM, the S/MIME implementation for GnuPG.

The CMS protocol is specified by `GPGME_PROTOCOL_CMS`.

### 3.6 Assuan

=====

Assuan is the RPC library used by the various GnuPG components. The Assuan protocol allows one to talk to arbitrary Assuan servers using GPGME. \*Note Using the Assuan protocol::

The ASSUAN protocol is specified by GPGME\_PROTOCOL\_ASSUAN.

## 4 Algorithms

\*\*\*\*\*

The crypto backends support a variety of algorithms used in public key cryptography.(1) The following sections list the identifiers used to denote such an algorithm.

\* Menu:

\* Public Key Algorithms:: A list of all public key algorithms.

\* Hash Algorithms:: A list of all hash algorithms.

----- Footnotes -----

(1) Some engines also provide symmetric only encryption; see the description of the encryption function on how to use this.

### 4.1 Public Key Algorithms

=====

Public key algorithms are used for encryption, decryption, signing and verification of signatures.

-- Data type: enum gpgme\_pubkey\_algo\_t

The gpgme\_pubkey\_algo\_t type specifies the set of all public key algorithms that are supported by GPGME. Possible values are:

GPGME\_PK\_RSA

This value indicates the RSA (Rivest, Shamir, Adleman) algorithm.

#### GPGME\_PK\_RSA\_E

Deprecated. This value indicates the RSA (Rivest, Shamir, Adleman) algorithm for encryption and decryption only.

#### GPGME\_PK\_RSA\_S

Deprecated. This value indicates the RSA (Rivest, Shamir, Adleman) algorithm for signing and verification only.

#### GPGME\_PK\_DSA

This value indicates DSA, the Digital Signature Algorithm.

#### GPGME\_PK\_ELG

This value indicates ElGamal.

#### GPGME\_PK\_ELG\_E

This value also indicates ElGamal and is used specifically in GnuPG.

#### GPGME\_PK\_ECC

SINCE: 1.5.0

This value is a generic indicator for elliptic curve algorithms.

#### GPGME\_PK\_ECDSA

SINCE: 1.3.0

This value indicates ECDSA, the Elliptic Curve Digital Signature Algorithm as defined by FIPS 186-2 and RFC-6637.

#### GPGME\_PK\_ECDH

SINCE: 1.3.0

This value indicates ECDH, the Elliptic Curve Diffie-Hellman encryption algorithm as defined by RFC-6637.

#### GPGME\_PK\_EDDSA

SINCE: 1.7.0

This value indicates the EdDSA algorithm.

-- Function: const char \* gpgme\_pubkey\_algo\_name

(gpgme\_pubkey\_algo\_t ALGO)

The function gpgme\_pubkey\_algo\_name returns a pointer to a statically allocated string containing a description of the public key algorithm ALGO. This string can be used to output the name of the public key algorithm to the user.

If ALGO is not a valid public key algorithm, NULL is returned.

-- Function: char \* gpgme\_pubkey\_algo\_string (gpgme\_subkey\_t KEY)  
SINCE: 1.7.0

The function gpgme\_pubkey\_algo\_string is a convenience function to build and return an algorithm string in the same way GnuPG does (e.g. rsa2048 or ed25519). The caller must free the result using gpgme\_free. On error (e.g. invalid argument or memory exhausted), the function returns NULL and sets ERRNO.

File: gpgme.info, Node: Hash Algorithms, Prev: Public Key Algorithms, Up: Algorithms

## 4.2 Hash Algorithms

=====

Hash (message digest) algorithms are used to compress a long message to make it suitable for public key cryptography.

-- Data type: enum gpgme\_hash\_algo\_t  
The gpgme\_hash\_algo\_t type specifies the set of all hash algorithms that are supported by GPGME. Possible values are:

GPGME\_MD\_MD5  
GPGME\_MD\_SHA1  
GPGME\_MD\_RMD160  
GPGME\_MD\_MD2  
GPGME\_MD\_TIGER  
GPGME\_MD\_HAVAL  
GPGME\_MD\_SHA256  
GPGME\_MD\_SHA384  
GPGME\_MD\_SHA512  
GPGME\_MD\_SHA224  
SINCE: 1.5.0

GPGME\_MD\_MD4  
GPGME\_MD\_CRC32  
GPGME\_MD\_CRC32\_RFC1510  
GPGME\_MD\_CRC24\_RFC2440

-- Function: const char \* gpgme\_hash\_algo\_name (gpgme\_hash\_algo\_t ALGO)  
The function gpgme\_hash\_algo\_name returns a pointer to a statically allocated string containing a description of the hash algorithm ALGO. This string can be used to output the name of the hash algorithm to the user.

If ALGO is not a valid hash algorithm, NULL is returned.

## 5 Error Handling

\*\*\*\*\*

Many functions in GPGME can return an error if they fail. For this reason, the application should always catch the error condition and take appropriate measures, for example by releasing the resources and passing the error up to the caller, or by displaying a descriptive message to the user and cancelling the operation.

Some error values do not indicate a system error or an error in the operation, but the result of an operation that failed properly. For example, if you try to decrypt a tempered message, the decryption will fail. Another error value actually means that the end of a data buffer or list has been reached. The following descriptions explain for many error codes what they mean usually. Some error values have specific meanings if returned by a certain functions. Such cases are described in the documentation of those functions.

GPGME uses the libgpg-error library. This allows to share the error codes with other components of the GnuPG system, and thus pass error values transparently from the crypto engine, or some helper application of the crypto engine, to the user. This way no information is lost. As a consequence, GPGME does not use its own identifiers for error codes, but uses those provided by libgpg-error. They usually start with GPG\_ERR\_.

However, GPGME does provide aliases for the functions defined in libgpg-error, which might be preferred for name space consistency.

\* Menu:

- \* Error Values::           The error value and what it means.
- \* Error Sources::         A list of important error sources.
- \* Error Codes::           A list of important error codes.
- \* Error Strings::         How to get a descriptive string from a value.

### 5.1 Error Values

=====

-- Data type: gpgme\_err\_code\_t

The gpgme\_err\_code\_t type is an alias for the libgpg-error type



`gpg_err_code_t`. The error code indicates the type of an error, or the reason why an operation failed.

A list of important error codes can be found in the next section.

-- Data type: `gpgme_err_source_t`

The `gpgme_err_source_t` type is an alias for the `libgpg-error` type `gpg_err_source_t`. The error source has not a precisely defined meaning. Sometimes it is the place where the error happened, sometimes it is the place where an error was encoded into an error value. Usually the error source will give an indication to where to look for the problem. This is not always true, but it is attempted to achieve this goal.

A list of important error sources can be found in the next section.

-- Data type: `gpgme_error_t`

The `gpgme_error_t` type is an alias for the `libgpg-error` type `gpg_error_t`. An error value like this has always two components, an error code and an error source. Both together form the error value.

Thus, the error value can not be directly compared against an error code, but the accessor functions described below must be used. However, it is guaranteed that only 0 is used to indicate success (`GPG_ERR_NO_ERROR`), and that in this case all other parts of the error value are set to 0, too.

Note that in GPGME, the error source is used purely for diagnostical purposes. Only the error code should be checked to test for a certain outcome of a function. The manual only documents the error code part of an error value. The error source is left unspecified and might be anything.

-- Function: `static inline gpgme_err_code_t gpgme_err_code(gpgme_error_t ERR)`

The static inline function `gpgme_err_code` returns the `gpgme_err_code_t` component of the error value `ERR`. This function must be used to extract the error code from an error value in order to compare it with the `GPG_ERR_*` error code macros.

-- Function: `static inline gpgme_err_source_t gpgme_err_source(gpgme_error_t ERR)`

The static inline function `gpgme_err_source` returns the `gpgme_err_source_t` component of the error value `ERR`. This function must be used to extract the error source from an error value in order to compare it with the `GPG_ERR_SOURCE_*` error source macros.

-- Function: static inline gpgme\_error\_t gpgme\_err\_make  
(gpgme\_err\_source\_t SOURCE, gpgme\_err\_code\_t CODE)  
The static inline function gpgme\_err\_make returns the error value  
consisting of the error source SOURCE and the error code CODE.

This function can be used in callback functions to construct an  
error value to return it to the library.

-- Function: static inline gpgme\_error\_t gpgme\_error  
(gpgme\_err\_code\_t CODE)  
The static inline function gpgme\_error returns the error value  
consisting of the default error source and the error code CODE.

For GPGME applications, the default error source is  
GPG\_ERR\_SOURCE\_USER\_1. You can define GPGME\_ERR\_SOURCE\_DEFAULT  
before including gpgme.h to change this default.

This function can be used in callback functions to construct an  
error value to return it to the library.

The libgpg-error library provides error codes for all system error  
numbers it knows about. If ERR is an unknown error number, the error  
code GPG\_ERR\_UNKNOWN\_ERRNO is used. The following functions can be  
used to construct error values from system error numbers.

-- Function: gpgme\_error\_t gpgme\_err\_make\_from\_errno  
(gpgme\_err\_source\_t SOURCE, int ERR)  
The function gpgme\_err\_make\_from\_errno is like gpgme\_err\_make,  
but it takes a system error like errno instead of a  
gpgme\_err\_code\_t error code.

-- Function: gpgme\_error\_t gpgme\_error\_from\_errno (int ERR)  
The function gpgme\_error\_from\_errno is like gpgme\_error, but it  
takes a system error like errno instead of a gpgme\_err\_code\_t  
error code.

Sometimes you might want to map system error numbers to error codes  
directly, or map an error code representing a system error back to the  
system error number. The following functions can be used to do that.

-- Function: gpgme\_err\_code\_t gpgme\_err\_code\_from\_errno (int ERR)  
The function gpgme\_err\_code\_from\_errno returns the error code for  
the system error ERR. If ERR is not a known system error, the  
function returns GPG\_ERR\_UNKNOWN\_ERRNO.

-- Function: int gpgme\_err\_code\_to\_errno (gpgme\_err\_code\_t ERR)  
The function gpgme\_err\_code\_to\_errno returns the system error for

the error code ERR. If ERR is not an error code representing a system error, or if this system error is not defined on this system, the function returns 0.

File: gpgme.info, Node: Error Sources, Next: Error Codes, Prev: Error Values, Up: Error Handling

## 5.2 Error Sources

=====

The library libgpg-error defines an error source for every component of the GnuPG system. The error source part of an error value is not well defined. As such it is mainly useful to improve the diagnostic error message for the user.

If the error code part of an error value is 0, the whole error value will be 0. In this case the error source part is of course GPG\_ERR\_SOURCE\_UNKNOWN.

The list of error sources that might occur in applications using GPGME is:

### GPG\_ERR\_SOURCE\_UNKNOWN

The error source is not known. The value of this error source is 0.

### GPG\_ERR\_SOURCE\_GPGME

The error source is GPGME itself. This is the default for errors that occur in the GPGME library.

### GPG\_ERR\_SOURCE\_GPG

The error source is GnuPG, which is the crypto engine used for the OpenPGP protocol.

### GPG\_ERR\_SOURCE\_GPGSM

The error source is GPGSM, which is the crypto engine used for the CMS protocol.

### GPG\_ERR\_SOURCE\_GCRYPT

The error source is libgcrypt, which is used by crypto engines to perform cryptographic operations.

### GPG\_ERR\_SOURCE\_GPGAGENT

The error source is gpg-agent, which is used by crypto engines to perform operations with the secret key.

### GPG\_ERR\_SOURCE\_PINENTRY

The error source is pinentry, which is used by gpg-agent to

query the passphrase to unlock a secret key.

#### GPG\_ERR\_SOURCE\_SCD

The error source is the SmartCard Daemon, which is used by `gpg-agent` to delegate operations with the secret key to a SmartCard.

#### GPG\_ERR\_SOURCE\_KEYBOX

The error source is `libkbx`, a library used by the crypto engines to manage local keyrings.

#### GPG\_ERR\_SOURCE\_USER\_1

#### GPG\_ERR\_SOURCE\_USER\_2

#### GPG\_ERR\_SOURCE\_USER\_3

#### GPG\_ERR\_SOURCE\_USER\_4

These error sources are not used by any GnuPG component and can be used by other software. For example, applications using GPGME can use them to mark error values coming from callback handlers. Thus `GPG_ERR_SOURCE_USER_1` is the default for errors created with `gpgme_error` and `gpgme_error_from_errno`, unless you define `GPGME_ERR_SOURCE_DEFAULT` before including `gpgme.h`.

File: `gpgme.info`, Node: Error Codes, Next: Error Strings, Prev: Error Sources, Up: Error Handling

### 5.3 Error Codes

=====

The library `libgpg-error` defines many error values. Most of them are not used by GPGME directly, but might be returned by GPGME because it received them from the crypto engine. The below list only includes such error codes that have a specific meaning in GPGME, or which are so common that you should know about them.

#### GPG\_ERR\_EOF

This value indicates the end of a list, buffer or file.

#### GPG\_ERR\_NO\_ERROR

This value indicates success. The value of this error code is 0.

Also, it is guaranteed that an error value made from the error code 0 will be 0 itself (as a whole). This means that the error source information is lost for this error code, however, as this error code indicates that no error occurred, this is generally not a problem.

#### GPG\_ERR\_GENERAL

This value means that something went wrong, but either there is not enough information about the problem to return a more useful error

value, or there is no separate error value for this type of problem.

#### GPG\_ERR\_ENOMEM

This value means that an out-of-memory condition occurred.

#### GPG\_ERR\_E...

System errors are mapped to GPG\_ERR\_FOO where FOO is the symbol for the system error.

#### GPG\_ERR\_INV\_VALUE

This value means that some user provided data was out of range.

This can also refer to objects. For example, if an empty `gpgme_data_t` object was expected, but one containing data was provided, this error value is returned.

#### GPG\_ERR\_UNUSABLE\_PUBKEY

This value means that some recipients for a message were invalid.

#### GPG\_ERR\_UNUSABLE\_SECKEY

This value means that some signers were invalid.

#### GPG\_ERR\_NO\_DATA

This value means that a `gpgme_data_t` object which was expected to have content was found empty.

#### GPG\_ERR\_CONFLICT

This value means that a conflict of some sort occurred.

#### GPG\_ERR\_NOT\_IMPLEMENTED

This value indicates that the specific function (or operation) is not implemented. This error should never happen. It can only occur if you use certain values or configuration options which do not work, but for which we think that they should work at some later time.

#### GPG\_ERR\_DECRYPT\_FAILED

This value indicates that a decryption operation was unsuccessful.

#### GPG\_ERR\_BAD\_PASSPHRASE

This value means that the user did not provide a correct passphrase when requested.

#### GPG\_ERR\_CANCELED

This value means that the operation was canceled.

#### GPG\_ERR\_INV\_ENGINE

This value means that the engine that implements the desired

protocol is currently not available. This can either be because the sources were configured to exclude support for this engine, or because the engine is not installed properly.

#### GPG\_ERR\_AMBIGUOUS\_NAME

This value indicates that a user ID or other specifier did not specify a unique key.

#### GPG\_ERR\_WRONG\_KEY\_USAGE

This value indicates that a key is not used appropriately.

#### GPG\_ERR\_CERT\_REVOKED

This value indicates that a key signature was revoked.

#### GPG\_ERR\_CERT\_EXPIRED

This value indicates that a key signature expired.

#### GPG\_ERR\_NO\_CRL\_KNOWN

This value indicates that no certificate revocation list is known for the certificate.

#### GPG\_ERR\_NO\_POLICY\_MATCH

This value indicates that a policy issue occurred.

#### GPG\_ERR\_NO\_SECKEY

This value indicates that no secret key for the user ID is available.

#### GPG\_ERR\_MISSING\_CERT

This value indicates that a key could not be imported because the issuer certificate is missing.

#### GPG\_ERR\_BAD\_CERT\_CHAIN

This value indicates that a key could not be imported because its certificate chain is not good, for example it could be too long.

#### GPG\_ERR\_UNSUPPORTED\_ALGORITHM

This value means a verification failed because the cryptographic algorithm is not supported by the crypto backend.

#### GPG\_ERR\_BAD\_SIGNATURE

This value means a verification failed because the signature is bad.

#### GPG\_ERR\_NO\_PUBKEY

This value means a verification failed because the public key is not available.

GPG\_ERR\_USER\_1  
GPG\_ERR\_USER\_2  
...  
GPG\_ERR\_USER\_16

These error codes are not used by any GnuPG component and can be freely used by other software. Applications using GPGME might use them to mark specific errors returned by callback handlers if no suitable error codes (including the system errors) for these errors exist already.

File: gpgme.info, Node: Error Strings, Prev: Error Codes, Up: Error Handling

## 5.4 Error Strings

=====

-- Function: `const char * gpgme_strerror (gpgme_error_t ERR)`

The function `gpgme_strerror` returns a pointer to a statically allocated string containing a description of the error code contained in the error value `ERR`. This string can be used to output a diagnostic message to the user.

This function is not thread safe. Use `gpgme_strerror_r` in multi-threaded programs.

-- Function: `int gpgme_strerror_r (gpgme_error_t ERR, char *BUF, size_t BUFLen)`

The function `gpgme_strerror_r` returns the error string for `ERR` in the user-supplied buffer `BUF` of size `BUFLen`. This function is, in contrast to `gpgme_strerror`, thread-safe if a thread-safe `strerror_r` function is provided by the system. If the function succeeds, 0 is returned and `BUF` contains the string describing the error. If the buffer was not large enough, `ERANGE` is returned and `BUF` contains as much of the beginning of the error string as fits into the buffer.

-- Function: `const char * gpgme_strsource (gpgme_error_t ERR)`

The function `gpgme_strsource` returns a pointer to a statically allocated string containing a description of the error source contained in the error value `ERR`. This string can be used to output a diagnostic message to the user.

The following example illustrates the use of `gpgme_strerror`:

```
gpgme_ctx_t ctx;  
gpgme_error_t err = gpgme_new (&ctx);  
if (err)  
{
```

```

fprintf(stderr, "%s: creating GpgME context failed: %s: %s\n",
        argv[0], gpgme_strerror(err), gpgme_strerror(err));
exit(1);
}

```

File: gpgme.info, Node: Exchanging Data, Next: Contexts, Prev: Error Handling, Up: Top

## 6 Exchanging Data

\*\*\*\*\*

A lot of data has to be exchanged between the user and the crypto engine, like plaintext messages, ciphertext, signatures and information about the keys. The technical details about exchanging the data information are completely abstracted by GPGME. The user provides and receives the data via `gpgme_data_t` objects, regardless of the communication protocol between GPGME and the crypto engine in use.

### -- Data type: `gpgme_data_t`

The `gpgme_data_t` type is a handle for a container for generic data, which is used by GPGME to exchange data with the user.

`gpgme_data_t` objects do not provide notifications on events. It is assumed that read and write operations are blocking until data is available. If this is undesirable, the application must ensure that all GPGME data operations always have data available, for example by using memory buffers or files rather than pipes or sockets. This might be relevant, for example, if the external event loop mechanism is used.

### -- Data type: `gpgme_off_t`

SINCE: 1.4.1

On POSIX platforms the `gpgme_off_t` type is an alias for `off_t`; it may be used interchangeably. On Windows platforms `gpgme_off_t` is defined as a long (i.e. 32 bit) for 32 bit Windows and as a 64 bit signed integer for 64 bit Windows.

### -- Data type: `gpgme_ssize_t`

The `gpgme_ssize_t` type is an alias for `ssize_t`. It has only been introduced to overcome portability problems pertaining to the declaration of `ssize_t` by different toolchains.

### \* Menu:

- \* Creating Data Buffers::      Creating new data buffers.
- \* Destroying Data Buffers::    Releasing data buffers.
- \* Manipulating Data Buffers::   Operations on data buffers.



## 6.1 Creating Data Buffers

=====

Data objects can be based on memory, files, or callback functions provided by the user. Not all operations are supported by all objects.

\* Menu:

- \* Memory Based Data Buffers:: Creating memory based data buffers.
- \* File Based Data Buffers:: Creating file based data buffers.
- \* Callback Based Data Buffers:: Creating callback based data buffers.

### 6.1.1 Memory Based Data Buffers

-----

Memory based data objects store all data in allocated memory. This is convenient, but only practical for an amount of data that is a fraction of the available physical memory. The data has to be copied from its source and to its destination, which can often be avoided by using one of the other data object

-- Function: `gpgme_error_t gpgme_data_new (gpgme_data_t *DH)`  
The function `gpgme_data_new` creates a new `gpgme_data_t` object and returns a handle for it in `DH`. The data object is memory based and initially empty.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `DH` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

-- Function: `gpgme_error_t gpgme_data_new_from_mem (gpgme_data_t *DH, const char *BUFFER, size_t SIZE, int COPY)`  
The function `gpgme_data_new_from_mem` creates a new `gpgme_data_t` object and fills it with `SIZE` bytes starting from `BUFFER`.

If `COPY` is not zero, a private copy of the data is made. If `COPY` is zero, the data is taken from the specified buffer as needed, and the user has to ensure that the buffer remains valid for the whole life span of the data object.

The function returns the error code `GPG_ERR_NO_ERROR` if the data

object was successfully created, GPG\_ERR\_INV\_VALUE if DH or BUFFER is not a valid pointer, and GPG\_ERR\_ENOMEM if not enough memory is available.

-- Function: gpgme\_error\_t gpgme\_data\_new\_from\_file (gpgme\_data\_t \*DH, const char \*FILENAME, int COPY)

The function gpgme\_data\_new\_from\_file creates a new gpgme\_data\_t object and fills it with the content of the file FILENAME.

If COPY is not zero, the whole file is read in at initialization time and the file is not used anymore after that. This is the only mode supported currently. Later, a value of zero for COPY might cause all reads to be delayed until the data is needed, but this is not yet implemented.

The function returns the error code GPG\_ERR\_NO\_ERROR if the data object was successfully created, GPG\_ERR\_INV\_VALUE if DH or FILENAME is not a valid pointer, GPG\_ERR\_NOT\_IMPLEMENTED if CODE is zero, and GPG\_ERR\_ENOMEM if not enough memory is available.

-- Function: gpgme\_error\_t gpgme\_data\_new\_from\_filepart (gpgme\_data\_t \*DH, const char \*FILENAME, FILE \*FP, off\_t OFFSET, size\_t LENGTH)

The function gpgme\_data\_new\_from\_filepart creates a new gpgme\_data\_t object and fills it with a part of the file specified by FILENAME or FP.

Exactly one of FILENAME and FP must be non-zero, the other must be zero. The argument that is not zero specifies the file from which LENGTH bytes are read into the data object, starting from OFFSET.

The function returns the error code GPG\_ERR\_NO\_ERROR if the data object was successfully created, GPG\_ERR\_INV\_VALUE if DH and exactly one of FILENAME and FP is not a valid pointer, and GPG\_ERR\_ENOMEM if not enough memory is available.

File: gpgme.info, Node: File Based Data Buffers, Next: Callback Based Data Buffers, Prev: Memory Based Data Buffers, Up: Creating Data Buffers

### 6.1.2 File Based Data Buffers

-----

File based data objects operate directly on file descriptors or streams. Only a small amount of data is stored in core at any time, so the size of the data objects is not limited by GPGME.

-- Function: `gpgme_error_t gpgme_data_new_from_fd (gpgme_data_t *DH, int FD)`

The function `gpgme_data_new_from_fd` creates a new `gpgme_data_t` object and uses the file descriptor `FD` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the file descriptor than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the file descriptor is set to blocking mode. Errors during I/O operations, except for `EINTR`, are usually fatal for crypto operations.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not enough memory is available.

-- Function: `gpgme_error_t gpgme_data_new_from_stream (gpgme_data_t *DH, FILE *STREAM)`

The function `gpgme_data_new_from_stream` creates a new `gpgme_data_t` object and uses the I/O stream `STREAM` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the stream than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the stream is in blocking mode. Errors during I/O operations, except for `EINTR`, are usually fatal for crypto operations.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not enough memory is available.

-- Function: `gpgme_error_t gpgme_data_new_from_estream (gpgme_data_t *DH, gpgmt_stream_t STREAM)`

The function `gpgme_data_new_from_estream` creates a new `gpgme_data_t` object and uses the `gpgmt` stream `STREAM` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the stream than is actually needed by the

crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the stream is in blocking mode. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function returns the error code GPG\_ERR\_NO\_ERROR if the data object was successfully created, and GPG\_ERR\_ENOMEM if not enough memory is available.

File: gpgme.info, Node: Callback Based Data Buffers, Prev: File Based Data Buffers, Up: Creating Data Buffers

### 6.1.3 Callback Based Data Buffers

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If neither memory nor file based data objects are a good fit for your application, you can implement the functions a data object provides yourself and create a data object from these callback functions.

-- Data type: `ssize_t (*gpgme_data_read_cb_t) (void *HANDLE, void *BUFFER, size_t SIZE)`

The `gpgme_data_read_cb_t` type is the type of functions which GPGME calls if it wants to read data from a user-implemented data object. The function should read up to `SIZE` bytes from the current read position into the space starting at `BUFFER`. The `HANDLE` is provided by the user at data object creation time.

Note that GPGME assumes that the read blocks until data is available. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function should return the number of bytes read, 0 on EOF, and -1 on error. If an error occurs, `ERRNO` should be set to describe the type of the error.

-- Data type: `ssize_t (*gpgme_data_write_cb_t) (void *HANDLE, const void *BUFFER, size_t SIZE)`

The `gpgme_data_write_cb_t` type is the type of functions which GPGME calls if it wants to write data to a user-implemented data object. The function should write up to `SIZE` bytes to the current write position from the space starting at `BUFFER`. The `HANDLE` is provided by the user at data object creation time.

Note that GPGME assumes that the write blocks until data is available. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function should return the number of bytes written, and -1 on error. If an error occurs, ERRNO should be set to describe the type of the error.

-- Data type: `off_t (*gpgme_data_seek_cb_t) (void *HANDLE, off_t OFFSET, int WHENCE)`

The `gpgme_data_seek_cb_t` type is the type of functions which GPGME calls if it wants to change the current read/write position in a user-implemented data object, just like the `lseek` function.

The function should return the new read/write position, and -1 on error. If an error occurs, ERRNO should be set to describe the type of the error.

-- Data type: `void (*gpgme_data_release_cb_t) (void *HANDLE)`

The `gpgme_data_release_cb_t` type is the type of functions which GPGME calls if it wants to destroy a user-implemented data object. The `HANDLE` is provided by the user at data object creation time.

-- Data type: `struct gpgme_data_cbs`

This structure is used to store the data callback interface functions described above. It has the following members:

`gpgme_data_read_cb_t read`

This is the function called by GPGME to read data from the data object. It is only required for input data object.

`gpgme_data_write_cb_t write`

This is the function called by GPGME to write data to the data object. It is only required for output data object.

`gpgme_data_seek_cb_t seek`

This is the function called by GPGME to change the current read/write pointer in the data object (if available). It is optional.

`gpgme_data_release_cb_t release`

This is the function called by GPGME to release a data object. It is optional.

-- Function: `gpgme_error_t gpgme_data_new_from_cbs (gpgme_data_t *DH, gpgme_data_cbs_t CBS, void *HANDLE)`

The function `gpgme_data_new_from_cbs` creates a new `gpgme_data_t` object and uses the user-provided callback functions to operate on the data object.

The handle `HANDLE` is passed as first argument to the callback

functions. This can be used to identify this data object.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not enough memory is available.

File: `gpgme.info`, Node: Destroying Data Buffers, Next: Manipulating Data Buffers, Prev: Creating Data Buffers, Up: Exchanging Data

## 6.2 Destroying Data Buffers

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-- Function: `void gpgme_data_release (gpgme_data_t DH)`

The function `gpgme_data_release` destroys the data object with the handle `DH`. It releases all associated resources that were not provided by the user in the first place.

-- Function: `char * gpgme_data_release_and_get_mem (gpgme_data_t DH, size_t *LENGTH)`

The function `gpgme_data_release_and_get_mem` is like `gpgme_data_release`, except that it returns the data buffer and its length that was provided by the object.

The user has to release the buffer with `gpgme_free`. In case the user provided the data buffer in non-copy mode, a copy will be made for this purpose.

In case an error returns, or there is no suitable data buffer that can be returned to the user, the function will return `NULL`. In any case, the data object `DH` is destroyed.

-- Function: `void gpgme_free (void *BUFFER)`

SINCE: 1.1.1

The function `gpgme_free` releases the memory returned by `gpgme_data_release_and_get_mem` and `gpgme_pubkey_algo_string`. It should be used instead of the system libraries `free` function in case different allocators are used by a program. This is often the case if `gpgme` is used under Windows as a DLL.

File: `gpgme.info`, Node: Manipulating Data Buffers, Prev: Destroying Data Buffers, Up: Exchanging Data

## 6.3 Manipulating Data Buffers

=====

Data buffers contain data and meta-data. The following operations can

be used to manipulate both.

\* Menu:

\* Data Buffer I/O Operations:: I/O operations on data buffers.

\* Data Buffer Meta-Data:: Meta-data manipulation of data buffers.

\* Data Buffer Convenience:: Convenience function for data buffers.

File: gpgme.info, Node: Data Buffer I/O Operations, Next: Data Buffer Meta-Data, Up: Manipulating Data Buffers

### 6.3.1 Data Buffer I/O Operations

-----

-- Function: `ssize_t gpgme_data_read (gpgme_data_t DH, void *BUFFER, size_t LENGTH)`

The function `gpgme_data_read` reads up to `LENGTH` bytes from the data object with the handle `DH` into the space starting at `BUFFER`.

If no error occurs, the actual amount read is returned. If the end of the data object is reached, the function returns 0.

In all other cases, the function returns -1 and sets `ERRNO`.

-- Function: `ssize_t gpgme_data_write (gpgme_data_t DH, const void *BUFFER, size_t SIZE)`

The function `gpgme_data_write` writes up to `SIZE` bytes starting from `BUFFER` into the data object with the handle `DH` at the current write position.

The function returns the number of bytes actually written, or -1 if an error occurs. If an error occurs, `ERRNO` is set.

-- Function: `off_t gpgme_data_seek (gpgme_data_t DH, off_t OFFSET, int WHENCE)`

The function `gpgme_data_seek` changes the current read/write position.

The `WHENCE` argument specifies how the `OFFSET` should be interpreted. It must be one of the following symbolic constants:

`SEEK_SET`

Specifies that `OFFSET` is a count of characters from the beginning of the data object.

`SEEK_CUR`

Specifies that `OFFSET` is a count of characters from the

current file position. This count may be positive or negative.

#### SEEK\_END

Specifies that OFFSET is a count of characters from the end of the data object. A negative count specifies a position within the current extent of the data object; a positive count specifies a position past the current end. If you set the position past the current end, and actually write data, you will extend the data object with zeros up to that position.

If successful, the function returns the resulting file position, measured in bytes from the beginning of the data object. You can use this feature together with SEEK\_CUR to read the current read/write position.

If the function fails, -1 is returned and ERRNO is set.

File: gpgme.info, Node: Data Buffer Meta-Data, Next: Data Buffer Convenience, Prev: Data Buffer I/O Operations, Up: Manipulating Data Buffers

#### 6.3.2 Data Buffer Meta-Data

-----  
-- Function: char \* gpgme\_data\_get\_file\_name (gpgme\_data\_t DH)  
SINCE: 1.1.0

The function gpgme\_data\_get\_file\_name returns a pointer to a string containing the file name associated with the data object. The file name will be stored in the output when encrypting or signing the data and will be returned to the user when decrypting or verifying the output data.

If no error occurs, the string containing the file name is returned. Otherwise, NULL will be returned.

-- Function: gpgme\_error\_t gpgme\_data\_set\_file\_name (gpgme\_data\_t DH,  
const char \*FILE\_NAME)  
SINCE: 1.1.0

The function gpgme\_data\_set\_file\_name sets the file name associated with the data object. The file name will be stored in the output when encrypting or signing the data and will be returned to the user when decrypting or verifying the output data.

The function returns the error code GPG\_ERR\_INV\_VALUE if DH is not a valid pointer and GPG\_ERR\_ENOMEM if not enough memory is



available.

-- Data type: enum `gpgme_data_encoding_t`

The `gpgme_data_encoding_t` type specifies the encoding of a `gpgme_data_t` object. For input data objects, the encoding is useful to give the backend a hint on the type of data. For output data objects, the encoding can specify the output data format on certain operations. Please note that not all backends support all encodings on all operations. The following data types are available:

#### `GPGME_DATA_ENCODING_NONE`

This specifies that the encoding is not known. This is the default for a new data object. The backend will try its best to detect the encoding automatically.

#### `GPGME_DATA_ENCODING_BINARY`

This specifies that the data is encoding in binary form; i.e. there is no special encoding.

#### `GPGME_DATA_ENCODING_BASE64`

This specifies that the data is encoded using the Base-64 encoding scheme as used by MIME and other protocols.

#### `GPGME_DATA_ENCODING_ARMOR`

This specifies that the data is encoded in an armored form as used by OpenPGP and PEM.

#### `GPGME_DATA_ENCODING_MIME`

SINCE: 1.7.0

This specifies that the data is encoded as a MIME part.

#### `GPGME_DATA_ENCODING_URL`

SINCE: 1.2.0

The data is a list of linefeed delimited URLs. This is only useful with `gpgme_op_import`.

#### `GPGME_DATA_ENCODING_URL0`

SINCE: 1.2.0

The data is a list of binary zero delimited URLs. This is only useful with `gpgme_op_import`.

#### `GPGME_DATA_ENCODING_URLESC`

SINCE: 1.2.0

The data is a list of linefeed delimited URLs with all control and space characters percent escaped. This mode is is not yet implemented.

-- Function: `gpgme_data_encoding_t gpgme_data_get_encoding(gpgme_data_t DH)`

The function `gpgme_data_get_encoding` returns the encoding of the data object with the handle `DH`. If `DH` is not a valid pointer (e.g. `NULL`) `GPGME_DATA_ENCODING_NONE` is returned.

-- Function: `gpgme_error_t gpgme_data_set_encoding(gpgme_data_t DH, gpgme_data_encoding_t ENC)`

The function `gpgme_data_set_encoding` changes the encoding of the data object with the handle `DH` to `ENC`.

-- Function: `gpgme_error_t gpgme_data_set_flag(gpgme_data_t DH, const char *NAME, const char *VALUE)`

SINCE: 1.7.0

Some minor properties of the data object can be controlled with flags set by this function. The properties are identified by the following values for `NAME`:

`size-hint`

The value is a decimal number with the length `gpgme` shall assume for this data object. This is useful if the data is provided by callbacks or via file descriptors but the applications knows the total size of the data. If this is set the OpenPGP engine may use this to decide on buffer allocation strategies and to provide a total value for its progress information.

This function returns 0 on success.

File: `gpgme.info`, Node: Data Buffer Convenience, Prev: Data Buffer Meta-Data, Up: Manipulating Data Buffers

### 6.3.3 Data Buffer Convenience Functions

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-- Data type: `enum gpgme_data_type_t`

SINCE: 1.4.3

The `gpgme_data_type_t` type is used to return the detected type of the content of a data buffer.

`GPGME_DATA_TYPE_INVALID`

This is returned by `gpgme_data_identify` if it was not possible to identify the data. Reasons for this might be a non-seekable stream or a memory problem. The value is 0.

`GPGME_DATA_TYPE_UNKNOWN`

The type of the data is not known.

`GPGME_DATA_TYPE_PGP_SIGNED`

The data is an OpenPGP signed message. This may be a binary signature, a detached one or a cleartext signature.

`GPGME_DATA_TYPE_PGP_ENCRYPTED`

SINCE: 1.7.0

The data is an OpenPGP encrypted message.

`GPGME_DATA_TYPE_PGP_SIGNATURE`

SINCE: 1.7.0

The data is an OpenPGP detached signature.

`GPGME_DATA_TYPE_PGP_OTHER`

This is a generic OpenPGP message. In most cases this will be encrypted data.

`GPGME_DATA_TYPE_PGP_KEY`

This is an OpenPGP key (private or public).

`GPGME_DATA_TYPE_CMS_SIGNED`

This is a CMS signed message.

`GPGME_DATA_TYPE_CMS_ENCRYPTED`

This is a CMS encrypted (enveloped data) message.

`GPGME_DATA_TYPE_CMS_OTHER`

This is used for other CMS message types.

`GPGME_DATA_TYPE_X509_CERT`

The data is a X.509 certificate

`GPGME_DATA_TYPE_PKCS12`

The data is a PKCS#12 message. This is commonly used to exchange private keys for X.509.

-- Function: `gpgme_data_type_t gpgme_data_identify (gpgme_data_t DH)`

SINCE: 1.4.3

The function `gpgme_data_identify` returns the type of the data with the handle `DH`. If it is not possible to perform the identification, the function returns zero (`GPGME_DATA_TYPE_INVALID`). Note that depending on how the data object has been created the identification may not be possible or the data object may change its internal state (file pointer moved). For file or memory based data object, the state should not change.

File: `gpgme.info`, Node: Contexts, Next: UI Server Protocol, Prev: Exchanging Data, Up: Top

7 Contexts

\*\*\*\*\*

All cryptographic operations in GPGME are performed within a context, which contains the internal state of the operation as well as configuration parameters. By using several contexts you can run several cryptographic operations in parallel, with different configuration.

-- Data type: `gpgme_ctx_t`

The `gpgme_ctx_t` type is a handle for a GPGME context, which is used to hold the configuration, status and result of cryptographic operations.

\* Menu:

- \* Creating Contexts:: Creating new GPGME contexts.
- \* Destroying Contexts:: Releasing GPGME contexts.
- \* Result Management:: Managing the result of crypto operations.
- \* Context Attributes:: Setting properties of a context.
- \* Key Management:: Managing keys with GPGME.
- \* Trust Item Management:: Managing trust items with GPGME.
- \* Crypto Operations:: Using a context for cryptography.
- \* Miscellaneous:: Miscellaneous operations
- \* Run Control:: Controlling how operations are run.

File: `gpgme.info`, Node: Creating Contexts, Next: Destroying Contexts, Up: Contexts

## 7.1 Creating Contexts

=====

-- Function: `gpgme_error_t gpgme_new (gpgme_ctx_t *CTX)`

The function `gpgme_new` creates a new `gpgme_ctx_t` object and returns a handle for it in `CTX`.

The function returns the error code `GPG_ERR_NO_ERROR` if the context was successfully created, `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available. Also, it returns `GPG_ERR_NOT_OPERATIONAL` if `gpgme_check_version` was not called to initialize GPGME, and `GPG_ERR_SELFTEST_FAILED` if a selftest failed. Currently, the only selftest is for Windows MingW32 targets to see if `-mms-bitfields` was used (as required).

File: `gpgme.info`, Node: Destroying Contexts, Next: Result Management, Prev: Creating Contexts, Up: Contexts

## 7.2 Destroying Contexts

=====

-- Function: void gpgme\_release (gpgme\_ctx\_t CTX)  
The function gpgme\_release destroys the context with the handle CTX and releases all associated resources.

File: gpgme.info, Node: Result Management, Next: Context Attributes, Prev: Destroying Contexts, Up: Contexts

### 7.3 Result Management

=====

The detailed result of an operation is returned in operation-specific structures such as gpgme\_decrypt\_result\_t. The corresponding retrieval functions such as gpgme\_op\_decrypt\_result provide static access to the results after an operation completes. Those structures shall be considered read-only and an application must not allocate such a structure on its own. The following interfaces make it possible to detach a result structure from its associated context and give it a lifetime beyond that of the current operation or context.

-- Function: void gpgme\_result\_ref (void \*RESULT)  
SINCE: 1.2.0

The function gpgme\_result\_ref acquires an additional reference for the result RESULT, which may be of any type gpgme\_\*\_result\_t. As long as the user holds a reference, the result structure is guaranteed to be valid and unmodified.

-- Function: void gpgme\_result\_unref (void \*RESULT)  
SINCE: 1.2.0

The function gpgme\_result\_unref releases a reference for the result RESULT. If this was the last reference, the result structure will be destroyed and all resources associated to it will be released.

Note that a context may hold its own references to result structures, typically until the context is destroyed or the next operation is started. In fact, these references are accessed through the gpgme\_op\_\*\_result functions.

File: gpgme.info, Node: Context Attributes, Next: Key Management, Prev: Result Management, Up: Contexts

### 7.4 Context Attributes

=====

\* Menu:

- \* Protocol Selection::        Selecting the protocol used by a context.
- \* Crypto Engine::            Configuring the crypto engine.
- \* Setting the Sender::        How to tell the engine the sender.
- \* ASCII Armor::              Requesting ASCII armored output.
- \* Text Mode::                 Choosing canonical text mode.
- \* Offline Mode::             Choosing offline mode.
- \* Pinentry Mode::            Choosing the pinentry mode.
- \* Included Certificates::    Including a number of certificates.
- \* Key Listing Mode::         Selecting key listing mode.
- \* Passphrase Callback::      Getting the passphrase from the user.
- \* Progress Meter Callback::  Being informed about the progress.
- \* Status Message Callback::  Status messages received from gpg.
- \* Context Flags::            Additional flags for a context.
- \* Locale::                    Setting the locale of a context.
- \* Additional Logs::         Additional logs of a context.

File: gpgme.info, Node: Protocol Selection, Next: Crypto Engine, Up: Context Attributes

#### 7.4.1 Protocol Selection

-----

-- Function: gpgme\_error\_t gpgme\_set\_protocol (gpgme\_ctx\_t CTX,  
                  gpgme\_protocol\_t PROTO)

The function gpgme\_set\_protocol sets the protocol used within the context CTX to PROTO. All crypto operations will be performed by the crypto engine configured for that protocol. \*Note Protocols and Engines::.

Setting the protocol with gpgme\_set\_protocol does intentionally not check if the crypto engine for that protocol is available and installed correctly. \*Note Engine Version Check::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the protocol could be set successfully, and GPG\_ERR\_INV\_VALUE if PROTOCOL is not a valid protocol.

-- Function: gpgme\_protocol\_t gpgme\_get\_protocol (gpgme\_ctx\_t CTX)

The function gpgme\_get\_protocol retrieves the protocol currently use with the context CTX.

File: gpgme.info, Node: Crypto Engine, Next: Setting the Sender, Prev: Protocol Selection, Up: Context Attributes

#### 7.4.2 Crypto Engine

-----

The following functions can be used to set and retrieve the configuration of the crypto engines of a specific context. The default can also be retrieved without any particular context. \*Note Engine Information::. The default can also be changed globally. \*Note Engine Configuration::.

-- Function: `gpgme_engine_info_t gpgme_ctx_get_engine_info`  
(`gpgme_ctx_t` CTX)  
SINCE: 1.1.0

The function `gpgme_ctx_get_engine_info` returns a linked list of engine info structures. Each info structure describes the configuration of one configured backend, as used by the context CTX.

The result is valid until the next invocation of `gpgme_ctx_set_engine_info` for this particular context.

This function can not fail.

-- Function: `gpgme_error_t gpgme_ctx_set_engine_info` (`gpgme_ctx_t` CTX,  
`gpgme_protocol_t` PROTO, `const char *FILE_NAME`,  
`const char *HOME_DIR`)  
SINCE: 1.1.0

The function `gpgme_ctx_set_engine_info` changes the configuration of the crypto engine implementing the protocol PROTO for the context CTX.

FILE\_NAME is the file name of the executable program implementing this protocol, and HOME\_DIR is the directory name of the configuration directory for this crypto engine. If HOME\_DIR is NULL, the engines default will be used.

Currently this function must be used before starting the first crypto operation. It is unspecified if and when the changes will take effect if the function is called after starting the first operation on the context CTX.

This function returns the error code `GPG_ERR_NO_ERROR` if successful, or an error code on failure.

File: `gpgme.info`, Node: Setting the Sender, Next: ASCII Armor, Prev: Crypto Engine, Up: Context Attributes

7.4.3 How to tell the engine the sender.

-----

Some engines can make use of the senders address, for example to figure out the best user id in certain trust models. For verification and signing of mails, it is thus suggested to let the engine know the sender ("From:") address. GPGME provides two functions to accomplish that. Note that the esoteric use of multiple "From:" addresses is not supported.

-- Function: `gpgme_error_t gpgme_set_sender (gpgme_ctx_t CTX, int ADDRESS)`

SINCE: 1.8.0

The function `gpgme_set_sender` specifies the sender address for use in `sign` and `verify` operations. `ADDRESS` is expected to be the `addr-spec` part of an address but may also be a complete mailbox address, in which case this function extracts the `addr-spec` from it. Using `NULL` for `ADDRESS` clears the sender address.

The function returns 0 on success or an error code on failure. The most likely failure is that no valid `addr-spec` was found in `ADDRESS`.

-- Function: `const char * gpgme_get_sender (gpgme_ctx_t CTX)`

SINCE: 1.8.0

The function `gpgme_get_sender` returns the current sender address from the context, or `NULL` if none was set. The returned value is valid as long as the `CTX` is valid and `gpgme_set_sender` has not been called again.

File: `gpgme.info`, Node: ASCII Armor, Next: Text Mode, Prev: Setting the Sender, Up: Context Attributes

#### 7.4.4 ASCII Armor

-----

-- Function: `void gpgme_set_armor (gpgme_ctx_t CTX, int YES)`

The function `gpgme_set_armor` specifies if the output should be ASCII armored. By default, output is not ASCII armored.

ASCII armored output is disabled if `YES` is zero, and enabled otherwise.

-- Function: `int gpgme_get_armor (gpgme_ctx_t CTX)`

The function `gpgme_get_armor` returns 1 if the output is ASCII armored, and 0 if it is not, or if `CTX` is not a valid pointer.



#### 7.4.5 Text Mode

-----

-- Function: void gpgme\_set\_textmode (gpgme\_ctx\_t CTX, int YES)  
The function gpgme\_set\_textmode specifies if canonical text mode should be used. By default, text mode is not used.

Text mode is for example used for the RFC2015 signatures; note that the updated RFC 3156 mandates that the mail user agent does some preparations so that text mode is not needed anymore.

This option is only relevant to the OpenPGP crypto engine, and ignored by all other engines.

Canonical text mode is disabled if YES is zero, and enabled otherwise.

-- Function: int gpgme\_get\_textmode (gpgme\_ctx\_t CTX)  
The function gpgme\_get\_textmode returns 1 if canonical text mode is enabled, and 0 if it is not, or if CTX is not a valid pointer.

#### 7.4.6 Offline Mode

-----

-- Function: void gpgme\_set\_offline (gpgme\_ctx\_t CTX, int YES)  
SINCE: 1.6.0

The function gpgme\_set\_offline specifies if offline mode should be used. Offline mode is disabled if YES is zero, and enabled otherwise. By default, offline mode is disabled.

The details of the offline mode depend on the used protocol and its backend engine. It may eventually be extended to be more stricter and for example completely disable the use of Dirmngr for any engine.

For the CMS protocol the offline mode specifies whether Dirmngr shall be used to do additional validation that might require connecting external services (e.g. CRL / OCSP checks). Here the offline mode only affects the keylist mode  
GPGME\_KEYLIST\_MODE\_VALIDATE.

For the OpenPGP protocol offline mode entirely disables the use of the Dirmngr and will thus guarantee that no network connections are done as part of an operation on this context. It has only an effect with GnuPG versions 2.1.23 or later.

For all other protocols the offline mode is currently ignored.

-- Function: int gpgme\_get\_offline (gpgme\_ctx\_t CTX)  
SINCE: 1.6.0

The function gpgme\_get\_offline returns 1 if offline mode is enabled, and 0 if it is not, or if CTX is not a valid pointer.

File: gpgme.info, Node: Pinentry Mode, Next: Included Certificates, Prev: Offline Mode, Up: Context Attributes

#### 7.4.7 Pinentry Mode

-----

-- Function: gpgme\_error\_t gpgme\_set\_pinentry\_mode (gpgme\_ctx\_t CTX,  
gpgme\_pinentry\_mode\_t MODE)

SINCE: 1.4.0

The function gpgme\_set\_pinentry\_mode specifies the pinentry mode to be used.

For GnuPG >= 2.1 this option is required to be set to GPGME\_PINENTRY\_MODE\_LOOPBACK to enable the passphrase callback mechanism in GPGME through gpgme\_set\_passphrase\_cb.

-- Function: gpgme\_pinentry\_mode\_t gpgme\_get\_pinentry\_mode  
(gpgme\_ctx\_t CTX)  
SINCE: 1.4.0

The function gpgme\_get\_pinentry\_mode returns the mode set for the context.

-- Data type: enum gpgme\_pinentry\_mode\_t  
SINCE: 1.4.0

The gpgme\_minentry\_mode\_t type specifies the set of possible pinentry modes that are supported by GPGME if GnuPG >= 2.1 is used. The following modes are supported:

GPGME\_PINENTRY\_MODE\_DEFAULT  
SINCE: 1.4.0

Use the default of the agent, which is ask.

GPGME\_PINENTRY\_MODE\_ASK

SINCE: 1.4.0

Force the use of the Pinentry.

GPGME\_PINENTRY\_MODE\_CANCEL

SINCE: 1.4.0

Emulate use of Pinentrys cancel button.

GPGME\_PINENTRY\_MODE\_ERROR

SINCE: 1.4.0

Return a Pinentry error No Pinentry.

GPGME\_PINENTRY\_MODE\_LOOPBACK

SINCE: 1.4.0

Redirect Pinentry queries to the caller. This enables the use of `gpgme_set_passphrase_cb` because pinentry queries are redirected to `gpgme`.

Note: For 2.1.0 - 2.1.12 this mode requires `allow-loopback-pinentry` to be enabled in the `gpg-agent.conf` or an agent started with that option.

File: `gpgme.info`, Node: Included Certificates, Next: Key Listing Mode, Prev: Pinentry Mode, Up: Context Attributes

#### 7.4.8 Included Certificates

-----

-- Function: `void gpgme_set_include_certs (gpgme_ctx_t CTX, int NR_OF_CERTS)`

The function `gpgme_set_include_certs` specifies how many certificates should be included in an S/MIME signed message. By default, only the senders certificate is included. The possible values of `NR_OF_CERTS` are:

GPGME\_INCLUDE\_CERTS\_DEFAULT

SINCE: 1.0.3

Fall back to the default of the crypto backend. This is the default for GPGME.

-2

Include all certificates except the root certificate.

-1

Include all certificates.

0

Include no certificates.

1

Include the senders certificate only.

n

Include the first n certificates of the certificates path, starting from the senders certificate. The number n must be positive.

Values of NR\_OF\_CERTS smaller than -2 are undefined.

This option is only relevant to the CMS crypto engine, and ignored by all other engines.

-- Function: int gpgme\_get\_include\_certs (gpgme\_ctx\_t CTX)  
The function gpgme\_get\_include\_certs returns the number of certificates to include into an S/MIME signed message.

File: gpgme.info, Node: Key Listing Mode, Next: Passphrase Callback, Prev: Included Certificates, Up: Context Attributes

#### 7.4.9 Key Listing Mode

-----

-- Function: gpgme\_error\_t gpgme\_set\_keylist\_mode (gpgme\_ctx\_t CTX, gpgme\_keylist\_mode\_t MODE)  
The function gpgme\_set\_keylist\_mode changes the default behaviour of the key listing functions. The value in MODE is a bitwise-or combination of one or multiple of the following bit values:

##### GPGME\_KEYLIST\_MODE\_LOCAL

The GPGME\_KEYLIST\_MODE\_LOCAL symbol specifies that the local keyring should be searched for keys in the keylisting operation. This is the default.

Using only this option results in a --list-keys.

##### GPGME\_KEYLIST\_MODE\_EXTERN

The GPGME\_KEYLIST\_MODE\_EXTERN symbol specifies that an external source should be searched for keys in the keylisting operation. The type of external source is dependent on the crypto engine used and whether it is combined with GPGME\_KEYLIST\_MODE\_LOCAL. For example, it can be a remote

keyserver or LDAP certificate server.

Using only this option results in a `--search-keys` for `GPGME_PROTOCOL_OpenPGP` and something similar to `--list-external-keys` for `GPGME_PROTOCOL_CMS`.

#### `GPGME_KEYLIST_MODE_LOCATE`

This is a shortcut for the combination of `GPGME_KEYLIST_MODE_LOCAL` and `GPGME_KEYLIST_MODE_EXTERN`, which results in a `--locate-keys` for `GPGME_PROTOCOL_OpenPGP`.

#### `GPGME_KEYLIST_MODE_SIGS`

The `GPGME_KEYLIST_MODE_SIGS` symbol specifies that the key signatures should be included in the listed keys.

#### `GPGME_KEYLIST_MODE_SIG_NOTATIONS`

SINCE: 1.1.1

The `GPGME_KEYLIST_MODE_SIG_NOTATIONS` symbol specifies that the signature notations on key signatures should be included in the listed keys. This only works if `GPGME_KEYLIST_MODE_SIGS` is also enabled.

#### `GPGME_KEYLIST_MODE_WITH_TOFU`

SINCE: 1.7.0

The `GPGME_KEYLIST_MODE_WITH_TOFU` symbol specifies that information pertaining to the TOFU trust model should be included in the listed keys.

#### `GPGME_KEYLIST_MODE_WITH_SECRET`

SINCE: 1.5.1

The `GPGME_KEYLIST_MODE_WITH_SECRET` returns information about the presence of a corresponding secret key in a public key listing. A public key listing with this mode is slower than a standard listing but can be used instead of a second run to list the secret keys. This is only supported for GnuPG versions  $\geq 2.1$ .

#### `GPGME_KEYLIST_MODE_EPHEMERAL`

SINCE: 1.2.0

The `GPGME_KEYLIST_MODE_EPHEMERAL` symbol specifies that keys flagged as ephemeral are included in the listing.

#### `GPGME_KEYLIST_MODE_VALIDATE`

SINCE: 0.4.5

The `GPGME_KEYLIST_MODE_VALIDATE` symbol specifies that the backend should do key or certificate validation and not just get the validity information from an internal cache. This might be an expensive operation and is in general not useful. Currently only implemented for the S/MIME backend and ignored for other backends.

At least one of `GPGME_KEYLIST_MODE_LOCAL` and `GPGME_KEYLIST_MODE_EXTERN` must be specified. For future binary compatibility, you should get the current mode with `gpgme_get_keylist_mode` and modify it by setting or clearing the appropriate bits, and then using that calculated value in the `gpgme_set_keylisting_mode` operation. This will leave all other bits in the mode value intact (in particular those that are not used in the current version of the library).

The function returns the error code `GPG_ERR_NO_ERROR` if the mode could be set correctly, and `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer or `MODE` is not a valid mode.

-- Function: `gpgme_keylist_mode_t gpgme_get_keylist_mode`  
(`gpgme_ctx_t CTX`)

The function `gpgme_get_keylist_mode` returns the current key listing mode of the context `CTX`. This value can then be modified and used in a subsequent `gpgme_set_keylist_mode` operation to only affect the desired bits (and leave all others intact).

The function returns 0 if `CTX` is not a valid pointer, and the current mode otherwise. Note that 0 is not a valid mode value.

File: `gpgme.info`, Node: `Passphrase Callback`, Next: `Progress Meter Callback`, Prev: `Key Listing Mode`, Up: `Context Attributes`

#### 7.4.10 Passphrase Callback

-----

-- Data type: `gpgme_error_t (*gpgme_passphrase_cb_t)(void *HOOK, const char *UID_HINT, const char *PASSPHRASE_INFO, int PREV_WAS_BAD, int FD)`

The `gpgme_passphrase_cb_t` type is the type of functions usable as passphrase callback function.

The argument `UID_HINT` might contain a string that gives an indication for which user ID the passphrase is required. If this is not available, or not applicable (in the case of symmetric

encryption, for example), `UID_HINT` will be `NULL`.

The argument `PASSPHRASE_INFO`, if not `NULL`, will give further information about the context in which the passphrase is required. This information is engine and operation specific.

If this is the repeated attempt to get the passphrase, because previous attempts failed, then `PREV_WAS_BAD` is 1, otherwise it will be 0.

The user must write the passphrase, followed by a newline character, to the file descriptor `FD`. The function `gpgme_io_writen` should be used for the write operation. Note that if the user returns 0 to indicate success, the user must at least write a newline character before returning from the callback.

If an error occurs, return the corresponding `gpgme_error_t` value. You can use the error code `GPG_ERR_CANCELED` to abort the operation. Otherwise, return 0.

Note: The `passphrase_cb` only works with GnuPG 1.x and 2.1.x and not with the 2.0.x series. See `gpgme_set_pinentry_mode` for more details on 2.1.x usage.

-- Function: `void gpgme_set_passphrase_cb (gpgme_ctx_t CTX, gpgme_passphrase_cb_t PASSFUNC, void *HOOK_VALUE)`  
The function `gpgme_set_passphrase_cb` sets the function that is used when a passphrase needs to be provided by the user to `PASSFUNC`. The function `PASSFUNC` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `HOOK_VALUE`. By default, no passphrase callback function is set.

Not all crypto engines require this callback to retrieve the passphrase. It is better if the engine retrieves the passphrase from a trusted agent (a daemon process), rather than having each user to implement their own passphrase query. Some engines do not even support an external passphrase callback at all, in this case the error code `GPG_ERR_NOT_SUPPORTED` is returned.

For GnuPG  $\geq$  2.1 the pinentry mode has to be set to `GPGME_PINENTRY_MODE_LOOPBACK` to enable the passphrase callback. See `gpgme_set_pinentry_mode`.

The user can disable the use of a passphrase callback function by calling `gpgme_set_passphrase_cb` with `PASSFUNC` being `NULL`.

-- Function: `void gpgme_get_passphrase_cb (gpgme_ctx_t CTX,`

gpgme\_passphrase\_cb\_t \*PASSFUNC, void \*\*HOOK\_VALUE)

The function gpgme\_get\_passphrase\_cb returns the function that is used when a passphrase needs to be provided by the user in \*PASSFUNC, and the first argument for this function in \*HOOK\_VALUE.

If no passphrase callback is set, or CTX is not a valid pointer, NULL is returned in both variables.

PASSFUNC or HOOK\_VALUE can be NULL. In this case, the corresponding value will not be returned.

File: gpgme.info, Node: Progress Meter Callback, Next: Status Message Callback, Prev: Passphrase Callback, Up: Context Attributes

#### 7.4.11 Progress Meter Callback

-----  
-- Data type: void (\*gpgme\_progress\_cb\_t)(void \*HOOK, const char \*WHAT, int TYPE, int CURRENT, int TOTAL)

The gpgme\_progress\_cb\_t type is the type of functions usable as progress callback function.

The arguments are specific to the crypto engine. More information about the progress information returned from the GnuPG engine can be found in the GnuPG source code in the file doc/DETAILS in the section PROGRESS.

-- Function: void gpgme\_set\_progress\_cb (gpgme\_ctx\_t CTX, gpgme\_progress\_cb\_t PROGFUNC, void \*HOOK\_VALUE)  
The function gpgme\_set\_progress\_cb sets the function that is used when progress information about a cryptographic operation is available. The function PROGFUNC needs to be implemented by the user, and whenever it is called, it is called with its first argument being HOOK\_VALUE. By default, no progress callback function is set.

Setting a callback function allows an interactive program to display progress information about a long operation to the user.

The user can disable the use of a progress callback function by calling gpgme\_set\_progress\_cb with PROGFUNC being NULL.

-- Function: void gpgme\_get\_progress\_cb (gpgme\_ctx\_t CTX, gpgme\_progress\_cb\_t \*PROGFUNC, void \*\*HOOK\_VALUE)  
The function gpgme\_get\_progress\_cb returns the function that is used to inform the user about the progress made in \*PROGFUNC, and the first argument for this function in \*HOOK\_VALUE. If no progress callback is set, or CTX is not a valid pointer, NULL is



returned in both variables.

PROGFUNC or HOOK\_VALUE can be NULL. In this case, the corresponding value will not be returned.

File: gpgme.info, Node: Status Message Callback, Next: Context Flags, Prev: Progress Meter Callback, Up: Context Attributes

#### 7.4.12 Status Message Callback

-----  
-- Data type: gpgme\_error\_t (\*gpgme\_status\_cb\_t)(void \*HOOK, const char \*KEYWORD, const char \*ARGS)

The gpgme\_status\_cb\_t type is the type of function usable as a status message callback function.

The argument KEYWORD is the name of the status message while the ARGS argument contains any arguments for the status message.

If an error occurs, return the corresponding gpgme\_error\_t value. Otherwise, return 0.

-- Function: void gpgme\_set\_status\_cb (gpgme\_ctx\_t CTX, gpgme\_status\_cb\_t STATUSFUNC, void \*HOOK\_VALUE)  
SINCE: 1.6.0

The function gpgme\_set\_status\_cb sets the function that is used when a status message is received from gpg to STATUSFUNC. The function STATUSFUNC needs to be implemented by the user, and whenever it is called, it is called with its first argument being HOOK\_VALUE. By default, no status message callback function is set.

The user can disable the use of a status message callback function by calling gpgme\_set\_status\_cb with STATUSFUNC being NULL.

-- Function: void gpgme\_get\_status\_cb (gpgme\_ctx\_t CTX, gpgme\_status\_cb\_t \*STATUSFUNC, void \*\*HOOK\_VALUE)  
SINCE: 1.6.0

The function gpgme\_get\_status\_cb returns the function that is used to process status messages from gpg in \*STATUSFUNC, and the first argument for this function in \*HOOK\_VALUE. If no status message callback is set, or CTX is not a valid pointer, NULL is returned in both variables.

### 7.4.13 Context Flags

-----

-- Function: `gpgme_error_t gpgme_set_ctx_flag (gpgme_ctx_t CTX,  
const char *NAME, const char *VALUE)`

SINCE: 1.7.0

Some minor properties of the context can be controlled with flags set by this function. The properties are identified by the following values for NAME:

#### "redraw"

This flag is normally not changed by the caller because GPGME sets and clears it automatically: The flag is cleared before an operation and set if an operation noticed that the engine has launched a Pinentry. A Curses based application may use this information to redraw the screen; for example:

```
err = gpgme_op_keylist_start (ctx, "foo@example.org", 0);  
while (!err)  
{  
    err = gpgme_op_keylist_next (ctx, &key);  
    if (err)  
        break;  
    show_key (key);  
    gpgme_key_release (key);  
}  
if ((s = gpgme_get_ctx_flag (ctx, "redraw")) && *s)  
    redraw_screen ();  
gpgme_release (ctx);
```

#### "full-status"

Using a VALUE of "1" the status callback set by `gpgme_set_status_cb` returns all status lines with the exception of PROGRESS lines. With the default of "0" the status callback is only called in certain situations.

#### "raw-description"

Setting the VALUE to "1" returns human readable strings in a raw format. For example the non breaking space characters ("~") will not be removed from the description field of the `gpgme_tofu_info_t` object.

#### "export-session-key"

Using a VALUE of "1" specifies that the context should try to

export the symmetric session key when decrypting data. By default, or when using an empty string or "0" for VALUE, session keys are not exported.

#### "override-session-key"

The string given in VALUE is passed to the GnuPG engine to override the session key for decryption. The format of that session key is specific to GnuPG and can be retrieved during a decrypt operation when the context flag "export-session-key" is enabled. Please be aware that using this feature with GnuPG < 2.1.16 will leak the session key on many platforms via ps(1).

#### "auto-key-retrieve"

Setting the VALUE to "1" asks the backend to automatically retrieve a key for signature verification if possible. Note that this option makes a "web bug" like behavior possible. Keyserver or Web Key Directory operators can see which keys you request, so by sending you a message signed by a brand new key (which you naturally will not have on your local keyring), the operator can tell both your IP address and the time when you verified the signature.

#### "request-origin"

The string given in VALUE is passed to the GnuPG engines to request restrictions based on the origin of the request. Valid values are documented in the GnuPG manual and the gpg man page under the option --request-origin. Requires at least GnuPG 2.2.6 to have an effect.

#### "no-symkey-cache"

For OpenPGP disable the passphrase cache used for symmetrical en- and decryption. This cache is based on the message specific salt value. Requires at least GnuPG 2.2.7 to have an effect.

#### "ignore-mdc-error"

This flag passes the option --ignore-mdc-error to gpg. This can be used to force decryption of a message which failed due to a missing integrity check. This flag must be used with great caution and only if it is a known non-corrupted old message and the decryption result of the former try had the decryption result flag legacy\_cipher\_nomdc set. For failsafe reasons this flag is reset after each operation.

#### "auto-key-locate"

The string given in VALUE is passed to gpg. This can be used to change the behavior of a GPGME\_KEYLIST\_MODE\_LOCATE

keylisting. Valid values are documented in the GnuPG manual and the `gpg` man page under the option `--auto-key-locate`. Requires at least GnuPG 2.1.18.

Note: Keys retrieved through `auto-key-locate` are automatically imported in the keyring.

`trust-model`

SINCE: 1.11.2

Change the `trust-model` for all GnuPG engine operations. An empty string sets the `trust-model` back to the users default. If the `trust-model` is not supported by GnuPG the behavior is undefined and will likely cause all operations to fail. Example: `"tofu+pgp"`.

This options should be used carefully with a strict version requirement. In some versions of GnuPG setting the `trust-model` changes the default `trust-model` for future operations. A change in the `trust-model` also can have unintended side effects, like rebuilding the `trust-db`.

This function returns 0 on success.

-- Function: `const char * gpgme_get_ctx_flag (gpgme_ctx_t CTX, const char *NAME)`

SINCE: 1.8.0

The value of flags settable by `gpgme_set_ctx_flag` can be retrieved by this function. If `NAME` is unknown the function returns `NULL`. For boolean flags an empty string is returned for False and the string `"1"` is returned for True; either `atoi(3)` or a test for an empty string can be used to get the boolean value.

File: `gpgme.info`, Node: `Locale`, Next: `Additional Logs`, Prev: `Context Flags`, Up: `Context Attributes`

#### 7.4.14 Locale

-----

A locale setting can be associated with a context. This locale is passed to the crypto engine, and used for applications like the PIN entry, which is displayed to the user when entering a passphrase is required.

The default locale is used to initialize the locale setting of all contexts created afterwards.

-- Function: `gpgme_error_t gpgme_set_locale (gpgme_ctx_t CTX,  
int CATEGORY, const char *VALUE)`  
SINCE: 0.4.3

The function `gpgme_set_locale` sets the locale of the context `CTX`, or the default locale if `CTX` is a null pointer.

The locale settings that should be changed are specified by `CATEGORY`. Supported categories are `LC_CTYPE`, `LC_MESSAGES`, and `LC_ALL`, which is a wildcard you can use if you want to change all the categories at once.

The value to be used for the locale setting is `VALUE`, which will be copied to GPGMEs internal data structures. `VALUE` can be a null pointer, which disables setting the locale, and will make PIN entry and other applications use their default setting, which is usually not what you want.

Note that the settings are only used if the application runs on a text terminal, and that the settings should fit the configuration of the output terminal. Normally, it is sufficient to initialize the default value at startup.

The function returns an error if not enough memory is available.

File: `gpgme.info`, Node: Additional Logs, Prev: Locale, Up: Context Attributes

#### 7.4.15 Additional Logs

-----

Additional logs can be associated with a context. These logs are engine specific and can be obtained with `gpgme_op_getauditlog`.

-- Function: `gpgme_error_t gpgme_op_getauditlog (gpgme_ctx_t CTX,  
gpgme_data_t OUTPUT, unsigned int FLAGS)`  
SINCE: 1.1.1

The function `gpgme_op_getauditlog` is used to obtain additional logs as specified by `FLAGS` into the `OUTPUT` data. If

The function returns the error code `GPG_ERR_NO_ERROR` if a log could be queried from the engine, and `GPG_ERR_NOT_IMPLEMENTED` if the log specified in `FLAGS` is not available for this engine. If no log is available `GPG_ERR_NO_DATA` is returned.

The value in `FLAGS` is a bitwise-or combination of one or multiple

of the following bit values:

#### GPGME\_AUDITLOG\_DIAG

SINCE: 1.11.2

Obtain diagnostic output which would be written to stderr in interactive use of the engine. This can be used to provide additional diagnostic information in case of errors in other operations.

Note: If log-file has been set in the configuration the log will be empty and GPG\_ERR\_NO\_DATA will be returned.

Implemented for: GPGME\_PROTOCOL\_OpenPGP

#### GPGME\_AUDITLOG\_DEFAULT

SINCE: 1.11.2

This flag has the value 0 for compatibility reasons. Obtains additional information from the engine by issuing the GETAUDITLOG command. For GPGME\_PROTOCOL\_CMS this provides additional information about the X509 certificate chain.

Implemented for: GPGME\_PROTOCOL\_CMS

#### GPGME\_AUDITLOG\_HTML

SINCE: 1.1.1

Same as GPGME\_AUDITLOG\_DEFAULT but in HTML.

Implemented for: GPGME\_PROTOCOL\_CMS

-- Function: gpgme\_error\_t gpgme\_op\_getauditlog\_start (gpgme\_ctx\_t CTX, gpgme\_data\_t OUTPUT, unsigned int FLAGS)

SINCE: 1.1.1

This is the asynchronous variant of gpgme\_op\_getauditlog.

File: gpgme.info, Node: Key Management, Next: Trust Item Management, Prev: Context Attributes, Up: Contexts

### 7.5 Key Management

=====

Some of the cryptographic operations require that recipients or signers are specified. This is always done by specifying the respective keys that should be used for the operation. The following section describes how such keys can be selected and manipulated.

- \* Menu:
- \* Key objects:: Description of the key structures.
- \* Listing Keys:: Browsing the list of available keys.
- \* Information About Keys:: Requesting detailed information about keys.
- \* Manipulating Keys:: Operations on keys.
- \* Generating Keys:: Creating new key pairs.
- \* Signing Keys:: Adding key signatures to public keys.
- \* Exporting Keys:: Retrieving key data from the key ring.
- \* Importing Keys:: Adding keys to the key ring.
- \* Deleting Keys:: Removing keys from the key ring.
- \* Changing Passphrases:: Change the passphrase of a key.
- \* Changing TOFU Data:: Changing data pertaining to TOFU.
- \* Advanced Key Editing:: Advanced key edit operation.

File: gpgme.info, Node: Key objects, Next: Listing Keys, Up: Key Management

### 7.5.1 Key objects

-----

The keys are represented in GPGME by structures which may only be read by the application but never be allocated or changed. They are valid as long as the key object itself is valid.

-- Data type: gpgme\_key\_t

The gpgme\_key\_t type is a pointer to a key object. It has the following members:

gpgme\_keylist\_mode\_t keylist\_mode  
 SINCE: 0.9.0

The keylist mode that was active when the key was retrieved.

unsigned int revoked : 1  
 This is true if the key is revoked.

unsigned int expired : 1  
 This is true if the key is expired.

unsigned int disabled : 1  
 This is true if the key is disabled.

unsigned int invalid : 1  
 This is true if the key is invalid. This might have several reasons, for a example for the S/MIME backend, it will be set

during key listings if the key could not be validated due to missing certificates or unmatched policies.

unsigned int can\_encrypt : 1

This is true if the key (ie one of its subkeys) can be used for encryption.

unsigned int can\_sign : 1

This is true if the key (ie one of its subkeys) can be used to create data signatures.

unsigned int can\_certify : 1

This is true if the key (ie one of its subkeys) can be used to create key certificates.

unsigned int can\_authenticate : 1

SINCE: 0.4.5

This is true if the key (ie one of its subkeys) can be used for authentication.

unsigned int is\_qualified : 1

SINCE: 1.1.0

This is true if the key can be used for qualified signatures according to local government regulations.

unsigned int secret : 1

This is true if the key is a secret key. Note, that this will always be true even if the corresponding subkey flag may be false (offline/stub keys). This is only set if a listing of secret keys has been requested or if GPGME\_KEYLIST\_MODE\_WITH\_SECRET is active.

unsigned int origin : 5

SINCE: 1.8.0

Reserved for the origin of this key.

gpgme\_protocol\_t protocol

This is the protocol supported by this key.

char \*issuer\_serial

If protocol is GPGME\_PROTOCOL\_CMS, then this is the issuer serial.

char \*issuer\_name

If protocol is GPGME\_PROTOCOL\_CMS, then this is the issuer



name.

char \*chain\_id

If protocol is GPGME\_PROTOCOL\_CMS, then this is the chain ID, which can be used to built the certificate chain.

gpgme\_validity\_t owner\_trust

If protocol is GPGME\_PROTOCOL\_OpenPGP, then this is the owner trust.

gpgme\_subkey\_t subkeys

This is a linked list with the subkeys of the key. The first subkey in the list is the primary key and usually available.

gpgme\_user\_id\_t uids

This is a linked list with the user IDs of the key. The first user ID in the list is the main (or primary) user ID.

char \*fpr

SINCE: 1.7.0

This field gives the fingerprint of the primary key. Note that this is a copy of the fingerprint of the first subkey. For an incomplete key (for example from a verification result) a subkey may be missing but this field may be set nevertheless.

unsigned long last\_update

SINCE: 1.8.0

Reserved for the time of the last update of this key.

-- Data type: gpgme\_subkey\_t

SINCE: 1.5.0

The gpgme\_subkey\_t type is a pointer to a subkey structure. Subkeys are one component of a gpgme\_key\_t object. In fact, subkeys are those parts that contains the real information about the individual cryptographic keys that belong to the same key object. One gpgme\_key\_t can contain several subkeys. The first subkey in the linked list is also called the primary key.

The subkey structure has the following members:

gpgme\_subkey\_t next

This is a pointer to the next subkey structure in the linked list, or NULL if this is the last element.

unsigned int revoked : 1

This is true if the subkey is revoked.

unsigned int expired : 1

This is true if the subkey is expired.

unsigned int disabled : 1

This is true if the subkey is disabled.

unsigned int invalid : 1

This is true if the subkey is invalid.

unsigned int can\_encrypt : 1

This is true if the subkey can be used for encryption.

unsigned int can\_sign : 1

This is true if the subkey can be used to create data signatures.

unsigned int can\_certify : 1

This is true if the subkey can be used to create key certificates.

unsigned int can\_authenticate : 1

SINCE: 0.4.5

This is true if the subkey can be used for authentication.

unsigned int is\_qualified : 1

SINCE: 1.1.0

This is true if the subkey can be used for qualified signatures according to local government regulations.

unsigned int is\_de\_vs : 1

SINCE: 1.8.0

This is true if the subkey complies with the rules for classified information in Germany at the restricted level (VS-NfD). This are currently RSA keys of at least 2048 bits or ECDH/ECDSA keys using a Brainpool curve.

unsigned int secret : 1

This is true if the subkey is a secret key. Note that it will be false if the key is actually a stub key; i.e. a secret key operation is currently not possible (offline-key). This is only set if a listing of secret keys has been requested or if GPGME\_KEYLIST\_MODE\_WITH\_SECRET is active.

gpgme\_pubkey\_algo\_t pubkey\_algo

This is the public key algorithm supported by this subkey.

unsigned int length

This is the length of the subkey (in bits).

char \*keyid

This is the key ID of the subkey in hexadecimal digits.

char \*fpr

This is the fingerprint of the subkey in hexadecimal digits, if available.

char \*keygrip

SINCE: 1.7.0

The keygrip of the subkey in hex digit form or NULL if not available.

long int timestamp

This is the creation timestamp of the subkey. This is -1 if the timestamp is invalid, and 0 if it is not available.

long int expires

This is the expiration timestamp of the subkey, or 0 if the subkey does not expire.

unsigned int is\_cardkey : 1

SINCE: 1.2.0

True if the secret key is stored on a smart card.

char \*card\_number

SINCE: 1.2.0

The serial number of a smart card holding this key or NULL.

char \*curve

For ECC algorithms the name of the curve.

-- Data type: gpgme\_user\_id\_t

A user ID is a component of a gpgme\_key\_t object. One key can have many user IDs. The first one in the list is the main (or primary) user ID.

The user ID structure has the following members.

gpgme\_user\_id\_t next

This is a pointer to the next user ID structure in the linked list, or NULL if this is the last element.

unsigned int revoked : 1

This is true if the user ID is revoked.

unsigned int invalid : 1

This is true if the user ID is invalid.

gpgme\_validity\_t validity

This specifies the validity of the user ID.

char \*uid

This is the user ID string.

char \*name

This is the name component of uid, if available.

char \*comment

This is the comment component of uid, if available.

char \*email

This is the email component of uid, if available.

char \*address;

The mail address (addr-spec from RFC-5322) of the user ID string. This is general the same as the email part of this structure but might be slightly different. If no mail address is available NULL is stored.

gpgme\_tofu\_info\_t tofu

SINCE: 1.7.0

If not NULL information from the TOFU database pertaining to this user id.

gpgme\_key\_sig\_t signatures

This is a linked list with the signatures on this user ID.

unsigned int origin : 5

SINCE: 1.8.0

Reserved for the origin of this user ID.

unsigned long last\_update

SINCE: 1.8.0

Reserved for the time of the last update of this user ID.

-- Data type: `gpgme_tofu_info_t`

SINCE: 1.7.0

The `gpgme_tofu_info_t` type is a pointer to a tofu info structure. Tofu info structures are one component of a `gpgme_user_id_t` object, and provide information from the TOFU database pertaining to the user ID.

The tofu info structure has the following members:

`gpgme_key_sig_t next`

This is a pointer to the next tofu info structure in the linked list, or NULL if this is the last element.

`unsigned int validity : 3`

This is the TOFU validity. It can have the following values:

0

The value 0 indicates a conflict.

1

The value 1 indicates a key without history.

2

The value 2 indicates a key with too little history.

3

The value 3 indicates a key with enough history for basic trust.

4

The value 4 indicates a key with a lot of history.

`unsigned int policy : 4`

This is the TOFU policy, see `gpgme_tofu_policy_t`.

`unsigned short signcount`

This is the number of signatures seen for this binding (or USHRT\_MAX if there are more than that).

`unsigned short encrcount`

This is the number of encryptions done with this binding (or USHRT\_MAX if there are more than that).

unsigned long signfirst

Number of seconds since Epoch when the first signature was seen with this binding.

unsigned long signlast

Number of seconds since Epoch when the last signature was seen with this binding.

unsigned long encrfirst

Number of seconds since Epoch when the first encryption was done with this binding.

unsigned long enclast

Number of seconds since Epoch when the last encryption was done with this binding.

char \*description

A human-readable string summarizing the TOFU data (or NULL).

-- Data type: gpgme\_key\_sig\_t

The gpgme\_key\_sig\_t type is a pointer to a key signature structure. Key signatures are one component of a gpgme\_key\_t object, and validate user IDs on the key in the OpenPGP protocol.

The signatures on a key are only available if the key was retrieved via a listing operation with the GPGME\_KEYLIST\_MODE\_SIGS mode enabled, because it can be expensive to retrieve all signatures of a key.

The signature notations on a key signature are only available if the key was retrieved via a listing operation with the GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS mode enabled, because it can be expensive to retrieve all signature notations.

The key signature structure has the following members:

gpgme\_key\_sig\_t next

This is a pointer to the next key signature structure in the linked list, or NULL if this is the last element.

unsigned int revoked : 1

This is true if the key signature is a revocation signature.

unsigned int expired : 1

This is true if the key signature is expired.

unsigned int invalid : 1

This is true if the key signature is invalid.

unsigned int exportable : 1

This is true if the key signature is exportable.

gpgme\_pubkey\_algo\_t pubkey\_algo

This is the public key algorithm used to create the signature.

char \*keyid

This is the key ID of the key (in hexadecimal digits) used to create the signature.

long int timestamp

This is the creation timestamp of the key signature. This is -1 if the timestamp is invalid, and 0 if it is not available.

long int expires

This is the expiration timestamp of the key signature, or 0 if the key signature does not expire.

gpgme\_error\_t status

This is the status of the signature and has the same meaning as the member of the same name in a `gpgme_signature_t` object.

unsigned int sig\_class

This specifies the signature class of the key signature. The meaning is specific to the crypto engine.

char \*uid

This is the main user ID of the key used to create the signature.

char \*name

This is the name component of uid, if available.

char \*comment

This is the comment component of uid, if available.

char \*email

This is the email component of uid, if available.

gpgme\_sig\_notation\_t notations

This is a linked list with the notation data and policy URLs.

File: [gpgme.info](#), Node: [Listing Keys](#), Next: [Information About Keys](#), Prev: [Key objects](#), Up: [Key Management](#)

## 7.5.2 Listing Keys

-----  
-- Function: `gpgme_error_t gpgme_op_keylist_start (gpgme_ctx_t CTX,  
const char *PATTERN, int SECRET_ONLY)`

The function `gpgme_op_keylist_start` initiates a key listing operation inside the context `CTX`. It sets everything up so that subsequent invocations of `gpgme_op_keylist_next` return the keys in the list.

If `PATTERN` is `NULL`, all available keys are returned. Otherwise, `PATTERN` contains an engine specific expression that is used to limit the list to all keys matching the pattern. Note that the total length of the pattern is restricted to an engine-specific maximum (a couple of hundred characters are usually accepted). The pattern should be used to restrict the search to a certain common name or user, not to list many specific keys at once by listing their fingerprints or key IDs.

If `SECRET_ONLY` is not 0, the list is restricted to secret keys only.

The context will be busy until either all keys are received (and `gpgme_op_keylist_next` returns `GPG_ERR_EOF`), or `gpgme_op_keylist_end` is called to finish the operation.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_keylist_ext_start (gpgme_ctx_t CTX,  
const char *PATTERN[], int SECRET_ONLY, int RESERVED)`

The function `gpgme_op_keylist_ext_start` initiates an extended key listing operation inside the context `CTX`. It sets everything up so that subsequent invocations of `gpgme_op_keylist_next` return the keys in the list.

If `PATTERN` or `*PATTERN` is `NULL`, all available keys are returned. Otherwise, `PATTERN` is a `NULL` terminated array of strings that are used to limit the list to all keys matching at least one of the patterns verbatim. Note that the total length of all patterns is restricted to an engine-specific maximum (the exact limit also depends on the number of patterns and amount of quoting required, but a couple of hundred characters are usually accepted). Patterns should be used to restrict the search to a certain common name or user, not to list many specific keys at once by listing their



fingerprints or key IDs.

If `SECRET_ONLY` is not 0, the list is restricted to secret keys only.

The value of `RESERVED` must be 0.

The context will be busy until either all keys are received (and `gpgme_op_keylist_next` returns `GPG_ERR_EOF`), or `gpgme_op_keylist_end` is called to finish the operation.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

```
-- Function: gpgme_error_t gpgme_op_keylist_from_data_start  
           (gpgme_ctx_t CTX, gpgme_data_t DATA, int RESERVED)
```

SINCE: 1.8.0

The function `gpgme_op_keylist_from_data_start` initiates a key listing operation inside the context `CTX`. In contrast to the other key listing operation the keys are read from the supplied `DATA` and not from the local key database. The keys are also not imported into the local key database. The function sets everything up so that subsequent invocations of `gpgme_op_keylist_next` return the keys from `DATA`.

The value of `RESERVED` must be 0.

This function requires at least GnuPG version 2.1.14 and currently works only with OpenPGP keys.

The context will be busy until either all keys are received (and `gpgme_op_keylist_next` returns `GPG_ERR_EOF`), or `gpgme_op_keylist_end` is called to finish the operation. While the context is busy `DATA` may not be released.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

```
-- Function: gpgme_error_t gpgme_op_keylist_next (gpgme_ctx_t CTX,  
           gpgme_key_t *R_KEY)
```

The function `gpgme_op_keylist_next` returns the next key in the list created by a previous `gpgme_op_keylist_start` operation in the context `CTX`. The key will have one reference for the user.

\*Note Manipulating Keys::

This is the only way to get at `gpgme_key_t` objects in GPGME.

If the last key in the list has already been returned, `gpgme_op_keylist_next` returns `GPG_ERR_EOF`.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` or `R_KEY` is not a valid pointer, and `GPG_ERR_ENOMEM` if there is not enough memory for the operation.

-- Function: `gpgme_error_t gpgme_op_keylist_end (gpgme_ctx_t CTX)`

The function `gpgme_op_keylist_end` ends a pending key list operation in the context `CTX`.

After the operation completed successfully, the result of the key listing operation can be retrieved with `gpgme_op_keylist_result`.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and `GPG_ERR_ENOMEM` if at some time during the operation there was not enough memory available.

The following example illustrates how all keys containing a certain string (`g10code`) can be listed with their key ID and the name and email address of the main user ID:

```
gpgme_ctx_t ctx;
gpgme_key_t key;
gpgme_error_t err = gpgme_new (&ctx);

if (!err)
{
    err = gpgme_op_keylist_start (ctx, "g10code", 0);
    while (!err)
    {
        err = gpgme_op_keylist_next (ctx, &key);
        if (err)
            break;
        printf ("%s:", key->subkeys->keyid);
        if (key->uids && key->uids->name)
            printf (" %s", key->uids->name);
        if (key->uids && key->uids->email)
            printf (" <%s>", key->uids->email);
        putchar ('\n');
        gpgme_key_release (key);
    }
    gpgme_release (ctx);
}
```

```

}
if (gpg_err_code (err) != GPG_ERR_EOF)
{
    fprintf (stderr, "can not list keys: %s\n", gpgme_strerror (err));
    exit (1);
}

```

-- Data type: `gpgme_keylist_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_keylist_*` operation. After successfully ending a key listing operation, you can retrieve the pointer to the result with `gpgme_op_keylist_result`. The structure contains the following member:

`unsigned int truncated : 1`

This is true if the crypto backend had to truncate the result, and less than the desired keys could be listed.

-- Function: `gpgme_keylist_result_t gpgme_op_keylist_result (gpgme_ctx_t CTX)`

The function `gpgme_op_keylist_result` returns a `gpgme_keylist_result_t` pointer to a structure holding the result of a `gpgme_op_keylist_*` operation. The pointer is only valid if the last operation on the context was a key listing operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

In a simple program, for which a blocking operation is acceptable, the following function can be used to retrieve a single key.

-- Function: `gpgme_error_t gpgme_get_key (gpgme_ctx_t CTX, const char *FPR, gpgme_key_t *R_KEY, int SECRET)`

The function `gpgme_get_key` gets the key with the fingerprint (or key ID) `FPR` from the crypto backend and return it in `R_KEY`. If `SECRET` is true, get the secret key. The currently active keylist mode is used to retrieve the key. The key will have one reference for the user.

If the key is not found in the keyring, `gpgme_get_key` returns the error code `GPG_ERR_EOF` and `*R_KEY` will be set to `NULL`.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` or `R_KEY` is not a valid pointer or `FPR` is not a fingerprint or key ID, `GPG_ERR_AMBIGUOUS_NAME` if the key ID was not a unique specifier for a key, and `GPG_ERR_ENOMEM` if at some time during the operation there was not enough memory available.

File: gpgme.info, Node: Information About Keys, Next: Manipulating Keys, Prev: Listing Keys, Up: Key Management

### 7.5.3 Information About Keys

-----

Please see the beginning of this section for more information about `gpgme_key_t` objects.

-- Data type: `gpgme_validity_t`

The `gpgme_validity_t` type is used to specify the validity of a user ID in a key. The following validities are defined:

#### `GPGME_VALIDITY_UNKNOWN`

The user ID is of unknown validity. The string representation of this validity is `?`.

#### `GPGME_VALIDITY_UNDEFINED`

The validity of the user ID is undefined. The string representation of this validity is `q`.

#### `GPGME_VALIDITY_NEVER`

The user ID is never valid. The string representation of this validity is `n`.

#### `GPGME_VALIDITY_MARGINAL`

The user ID is marginally valid. The string representation of this validity is `m`.

#### `GPGME_VALIDITY_FULL`

The user ID is fully valid. The string representation of this validity is `f`.

#### `GPGME_VALIDITY_ULTIMATE`

The user ID is ultimately valid. The string representation of this validity is `u`.

File: gpgme.info, Node: Manipulating Keys, Next: Generating Keys, Prev: Information About Keys, Up: Key Management

### 7.5.4 Manipulating Keys

-----

-- Function: `void gpgme_key_ref (gpgme_key_t KEY)`

The function `gpgme_key_ref` acquires an additional reference for the key `KEY`.

-- Function: void gpgme\_key\_unref (gpgme\_key\_t KEY)  
The function gpgme\_key\_unref releases a reference for the key KEY. If this was the last reference, the key will be destroyed and all resources associated to it will be released.

File: gpgme.info, Node: Generating Keys, Next: Signing Keys, Prev: Manipulating Keys, Up: Key Management

### 7.5.5 Generating Keys

-----

GPGME provides a set of functions to create public key pairs. Most of these functions require the use of GnuPG 2.1 and later; for older GnuPG versions the gpgme\_op\_genkey function can be used. Existing code which wants to update to the new functions or new code which shall supports older GnuPG versions may try the new functions first and provide a fallback to the old function if the error code GPG\_ERR\_NOT\_SUPPORTED is received.

-- Function: gpgme\_error\_t gpgme\_op\_createkey (gpgme\_ctx\_t CTX,  
const char \*USERID, const char \*ALGO, unsigned long RESERVED,  
unsigned long EXPIRES, gpgme\_key\_t EXTRAKEY,  
unsigned int FLAGS);

SINCE: 1.7.0

The function gpgme\_op\_createkey generates a new key for the protocol active in the context CTX. As of now this function does only work for OpenPGP and requires at least version 2.1.13 of GnuPG.

USERID is commonly the mail address associated with the key. GPGME does not require a specific syntax but if more than a mail address is given, RFC-822 style format is suggested. The value is expected to be in UTF-8 encoding (i.e. no IDN encoding for mail addresses). This is a required parameter.

ALGO specifies the algorithm for the new key (actually a keypair of public and private key). For a list of supported algorithms, see the GnuPG manual. If ALGO is NULL or the string "default", the key is generated using the default algorithm of the engine. If the string "future-default" is used the engine may use an algorithm which is planned to be the default in a future release of the engine; however existing implementation of the protocol may not be able to already handle such future algorithms. For the OpenPGP protocol, the specification of a default algorithm, without requesting a non-default usage via FLAGS, triggers the creation of a primary key plus a secondary key (subkey).

RESERVED must be set to zero.

EXPIRES specifies the expiration time in seconds. If you supply 0, a reasonable expiration time is chosen. Use the flag GPGME\_CREATE\_NOEXPIRE to create keys that do not expire. Note that this parameter takes an unsigned long value and not a time\_t to avoid problems on systems which use a signed 32 bit time\_t. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

EXTRAKEY is currently not used and must be set to NULL. A future version of GPGME may use this parameter to create X.509 keys.

FLAGS can be set to the bit-wise OR of the following flags:

GPGME\_CREATE\_SIGN

GPGME\_CREATE\_ENCR

GPGME\_CREATE\_CERT

GPGME\_CREATE\_AUTH

SINCE: 1.7.0

Do not create the key with the default capabilities (key usage) of the requested algorithm but use those explicitly given by these flags: signing, encryption, certification, or authentication. The allowed combinations depend on the algorithm.

If any of these flags are set and a default algorithm has been selected only one key is created in the case of the OpenPGP protocol.

GPGME\_CREATE\_NOPASSWD

SINCE: 1.7.0

Request generation of the key without password protection.

GPGME\_CREATE\_SELFSIGNED

SINCE: 1.7.0

For an X.509 key do not create a CSR but a self-signed certificate. This has not yet been implemented.

GPGME\_CREATE\_NOSTORE

SINCE: 1.7.0

Do not store the created key in the local key database. This has not yet been implemented.

GPGME\_CREATE\_WANTPUB

GPGME\_CREATE\_WANTSEC

SINCE: 1.7.0

Return the public or secret key as part of the result structure. This has not yet been implemented.

GPGME\_CREATE\_FORCE

SINCE: 1.7.0

The engine does not allow the creation of a key with a user ID already existing in the local key database. This flag can be used to override this check.

GPGME\_CREATE\_NOEXPIRE

SINCE: 1.8.0

Request generation of keys that do not expire.

After the operation completed successfully, information about the created key can be retrieved with `gpgme_op_genkey_result`.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_createkey_start (gpgme_ctx_t CTX,  
    const char *USERID, const char *ALGO, unsigned long RESERVED,  
    unsigned long EXPIRES, gpgme_key_t EXTRAKEY,  
    unsigned int FLAGS);
```

SINCE: 1.7.0

The function `gpgme_op_createkey_start` initiates a `gpgme_op_createkey` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

```
-- Function: gpgme_error_t gpgme_op_createsubkey (gpgme_ctx_t CTX,  
    gpgme_key_t KEY, const char *ALGO, unsigned long RESERVED,  
    unsigned long EXPIRES, unsigned int FLAGS);
```

SINCE: 1.7.0

The function `gpgme_op_createsubkey` creates and adds a new subkey to the primary OpenPGP key given by `KEY`. The only allowed protocol in `CTX` is `GPGME_PROTOCOL_OPENPGP`. Subkeys (aka secondary keys)

are a concept in the OpenPGP protocol to bind several keys to a primary key. As of now this function requires at least version 2.1.13 of GnuPG.

KEY specifies the key to operate on.

ALGO specifies the algorithm for the new subkey. For a list of supported algorithms, see the GnuPG manual. If ALGO is NULL or the string "default", the subkey is generated using the default algorithm for an encryption subkey of the engine. If the string "future-default" is used the engine may use an encryption algorithm which is planned to be the default in a future release of the engine; however existing implementation of the protocol may not be able to already handle such future algorithms.

RESERVED must be set to zero.

EXPIRES specifies the expiration time in seconds. If you supply 0, a reasonable expiration time is chosen. Use the flag GPGME\_CREATE\_NOEXPIRE to create keys that do not expire. Note that this parameter takes an unsigned long value and not a time\_t to avoid problems on systems which use a signed 32 bit time\_t. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

FLAGS takes the same values as described above for gpgme\_op\_createkey.

After the operation completed successfully, information about the created key can be retrieved with gpgme\_op\_genkey\_result.

The function returns zero on success, GPG\_ERR\_NOT\_SUPPORTED if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_createsubkey_start
(gpgme_ctx_t CTX, gpgme_key_t KEY, const char *ALGO,
 unsigned long RESERVED, unsigned long EXPIRES,
 unsigned int FLAGS);
```

SINCE: 1.7.0

The function gpgme\_op\_createsubkey\_start initiates a gpgme\_op\_createsubkey operation; see there for details. It must be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

```
-- Function: gpgme_error_t gpgme_op_adduid (gpgme_ctx_t CTX,
```



gpgme\_key\_t KEY, const char \*USERID, unsigned int FLAGS);

SINCE: 1.7.0

The function `gpgme_op_adduid` adds a new user ID to the OpenPGP key given by `KEY`. Adding additional user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context `CTX` must be set to OpenPGP. As of now this function requires at least version 2.1.13 of GnuPG.

`KEY` specifies the key to operate on.

`USERID` is the user ID to add to the key. A user ID is commonly the mail address to be associated with the key. GPGME does not require a specific syntax but if more than a mail address is given, RFC-822 style format is suggested. The value is expected to be in UTF-8 encoding (i.e. no IDN encoding for mail addresses). This is a required parameter.

`FLAGS` are currently not used and must be set to zero.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

-- Function: `gpgme_error_t gpgme_op_adduid_start (gpgme_ctx_t CTX, gpgme_key_t KEY, const char *USERID, unsigned int FLAGS);`

SINCE: 1.7.0

The function `gpgme_op_adduid_start` initiates a `gpgme_op_adduid` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

-- Function: `gpgme_error_t gpgme_op_revuid (gpgme_ctx_t CTX, gpgme_key_t KEY, const char *USERID, unsigned int FLAGS);`

SINCE: 1.7.0

The function `gpgme_op_revuid` revokes a user ID from the OpenPGP key given by `KEY`. Revoking user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context `CTX` must be set to OpenPGP. As of now this function requires at least version 2.1.13 of GnuPG.

`KEY` specifies the key to operate on.

`USERID` is the user ID to be revoked from the key. The user ID must

be given verbatim because the engine does an exact and case sensitive match. Thus the uid field from the user ID object (gpgme\_user\_id\_t) is to be used. This is a required parameter.

FLAGS are currently not used and must be set to zero.

Note that the engine wont allow to revoke the last valid user ID. To change a user ID is better to first add the new user ID, then revoke the old one, and finally publish the key.

The function returns zero on success, GPG\_ERR\_NOT\_SUPPORTED if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_revuid_start (gpgme_ctx_t CTX,  
          gpgme_key_t KEY, const char *USERID, unsigned int FLAGS);
```

SINCE: 1.7.0

The function gpgme\_op\_revuid\_start initiates a gpgme\_op\_revuid operation; see there for details. It must be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

```
-- Function: gpgme_error_t gpgme_op_set_ui_flag (gpgme_ctx_t CTX,  
          gpgme_key_t KEY, const char *USERID, cons char * NAME,  
          cons char * VALUE);
```

SINCE: 1.8.0

The function gpgme\_op\_set\_uid\_flag is used to set flags on a user ID from the OpenPGP key given by KEY. Setting flags on user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context CTX must be set to OpenPGP.

KEY specifies the key to operate on. This parameters is required.

USERID is the user ID of the key to be manipulated. This user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the uid field from the user ID object (gpgme\_user\_id\_t) is to be used. This is a required parameter.

NAME names the flag which is to be changed. The only currently supported flag is:

primary

This sets the primary key flag on the given user ID. All other primary key flag on other user IDs are removed. VALUE must be given as NULL. For technical reasons this functions bumps the

creation timestamp of all affected self-signatures up by one second. At least GnuPG version 2.1.20 is required.

The function returns zero on success, GPG\_ERR\_NOT\_SUPPORTED if the engine does not support the command, or a bunch of other error codes.

-- Function: gpgme\_error\_t gpgme\_op\_set\_uid\_flag\_start  
(gpgme\_ctx\_t CTX, gpgme\_key\_t KEY, const char \*USERID,  
const char \* NAME, const char \* VALUE);

SINCE: 1.8.0

The function gpgme\_op\_set\_uid\_flag\_start initiates a gpgme\_op\_set\_uid\_flag operation; see there for details. It must be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

-- Function: gpgme\_error\_t gpgme\_op\_genkey (gpgme\_ctx\_t CTX,  
const char \*PARMS, gpgme\_data\_t PUBLIC, gpgme\_data\_t SECRET)

The function gpgme\_op\_genkey generates a new key pair in the context CTX. The meaning of PUBLIC and SECRET depends on the crypto backend.

GPG does not support PUBLIC and SECRET, they should be NULL. GnuPG will generate a key pair and add it to the standard key ring. The fingerprint of the generated key is available with gpgme\_op\_genkey\_result.

GpgSM requires PUBLIC to be a writable data object. GpgSM will generate a secret key (which will be stored by gpg-agent, and return a certificate request in PUBLIC, which then needs to be signed by the certification authority and imported before it can be used. GpgSM does not make the fingerprint available.

The argument PARMS specifies parameters for the key in a string that looks something like XML. The details about the format of PARMS are specific to the crypto engine used by CTX. The first line of the parameters must be <GnupgKeyParams format="internal"> and the last line must be </GnupgKeyParams>. Every line in between the first and last lines is treated as a Header: Value pair. In particular, no XML escaping is necessary if you need to include the characters <, >, or &.

Here is an example for GnuPG as the crypto engine (all parameters of OpenPGP key generation are documented in the GPG manual):

```
<GnupgKeyParms format="internal">
Key-Type: default
Subkey-Type: default
Name-Real: Joe Tester
Name-Comment: with stupid passphrase
Name-Email: joe@foo.bar
Expire-Date: 0
Passphrase: abc
</GnupgKeyParms>
```

Here is an example for GpgSM as the crypto engine (all parameters of OpenPGP key generation are documented in the GPGSM manual):

```
<GnupgKeyParms format="internal">
Key-Type: RSA
Key-Length: 1024
Name-DN: C=de,O=g10 code,OU=Testlab,CN=Joe 2 Tester
Name-Email: joe@foo.bar
</GnupgKeyParms>
```

Strings should be given in UTF-8 encoding. The only format supported for now is internal. The content of the GnupgKeyParms container is passed verbatim to the crypto backend. Control statements are not allowed.

After the operation completed successfully, the result can be retrieved with `gpgme_op_genkey_result`.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `PARMS` is not a well-formed string (e.g. does not have the expected tag-like headers and footers), `GPG_ERR_NOT_SUPPORTED` if `PUBLIC` or `SECRET` is not valid, and `GPG_ERR_GENERAL` if no key was created by the backend.

```
-- Function: gpgme_error_t gpgme_op_genkey_start (gpgme_ctx_t CTX,
const char *PARMS, gpgme_data_t PUBLIC, gpgme_data_t SECRET)
```

The function `gpgme_op_genkey_start` initiates a `gpgme_op_genkey` operation. It can be completed by calling `gpgme_wait` on the context. *\*Note Waiting For Completion::*

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `PARMS` is not a valid XML string, and `GPG_ERR_NOT_SUPPORTED` if `PUBLIC` or `SECRET` is not `NULL`.

```
-- Data type: gpgme_genkey_result_t
```

This is a pointer to a structure used to store the result of a `gpgme_op_genkey` operation. After successfully generating a key, you can retrieve the pointer to the result with `gpgme_op_genkey_result`. The structure contains the following members:

`unsigned int primary : 1`

This flag is set to 1 if a primary key was created and to 0 if not.

`unsigned int sub : 1`

This flag is set to 1 if a subkey was created and to 0 if not.

`unsigned int uid : 1`

This flag is set to 1 if a user ID was created and to 0 if not.

`char *fpr`

This is the fingerprint of the key that was created. If both a primary and a subkey were generated, the fingerprint of the primary key will be returned. If the crypto engine does not provide the fingerprint, `fpr` will be a null pointer.

`gpgme_data_t pubkey`

SINCE: 1.7.0

This will eventually be used to return the public key. It is currently not used.

`gpgme_data_t seckey`

SINCE: 1.7.0

This will eventually be used to return the secret key. It is currently not used.

-- Function: `gpgme_genkey_result_t gpgme_op_genkey_result`  
(`gpgme_ctx_t` CTX)

The function `gpgme_op_genkey_result` returns a `gpgme_genkey_result_t` pointer to a structure holding the result of a `gpgme_op_genkey` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_genkey` or `gpgme_op_genkey_start` operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

## 7.5.6 Signing Keys

-----

Key signatures are a unique concept of the OpenPGP protocol. They can be used to certify the validity of a key and are used to create the Web-of-Trust (WoT). Instead of using the `gpgme_op_interact` function along with a finite state machine, GPGME provides a convenient function to create key signatures when using modern GnuPG versions.

```
-- Function: gpgme_error_t gpgme_op_keysign (gpgme_ctx_t CTX,  
      gpgme_key_t KEY, const char *USERID, unsigned long EXPIRES,  
      unsigned int FLAGS);
```

SINCE: 1.7.0

The function `gpgme_op_keysign` adds a new key signature to the public key `KEY`. This function requires at least version 2.1.12 of GnuPG.

`CTX` is the usual context which describes the protocol to use (which must be OpenPGP) and has also the list of signer keys to be used for the signature. The common case is to use the default key for signing other keys. If another key or more than one key shall be used for a key signature, `gpgme_signers_add` can be used. \*Note Selecting Signers::.

`KEY` specifies the key to operate on.

`USERID` selects the user ID or user IDs to be signed. If `USERID` is set to `NULL` all valid user IDs are signed. The user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the `uid` field from the user ID object (`gpgme_user_id_t`) is to be used. To select more than one user ID put them all into one string separated by linefeeds characters (`\n`) and set the flag `GPGME_KEYSIGN_LFSEP`.

`EXPIRES` specifies the expiration time of the new signature in seconds. The common case is to use 0 to not set an expiration date. However, if the configuration of the engine defines a default expiration for key signatures, that is still used unless the flag `GPGME_KEYSIGN_NOEXPIRE` is used. Note that this parameter takes an unsigned long value and not a `time_t` to avoid problems on systems which use a signed 32 bit `time_t`. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

FLAGS can be set to the bit-wise OR of the following flags:

#### GPGME\_KEYSIGN\_LOCAL

SINCE: 1.7.0

Instead of creating an exportable key signature, create a key signature which is marked as non-exportable.

#### GPGME\_KEYSIGN\_LFSEP

SINCE: 1.7.0

Although linefeeds are uncommon in user IDs this flag is required to explicitly declare that USERID may contain several linefeed separated user IDs.

#### GPGME\_KEYSIGN\_NOEXPIRE

Force the creation of a key signature without an expiration date. This overrides EXPIRE and any local configuration of the engine.

The function returns zero on success, GPG\_ERR\_NOT\_SUPPORTED if the engine does not support the command, or a bunch of other error codes.

```
-- Function: gpgme_error_t gpgme_op_keysign_start (gpgme_ctx_t CTX,  
          gpgme_key_t KEY, const char *USERID, unsigned long EXPIRES,  
          unsigned int FLAGS);
```

SINCE: 1.7.0

The function gpgme\_op\_keysign\_start initiates a gpgme\_op\_keysign operation; see there for details. It must be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion:.

File: gpgme.info, Node: Exporting Keys, Next: Importing Keys, Prev: Signing Keys, Up: Key Management

### 7.5.7 Exporting Keys

-----

Exporting keys means the same as running gpg with the command --export. However, a mode flag can be used to change the way the export works. The available mode flags are described below, they may be or-ed together.

#### GPGME\_EXPORT\_MODE\_EXTERN

If this bit is set, the output is send directly to the default

keyserver. This is currently only allowed for OpenPGP keys. It is good practise to not send more than a few dozens key to a keyserver at one time. Using this flag requires that the KEYDATA argument of the export function is set to NULL.

#### GPGME\_EXPORT\_MODE\_MINIMAL

SINCE: 1.3.1

If this bit is set, the smallest possible key is exported. For OpenPGP keys it removes all signatures except for the latest self-signatures. For X.509 keys it has no effect.

#### GPGME\_EXPORT\_MODE\_SECRET

SINCE: 1.6.0

Instead of exporting the public key, the secret key is exported. This may not be combined with GPGME\_EXPORT\_MODE\_EXTERN. For X.509 the export format is PKCS#8.

#### GPGME\_EXPORT\_MODE\_RAW

SINCE: 1.6.0

If this flag is used with GPGME\_EXPORT\_MODE\_SECRET for an X.509 key the export format will be changed to PKCS#1. This flag may not be used with OpenPGP.

#### GPGME\_EXPORT\_MODE\_PKCS12

SINCE: 1.6.0

If this flag is used with GPGME\_EXPORT\_MODE\_SECRET for an X.509 key the export format will be changed to PKCS#12 which also includes the certificate. This flag may not be used with OpenPGP.

#### GPGME\_EXPORT\_MODE\_NOUID

SINCE: 1.12.0 - experimental Do not export user ids. Works only with certain gpg version.

-- Function: gpgme\_error\_t gpgme\_op\_export (gpgme\_ctx\_t CTX,  
const char \*PATTERN, gpgme\_export\_mode\_t MODE,  
gpgme\_data\_t KEYDATA)

The function gpgme\_op\_export extracts public keys and returns them in the data buffer KEYDATA. The output format of the key data returned is determined by the ASCII armor attribute set for the context CTX, or, if that is not set, by the encoding specified for KEYDATA.

If PATTERN is NULL, all available keys are returned. Otherwise, PATTERN contains an engine specific expression that is used to



limit the list to all keys matching the pattern.

MODE is usually 0; other values are described above.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation completed successfully, GPG\_ERR\_INV\_VALUE if KEYDATA is not a valid empty data buffer, and passes through any errors that are reported by the crypto engine support routines.

```
-- Function: gpgme_error_t gpgme_op_export_start (gpgme_ctx_t CTX,  
    const char *PATTERN, gpgme_export_mode_t MODE,  
    gpgme_data_t KEYDATA)
```

The function gpgme\_op\_export\_start initiates a gpgme\_op\_export operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation could be started successfully, and GPG\_ERR\_INV\_VALUE if KEYDATA is not a valid empty data buffer.

```
-- Function: gpgme_error_t gpgme_op_export_ext (gpgme_ctx_t CTX,  
    const char *PATTERN[], gpgme_export_mode_t MODE,  
    gpgme_data_t KEYDATA)
```

The function gpgme\_op\_export\_ext extracts public keys and returns them in the data buffer KEYDATA. The output format of the key data returned is determined by the ASCII armor attribute set for the context CTX, or, if that is not set, by the encoding specified for KEYDATA.

If PATTERN or \*PATTERN is NULL, all available keys are returned. Otherwise, PATTERN is a NULL terminated array of strings that are used to limit the list to all keys matching at least one of the patterns verbatim.

MODE is usually 0; other values are described above.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation completed successfully, GPG\_ERR\_INV\_VALUE if KEYDATA is not a valid empty data buffer, and passes through any errors that are reported by the crypto engine support routines.

```
-- Function: gpgme_error_t gpgme_op_export_ext_start (gpgme_ctx_t CTX,  
    const char *PATTERN[], gpgme_export_mode_t MODE,  
    gpgme_data_t KEYDATA)
```

The function gpgme\_op\_export\_ext\_start initiates a gpgme\_op\_export\_ext operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `KEYDATA` is not a valid empty data buffer.

-- Function: `gpgme_error_t gpgme_op_export_keys (gpgme_ctx_t CTX, gpgme_key_t keys[], gpgme_export_mode_t MODE, gpgme_data_t KEYDATA)`  
SINCE: 1.2.0

The function `gpgme_op_export_keys` extracts public keys and returns them in the data buffer `KEYDATA`. The output format of the key data returned is determined by the ASCII armor attribute set for the context `CTX`, or, if that is not set, by the encoding specified for `KEYDATA`.

The keys to export are taken from the NULL terminated array `KEYS`. Only keys of the currently selected protocol of `CTX` which do have a fingerprint set are considered for export. Other keys specified by the `KEYS` are ignored. In particular OpenPGP keys retrieved via an external key listing are not included.

`MODE` is usually 0; other values are described above.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation completed successfully, `GPG_ERR_INV_VALUE` if `KEYDATA` is not a valid empty data buffer, `GPG_ERR_NO_DATA` if no useful keys are in `KEYS` and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_export_keys_start (gpgme_ctx_t CTX, gpgme_key_t KEYS[], gpgme_export_mode_t MODE, gpgme_data_t KEYDATA)`  
SINCE: 1.2.0

The function `gpgme_op_export_keys_start` initiates a `gpgme_op_export_ext` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `KEYDATA` is not a valid empty data buffer, `GPG_ERR_NO_DATA` if no useful keys are in `KEYS` and passes through any errors that are reported by the crypto engine support routines.

File: `gpgme.info`, Node: Importing Keys, Next: Deleting Keys, Prev: Exporting Keys, Up: Key Management

### 7.5.8 Importing Keys

-----  
Importing keys means the same as running gpg with the command  
--import.

-- Function: gpgme\_error\_t gpgme\_op\_import (gpgme\_ctx\_t CTX,  
gpgme\_data\_t KEYDATA)

The function gpgme\_op\_import adds the keys in the data buffer  
KEYDATA to the key ring of the crypto engine used by CTX. The  
format of KEYDATA can be ASCII armored, for example, but the  
details are specific to the crypto engine.

After the operation completed successfully, the result can be  
retrieved with gpgme\_op\_import\_result.

The function returns the error code GPG\_ERR\_NO\_ERROR if the  
import was completed successfully, GPG\_ERR\_INV\_VALUE if KEYDATA  
if CTX or KEYDATA is not a valid pointer, and GPG\_ERR\_NO\_DATA if  
KEYDATA is an empty data buffer.

-- Function: gpgme\_error\_t gpgme\_op\_import\_start (gpgme\_ctx\_t CTX,  
gpgme\_data\_t KEYDATA)

The function gpgme\_op\_import\_start initiates a gpgme\_op\_import  
operation. It can be completed by calling gpgme\_wait on the  
context. \*Note Waiting For Completion::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the  
import could be started successfully, GPG\_ERR\_INV\_VALUE if CTX or  
KEYDATA is not a valid pointer, and GPG\_ERR\_NO\_DATA if KEYDATA is  
an empty data buffer.

-- Function: gpgme\_error\_t gpgme\_op\_import\_keys (gpgme\_ctx\_t CTX,  
gpgme\_key\_t \*KEYS)

SINCE: 1.2.0

The function gpgme\_op\_import\_keys adds the keys described by the  
NULL terminated array KEYS to the key ring of the crypto engine  
used by CTX. It is used to actually import and make keys permanent  
which have been retrieved from an external source (i.e. using  
GPGME\_KEYLIST\_MODE\_EXTERN) earlier. The external keylisting must  
have been made with the same context configuration (in particular  
the same home directory). (1) Note that for OpenPGP this may  
require another access to the keyserver over the network.

Only keys of the currently selected protocol of CTX are considered  
for import. Other keys specified by the KEYS are ignored. As of  
now all considered keys must have been retrieved using the same  
method, i.e. the used key listing mode must be identical.

After the operation completed successfully, the result can be retrieved with `gpgme_op_import_result`.

To move keys from one home directory to another, export and import the keydata using `gpgme_op_export` and `gpgme_op_import`.

The function returns the error code `GPG_ERR_NO_ERROR` if the import was completed successfully, `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, `GPG_ERR_CONFLICT` if the key listing mode does not match, and `GPG_ERR_NO_DATA` if no keys are considered for export.

-- Function: `gpgme_error_t gpgme_op_import_keys_start (gpgme_ctx_t CTX, gpgme_key_t *KEYS)`  
SINCE: 1.2.0

The function `gpgme_op_import_keys_start` initiates a `gpgme_op_import_keys` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the import was completed successfully, `GPG_ERR_INV_VALUE` if `KEYDATA` if `CTX` or `KEYDATA` is not a valid pointer, `GPG_ERR_CONFLICT` if the key listing mode does not match, and `GPG_ERR_NO_DATA` if no keys are considered for export.

-- Data type: `gpgme_import_status_t`

This is a pointer to a structure used to store a part of the result of a `gpgme_op_import` operation. For each considered key one status is added that contains information about the result of the import. The structure contains the following members:

`gpgme_import_status_t next`

This is a pointer to the next status structure in the linked list, or `NULL` if this is the last element.

`char *fpr`

This is the fingerprint of the key that was considered.

`gpgme_error_t result`

If the import was not successful, this is the error value that caused the import to fail. Otherwise the error code is `GPG_ERR_NO_ERROR`.

`unsigned int status`

This is a bit-wise OR of the following flags that give more information about what part of the key was imported. If the

key was already known, this might be 0.

GPGME\_IMPORT\_NEW

The key was new.

GPGME\_IMPORT\_UID

The key contained new user IDs.

GPGME\_IMPORT\_SIG

The key contained new signatures.

GPGME\_IMPORT\_SUBKEY

The key contained new sub keys.

GPGME\_IMPORT\_SECRET

The key contained a secret key.

-- Data type: gpgme\_import\_result\_t

This is a pointer to a structure used to store the result of a gpgme\_op\_import operation. After a successful import operation, you can retrieve the pointer to the result with gpgme\_op\_import\_result. The structure contains the following members:

int considered

The total number of considered keys.

int no\_user\_id

The number of keys without user ID.

int imported

The total number of imported keys.

int imported\_rsa

The number of imported RSA keys.

int unchanged

The number of unchanged keys.

int new\_user\_ids

The number of new user IDs.

int new\_sub\_keys

The number of new sub keys.

int new\_signatures

The number of new signatures.

int new\_revocations

The number of new revocations.

int secret\_read

The total number of secret keys read.

int secret\_imported

The number of imported secret keys.

int secret\_unchanged

The number of unchanged secret keys.

int not\_imported

The number of keys not imported.

gpgme\_import\_status\_t imports

A list of gpgme\_import\_status\_t objects which contain more information about the keys for which an import was attempted.

int skipped\_v3\_keys

For security reasons modern versions of GnuPG do not anymore support v3 keys (created with PGP 2.x) and ignores them on import. This counter provides the number of such skipped v3 keys.

-- Function: gpgme\_import\_result\_t gpgme\_op\_import\_result  
(gpgme\_ctx\_t CTX)

The function gpgme\_op\_import\_result returns a gpgme\_import\_result\_t pointer to a structure holding the result of a gpgme\_op\_import operation. The pointer is only valid if the last operation on the context was a gpgme\_op\_import or gpgme\_op\_import\_start operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

----- Footnotes -----

(1) Thus it is a replacement for the usual workaround of exporting and then importing a key to make an X.509 key permanent.

File: gpgme.info, Node: Deleting Keys, Next: Changing Passphrases, Prev: Importing Keys, Up: Key Management

### 7.5.9 Deleting Keys

-----

-- Function: gpgme\_error\_t gpgme\_op\_delete\_ext (gpgme\_ctx\_t CTX,

const gpgme\_key\_t KEY, unsigned int FLAGS)  
SINCE: 1.9.1

The function `gpgme_op_delete_ext` deletes the key `KEY` from the key ring of the crypto engine used by `CTX`.

`FLAGS` can be set to the bit-wise OR of the following flags:

`GPGME_DELETE_ALLOW_SECRET`  
SINCE: 1.9.1

If not set, only public keys are deleted. If set, secret keys are deleted as well, if that is supported.

`GPGME_DELETE_FORCE`  
SINCE: 1.9.1

If set, the user is not asked to confirm the deletion.

The function returns the error code `GPG_ERR_NO_ERROR` if the key was deleted successfully, `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer, `GPG_ERR_NO_PUBKEY` if `KEY` could not be found in the keyring, `GPG_ERR_AMBIGUOUS_NAME` if the key was not specified unambiguously, and `GPG_ERR_CONFLICT` if the secret key for `KEY` is available, but `ALLOW_SECRET` is zero.

-- Function: `gpgme_error_t gpgme_op_delete_ext_start (gpgme_ctx_t CTX, const gpgme_key_t KEY, unsigned int FLAGS)`  
SINCE: 1.9.1

The function `gpgme_op_delete_ext_start` initiates a `gpgme_op_delete` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation was started successfully, and `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer.

The following functions allow only to use one particular flag.

-- Function: `gpgme_error_t gpgme_op_delete (gpgme_ctx_t CTX, const gpgme_key_t KEY, int ALLOW_SECRET)`  
Similar to `gpgme_op_delete_ext`, but only the flag `GPGME_DELETE_ALLOW_SECRET` can be provided.

-- Function: `gpgme_error_t gpgme_op_delete_start (gpgme_ctx_t CTX, const gpgme_key_t KEY, int ALLOW_SECRET)`  
Similar to `gpgme_op_delete_ext_start`, but only the flag

GPGME\_DELETE\_ALLOW\_SECRET can be provided.

File: gpgme.info, Node: Changing Passphrases, Next: Changing TOFU Data, Prev: Deleting Keys, Up: Key Management

### 7.5.10 Changing Passphrases

-----

-- Function: gpgme\_error\_t gpgme\_op\_passwd (gpgme\_ctx\_t CTX,  
const gpgme\_key\_t KEY, unsigned int FLAGS)

SINCE: 1.3.0

The function gpgme\_op\_passwd changes the passphrase of the private key associated with KEY. The only allowed value for FLAGS is 0. The backend engine will usually popup a window to ask for the old and the new passphrase. Thus this function is not useful in a server application (where passphrases are not required anyway).

Note that old gpg engines (before version 2.0.15) do not support this command and will silently ignore it.

-- Function: gpgme\_error\_t gpgme\_op\_passwd\_start (gpgme\_ctx\_t CTX,  
const gpgme\_key\_t KEY, unsigned int FLAGS)

SINCE: 1.3.0

The function gpgme\_op\_passwd\_start initiates a gpgme\_op\_passwd operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns 0 if the operation was started successfully, and an error code if one of the arguments is not valid or the operation could not be started.

File: gpgme.info, Node: Changing TOFU Data, Next: Advanced Key Editing, Prev: Changing Passphrases, Up: Key Management

### 7.5.11 Changing TOFU Data

-----

The OpenPGP engine features a Trust-On-First-Use (TOFU) key validation model. For resolving conflicts it is necessary to declare the policy for a key. See the GnuPG manual for details on the TOFU implementation.



-- Data type: enum gpgme\_tofu\_policy\_t  
SINCE: 1.7.0

The gpgme\_tofu\_policy\_t type specifies the set of possible policy values that are supported by GPGME:

GPGME\_TOFU\_POLICY\_AUTO

Set the policy to auto.

GPGME\_TOFU\_POLICY\_GOOD

Set the policy to good.

GPGME\_TOFU\_POLICY\_BAD

Set the policy to bad.

GPGME\_TOFU\_POLICY\_ASK

Set the policy to ask.

GPGME\_TOFU\_POLICY\_UNKNOWN

Set the policy to unknown.

To change the policy for a key the following functions can be used:

-- Function: gpgme\_error\_t gpgme\_op\_tofu\_policy (gpgme\_ctx\_t CTX,  
const gpgme\_key\_t KEY, gpgme\_tofu\_policy\_t POLICY)

SINCE: 1.7.0

The function gpgme\_op\_tofu\_policy changes the TOFU policy of KEY. The valid values for POLICY are listed above. As of now this function does only work for OpenPGP and requires at least version 2.1.10 of GnuPG.

The function returns zero on success, GPG\_ERR\_NOT\_SUPPORTED if the engine does not support the command, or a bunch of other error codes.

-- Function: gpgme\_error\_t gpgme\_op\_tofu\_policy\_start (gpgme\_ctx\_t CTX,  
const gpgme\_key\_t KEY, gpgme\_tofu\_policy\_t POLICY)

SINCE: 1.7.0

The function gpgme\_op\_tofu\_policy\_start initiates a gpgme\_op\_tofu\_policy operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns 0 if the operation was started successfully, and an error code if one of the arguments is not valid or the operation could not be started.

File: gpgme.info, Node: Advanced Key Editing, Prev: Changing TOFU Data, Up: Key Management

## 7.5.12 Advanced Key Editing

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-- Data type: `gpgme_error_t (*gpgme_interact_cb_t) (void *HANDLE, const char *STATUS, const char *ARGS, int FD)`

SINCE: 1.7.0

The `gpgme_interact_cb_t` type is the type of functions which GPGME calls if it a key interact operation is on-going. The status keyword `STATUS` and the argument line `ARGS` are passed through by GPGME from the crypto engine. An empty string represents EOF. The file descriptor `FD` is -1 for normal status messages. If `STATUS` indicates a command rather than a status message, the response to the command should be written to `FD`. The `HANDLE` is provided by the user at start of operation.

The function should return `GPG_ERR_FALSE` if it did not handle the status code, 0 for success, or any other error value.

-- Function: `gpgme_error_t gpgme_op_interact (gpgme_ctx_t CTX, gpgme_key_t KEY, unsigned int FLAGS, gpgme_interact_cb_t FNC, void *HANDLE, gpgme_data_t OUT)`

SINCE: 1.7.0

The function `gpgme_op_interact` processes the key `KEY` interactively, using the interact callback function `FNC` with the handle `HANDLE`. The callback is invoked for every status and command request from the crypto engine. The output of the crypto engine is written to the data object `OUT`.

Note that the protocol between the callback function and the crypto engine is specific to the crypto engine and no further support in implementing this protocol correctly is provided by GPGME.

`FLAGS` modifies the behaviour of the function; the only defined bit value is:

`GPGME_INTERACT_CARD`

SINCE: 1.7.0

This is used for smartcard based keys and uses `gpgs --card-edit` command.

The function returns 0 if the edit operation completes successfully, `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid

pointer, and any error returned by the crypto engine or the edit callback handler.

-- Function: `gpgme_error_t gpgme_op_interact_start (gpgme_ctx_t CTX, gpgme_key_t KEY, unsigned int FLAGS, gpgme_interact_cb_t FNC, void *HANDLE, gpgme_data_t OUT)`

SINCE: 1.7.0

The function `gpgme_op_interact_start` initiates a `gpgme_op_interact` operation. It can be completed by calling `gpgme_wait` on the context. *\*Note Waiting For Completion::*

The function returns 0 if the operation was started successfully, and `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer.

File: `gpgme.info`, Node: Trust Item Management, Next: Crypto Operations, Prev: Key Management, Up: Contexts

## 7.6 Trust Item Management

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*\*Caution:* The trust items interface is experimental.

-- Data type: `gpgme_trust_item_t`

The `gpgme_trust_item_t` type is a pointer to a trust item object.

It has the following members:

`char *keyid`

This is a string describing the key to which this trust items belongs.

`int type`

This is the type of the trust item. A value of 1 refers to a key, a value of 2 refers to a user ID.

`int level`

This is the trust level.

`char *owner_trust`

The owner trust if type is 1.

`char *validity`

The calculated validity.

`char *name`

The user name if type is 2.

\* Menu:

\* Listing Trust Items::        Browsing the list of available trust items.

\* Manipulating Trust Items::    Operations on trust items.

File: gpgme.info, Node: Listing Trust Items, Next: Manipulating Trust Items, Up: Trust Item Management

## 7.6.1 Listing Trust Items

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-- Function: `gpgme_error_t gpgme_op_trustlist_start (gpgme_ctx_t CTX,  
          const char *PATTERN, int MAX_LEVEL)`

The function `gpgme_op_trustlist_start` initiates a trust item listing operation inside the context `CTX`. It sets everything up so that subsequent invocations of `gpgme_op_trustlist_next` return the trust items in the list.

The string `PATTERN` contains an engine specific expression that is used to limit the list to all trust items matching the pattern. It can not be the empty string.

The argument `MAX_LEVEL` is currently ignored.

The context will be busy until either all trust items are received (and `gpgme_op_trustlist_next` returns `GPG_ERR_EOF`), or `gpgme_op_trustlist_end` is called to finish the operation.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_trustlist_next (gpgme_ctx_t CTX,  
          gpgme_trust_item_t *R_ITEM)`

The function `gpgme_op_trustlist_next` returns the next trust item in the list created by a previous `gpgme_op_trustlist_start` operation in the context `CTX`. The trust item can be destroyed with `gpgme_trust_item_release`. \*Note Manipulating Trust Items::.

This is the only way to get at `gpgme_trust_item_t` objects in GPGME.

If the last trust item in the list has already been returned, `gpgme_op_trustlist_next` returns `GPG_ERR_EOF`.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` or `R_ITEM` is not a valid pointer, and `GPG_ERR_ENOMEM` if there is not enough memory for the operation.

-- Function: `gpgme_error_t gpgme_op_trustlist_end (gpgme_ctx_t CTX)`  
The function `gpgme_op_trustlist_end` ends a pending trust list operation in the context `CTX`.

The function returns the error code `GPG_ERR_INV_VALUE` if `CTX` is not a valid pointer, and `GPG_ERR_ENOMEM` if at some time during the operation there was not enough memory available.

File: `gpgme.info`, Node: Manipulating Trust Items, Prev: Listing Trust Items, Up: Trust Item Management

## 7.6.2 Manipulating Trust Items

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-- Function: `void gpgme_trust_item_ref (gpgme_trust_item_t ITEM)`  
The function `gpgme_trust_item_ref` acquires an additional reference for the trust item `ITEM`.

-- Function: `void gpgme_trust_item_unref (gpgme_trust_item_t ITEM)`  
The function `gpgme_trust_item_unref` releases a reference for the trust item `ITEM`. If this was the last reference, the trust item will be destroyed and all resources associated to it will be released.

File: `gpgme.info`, Node: Crypto Operations, Next: Miscellaneous, Prev: Trust Item Management, Up: Contexts

## 7.7 Crypto Operations

=====

Sometimes, the result of a crypto operation returns a list of invalid keys encountered in processing the request. The following structure is used to hold information about such a key.

-- Data type: `gpgme_invalid_key_t`  
This is a pointer to a structure used to store a part of the result of a crypto operation which takes user IDs as one input parameter. The structure contains the following members:

`gpgme_invalid_key_t next`

This is a pointer to the next invalid key structure in the linked list, or `NULL` if this is the last element.

`char *fpr`

The fingerprint or key ID of the invalid key encountered.

`gpgme_error_t reason`

An error code describing the reason why the key was found invalid.

\* Menu:

- \* Decrypt::            Decrypting a ciphertext.
- \* Verify::            Verifying a signature.
- \* Decrypt and Verify::    Decrypting a signed ciphertext.
- \* Sign::              Creating a signature.
- \* Encrypt::            Encrypting a plaintext.

File: gpgme.info, Node: Decrypt, Next: Verify, Up: Crypto Operations

### 7.7.1 Decrypt

-----

-- Function: gpgme\_error\_t gpgme\_op\_decrypt (gpgme\_ctx\_t CTX,  
          gpgme\_data\_t CIPHER, gpgme\_data\_t PLAIN)

The function gpgme\_op\_decrypt decrypts the ciphertext in the data object CIPHER and stores it into the data object PLAIN.

The function returns the error code GPG\_ERR\_NO\_ERROR if the ciphertext could be decrypted successfully, GPG\_ERR\_INV\_VALUE if CTX, CIPHER or PLAIN is not a valid pointer, GPG\_ERR\_NO\_DATA if CIPHER does not contain any data to decrypt, GPG\_ERR\_DECRYPT\_FAILED if CIPHER is not a valid cipher text, GPG\_ERR\_BAD\_PASSPHRASE if the passphrase for the secret key could not be retrieved, and passes through some errors that are reported by the crypto engine support routines.

-- Function: gpgme\_error\_t gpgme\_op\_decrypt\_start (gpgme\_ctx\_t CTX,  
          gpgme\_data\_t CIPHER, gpgme\_data\_t PLAIN)

The function gpgme\_op\_decrypt\_start initiates a gpgme\_op\_decrypt operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation could be started successfully, and GPG\_ERR\_INV\_VALUE if CIPHER or PLAIN is not a valid pointer.

-- Function: gpgme\_error\_t gpgme\_op\_decrypt\_ext ( gpgme\_ctx\_t CTX,  
          gpgme\_decrypt\_flags\_t FLAGS, gpgme\_data\_t CIPHER,  
          gpgme\_data\_t PLAIN)

SINCE: 1.8.0

The function gpgme\_op\_decrypt\_ext is the same as

gpgme\_op\_decrypt but has an additional argument FLAGS. If FLAGS is 0 both function behave identically.

The value in FLAGS is a bitwise-or combination of one or multiple of the following bit values:

#### GPGME\_DECRYPT\_VERIFY

SINCE: 1.8.0

The GPGME\_DECRYPT\_VERIFY symbol specifies that this function shall exactly act as gpgme\_op\_decrypt\_verify.

#### GPGME\_DECRYPT\_UNWRAP

SINCE: 1.8.0

The GPGME\_DECRYPT\_UNWRAP symbol specifies that the output shall be an OpenPGP message with only the encryption layer removed. This requires GnuPG 2.1.12 and works only for OpenPGP. This is the counterpart to GPGME\_ENCRYPT\_WRAP.

The function returns the error codes as described for gpgme\_op\_decrypt respective gpgme\_op\_encrypt.

-- Function: gpgme\_error\_t gpgme\_op\_decrypt\_ext\_start (  
gpgme\_ctx\_t CTX, gpgme\_decrypt\_flags\_t FLAGS,  
gpgme\_data\_t CIPHER, gpgme\_data\_t PLAIN)

SINCE: 1.8.0

The function gpgme\_op\_decrypt\_ext\_start initiates a gpgme\_op\_decrypt\_ext operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation could be started successfully, and GPG\_ERR\_INV\_VALUE if CIPHER or PLAIN is not a valid pointer.

-- Data type: gpgme\_recipient\_t

SINCE: 1.1.0

This is a pointer to a structure used to store information about the recipient of an encrypted text which is decrypted in a gpgme\_op\_decrypt operation. This information (except for the status field) is even available before the operation finished successfully, for example in a passphrase callback. The structure contains the following members:

gpgme\_recipient\_t next

This is a pointer to the next recipient structure in the linked list, or NULL if this is the last element.

`gpgme_pubkey_algo_t`

The public key algorithm used in the encryption.

`char *keyid`

This is the key ID of the key (in hexadecimal digits) used as recipient.

`gpgme_error_t status`

This is an error number with the error code `GPG_ERR_NO_SECKEY` if the secret key for this recipient is not available, and 0 otherwise.

-- Data type: `gpgme_decrypt_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_decrypt` operation. After successfully decrypting data, you can retrieve the pointer to the result with `gpgme_op_decrypt_result`. As with all result structures, this structure shall be considered read-only and an application must not allocate such a structure on its own. The structure contains the following members:

`char *unsupported_algorithm`

If an unsupported algorithm was encountered, this string describes the algorithm that is not supported.

`unsigned int wrong_key_usage : 1`

SINCE: 0.9.0 This is true if the key was not used according to its policy.

`unsigned int legacy_cipher_nomdc : 1`

SINCE: 1.11.2 The message was made by a legacy algorithm without any integrity protection. This might be an old but legitimate message.

`unsigned int is_mime : 1;`

SINCE: 1.11.0 The message claims that the content is a MIME object.

`unsigned int is_de_vs : 1;`

SINCE: 1.10.0 The message was encrypted in a VS-NfD compliant way. This is a specification in Germany for a restricted communication level.

`gpgme_recipient_t recipients`

SINCE: 1.1.0



This is a linked list of recipients to which this message was encrypted.

char \*file\_name

This is the filename of the original plaintext message file if it is known, otherwise this is a null pointer.

char \*session\_key

SINCE: 1.8.0

A textual representation (nul-terminated string) of the session key used in symmetric encryption of the message, if the context has been set to export session keys (see `gpgme_set_ctx_flag`, "export-session-key"), and a session key was available for the most recent decryption operation. Otherwise, this is a null pointer.

You must not try to access this member of the struct unless `gpgme_set_ctx_flag` (ctx, "export-session-key") returns success or `gpgme_get_ctx_flag` (ctx, "export-session-key") returns true (non-empty string).

char \*symkey\_algo

SINCE: 1.11.0

A string with the symmetric encryption algorithm and mode using the format "<algo>.<mode>". Note that the deprecated non-MDC encryption mode of OpenPGP is given as "PGPCFB".

-- Function: `gpgme_decrypt_result_t gpgme_op_decrypt_result`  
(`gpgme_ctx_t` CTX)

The function `gpgme_op_decrypt_result` returns a `gpgme_decrypt_result_t` pointer to a structure holding the result of a `gpgme_op_decrypt` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_decrypt` or `gpgme_op_decrypt_start` operation. If the operation failed this might be a NULL pointer. The returned pointer is only valid until the next operation is started on the context.

File: `gpgme.info`, Node: Verify, Next: Decrypt and Verify, Prev: Decrypt, Up: Crypto Operations

## 7.7.2 Verify

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-- Function: `gpgme_error_t gpgme_op_verify` (`gpgme_ctx_t` CTX,  
`gpgme_data_t` SIG, `gpgme_data_t` SIGNED\_TEXT,

gpgme\_data\_t PLAIN)

The function `gpgme_op_verify` verifies that the signature in the data object `SIG` is a valid signature. If `SIG` is a detached signature, then the signed text should be provided in `SIGNED_TEXT` and `PLAIN` should be a null pointer. Otherwise, if `SIG` is a normal (or cleartext) signature, `SIGNED_TEXT` should be a null pointer and `PLAIN` should be a writable data object that will contain the plaintext after successful verification.

The results of the individual signature verifications can be retrieved with `gpgme_op_verify_result`.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be completed successfully, `GPG_ERR_INV_VALUE` if `CTX`, `SIG` or `PLAIN` is not a valid pointer, `GPG_ERR_NO_DATA` if `SIG` does not contain any data to verify, and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_verify_start (gpgme_ctx_t CTX, gpgme_data_t SIG, gpgme_data_t SIGNED_TEXT, gpgme_data_t PLAIN)`

The function `gpgme_op_verify_start` initiates a `gpgme_op_verify` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `CTX`, `SIG` or `PLAIN` is not a valid pointer, and `GPG_ERR_NO_DATA` if `SIG` or `PLAIN` does not contain any data to verify.

-- Data type: `gpgme_sig_notation_t`

This is a pointer to a structure used to store a part of the result of a `gpgme_op_verify` operation. The structure contains the following members:

`gpgme_sig_notation_t next`

This is a pointer to the next new signature notation structure in the linked list, or `NULL` if this is the last element.

`char *name`

The name of the notation field. If this is `NULL`, then the member value will contain a policy URL.

`int name_len`

The length of the name field. For strings the length is counted without the trailing binary zero.

`char *value`

The value of the notation field. If name is NULL, then this is a policy URL.

int value\_len

The length of the value field. For strings the length is counted without the trailing binary zero.

gpgme\_sig\_notation\_flags\_t flags

The accumulated flags field. This field contains the flags associated with the notation data in an accumulated form which can be used as an argument to the function `gpgme_sig_notation_add`. The value flags is a bitwise-or combination of one or multiple of the following bit values:

`GPGME_SIG_NOTATION_HUMAN_READABLE`

SINCE: 1.1.0

The `GPGME_SIG_NOTATION_HUMAN_READABLE` symbol specifies that the notation data is in human readable form

`GPGME_SIG_NOTATION_CRITICAL`

SINCE: 1.1.0

The `GPGME_SIG_NOTATION_CRITICAL` symbol specifies that the notation data is critical.

unsigned int human\_readable : 1

This is true if the `GPGME_SIG_NOTATION_HUMAN_READABLE` flag is set and false otherwise. This flag is only valid for notation data, not for policy URLs.

unsigned int critical : 1

This is true if the `GPGME_SIG_NOTATION_CRITICAL` flag is set and false otherwise. This flag is valid for notation data and policy URLs.

-- Data type: `gpgme_signature_t`

This is a pointer to a structure used to store a part of the result of a `gpgme_op_verify` operation. The structure contains the following members:

`gpgme_signature_t` next

This is a pointer to the next new signature structure in the linked list, or NULL if this is the last element.

`gpgme_sigsum_t` summary

This is a bit vector giving a summary of the signature status.

It provides an easy interface to a defined semantic of the

signature status. Checking just one bit is sufficient to see whether a signature is valid without any restrictions. This means that you can check for GPGME\_SIGSUM\_VALID like this:

```
if ((sig.summary & GPGME_SIGSUM_VALID))
{
    ..do stuff if valid..
}
else
{
    ..do stuff if not fully valid..
}
```

The defined bits are:

#### GPGME\_SIGSUM\_VALID

The signature is fully valid.

#### GPGME\_SIGSUM\_GREEN

The signature is good but one might want to display some extra information. Check the other bits.

#### GPGME\_SIGSUM\_RED

The signature is bad. It might be useful to check other bits and display more information, i.e. a revoked certificate might not render a signature invalid when the message was received prior to the cause for the revocation.

#### GPGME\_SIGSUM\_KEY\_REVOKED

The key or at least one certificate has been revoked.

#### GPGME\_SIGSUM\_KEY\_EXPIRED

The key or one of the certificates has expired. It is probably a good idea to display the date of the expiration.

#### GPGME\_SIGSUM\_SIG\_EXPIRED

The signature has expired.

#### GPGME\_SIGSUM\_KEY\_MISSING

Can't verify due to a missing key or certificate.

#### GPGME\_SIGSUM\_CRL\_MISSING

The CRL (or an equivalent mechanism) is not available.

#### GPGME\_SIGSUM\_CRL\_TOO\_OLD

Available CRL is too old.

#### GPGME\_SIGSUM\_BAD\_POLICY

A policy requirement was not met.

#### GPGME\_SIGSUM\_SYS\_ERROR

A system error occurred.

#### GPGME\_SIGSUM\_TOFU\_CONFLICT

A TOFU conflict was detected.

#### char \*fpr

This is the fingerprint or key ID of the signature.

#### gpgme\_error\_t status

This is the status of the signature. In particular, the following status codes are of interest:

#### GPG\_ERR\_NO\_ERROR

This status indicates that the signature is valid. For the combined result this status means that all signatures are valid.

#### GPG\_ERR\_SIG\_EXPIRED

This status indicates that the signature is valid but expired. For the combined result this status means that all signatures are valid and expired.

#### GPG\_ERR\_KEY\_EXPIRED

This status indicates that the signature is valid but the key used to verify the signature has expired. For the combined result this status means that all signatures are valid and all keys are expired.

#### GPG\_ERR\_CERT\_REVOKED

This status indicates that the signature is valid but the key used to verify the signature has been revoked. For the combined result this status means that all signatures are valid and all keys are revoked.

#### GPG\_ERR\_BAD\_SIGNATURE

This status indicates that the signature is invalid. For the combined result this status means that all signatures are invalid.

#### GPG\_ERR\_NO\_PUBKEY

This status indicates that the signature could not be verified due to a missing key. For the combined result this status means that all signatures could not be checked due to missing keys.

## GPG\_ERR\_GENERAL

This status indicates that there was some other error which prevented the signature verification.

## gpgme\_sig\_notation\_t notations

This is a linked list with the notation data and policy URLs.

## unsigned long timestamp

The creation timestamp of this signature.

## unsigned long exp\_timestamp

The expiration timestamp of this signature, or 0 if the signature does not expire.

## unsigned int wrong\_key\_usage : 1

This is true if the key was not used according to its policy.

## unsigned int pka\_trust : 2

This is set to the trust information gained by means of the PKA system. Values are:

0

No PKA information available or verification not possible.

1

PKA verification failed.

2

PKA verification succeeded.

3

Reserved for future use.

Depending on the configuration of the engine, this metric may also be reflected by the validity of the signature.

## unsigned int chain\_model : 1

SINCE: 1.1.6

This is true if the validity of the signature has been checked using the chain model. In the chain model the time the signature has been created must be within the validity period of the certificate and the time the certificate itself has been created must be within the validity period of the issuing certificate. In contrast the default validation model checks the validity of signature as well at the entire certificate chain at the current time.

## gpgme\_validity\_t validity

The validity of the signature.

gpgme\_error\_t validity\_reason

If a signature is not valid, this provides a reason why.

gpgme\_pubkey\_algo\_t

The public key algorithm used to create this signature.

gpgme\_hash\_algo\_t

The hash algorithm used to create this signature.

char \*pka\_address

The mailbox from the PKA information or NULL.

gpgme\_key\_t key

SINCE: 1.7.0

An object describing the key used to create the signature.

This key object may be incomplete in that it only conveys information available directly with a signature. It may also be NULL if such information is not readily available.

-- Data type: gpgme\_verify\_result\_t

This is a pointer to a structure used to store the result of a gpgme\_op\_verify operation. After verifying a signature, you can retrieve the pointer to the result with gpgme\_op\_verify\_result.

If the operation failed this might be a NULL pointer. The structure contains the following member:

gpgme\_signature\_t signatures

A linked list with information about all signatures for which a verification was attempted.

char \*file\_name

This is the filename of the original plaintext message file if it is known, otherwise this is a null pointer. Warning: The filename is not covered by the signature.

unsigned int is\_mime : 1;

SINCE: 1.11.0

The message claims that the content is a MIME object.

Warning: This flag is not covered by the signature.

-- Function: gpgme\_verify\_result\_t gpgme\_op\_verify\_result  
(gpgme\_ctx\_t CTX)

The function gpgme\_op\_verify\_result returns a gpgme\_verify\_result\_t pointer to a structure holding the result of a gpgme\_op\_verify operation. The pointer is only valid if the last operation on the context was a gpgme\_op\_verify,

gpgme\_op\_decrypt\_verify\_start, gpgme\_op\_decrypt\_verify or gpgme\_op\_decrypt\_verify\_start operation, and if this operation finished successfully (for gpgme\_op\_decrypt\_verify and gpgme\_op\_decrypt\_verify\_start, the error code GPG\_ERR\_NO\_DATA counts as successful in this context). The returned pointer is only valid until the next operation is started on the context.

File: gpgme.info, Node: Decrypt and Verify, Next: Sign, Prev: Verify, Up: Crypto Operations

### 7.7.3 Decrypt and Verify

-----  
-- Function: gpgme\_error\_t gpgme\_op\_decrypt\_verify (gpgme\_ctx\_t CTX,  
gpgme\_data\_t CIPHER, gpgme\_data\_t PLAIN)

The function gpgme\_op\_decrypt\_verify decrypts the ciphertext in the data object CIPHER and stores it into the data object PLAIN. If CIPHER contains signatures, they will be verified.

After the operation completed, gpgme\_op\_decrypt\_result and gpgme\_op\_verify\_result can be used to retrieve more information about the signatures.

If the error code GPG\_ERR\_NO\_DATA is returned, CIPHER does not contain any data to decrypt. However, it might still be signed. The information about detected signatures is available with gpgme\_op\_verify\_result in this case.

The function returns the error code GPG\_ERR\_NO\_ERROR if the ciphertext could be decrypted successfully, GPG\_ERR\_INV\_VALUE if CTX, CIPHER or PLAIN is not a valid pointer, GPG\_ERR\_NO\_DATA if CIPHER does not contain any data to decrypt, GPG\_ERR\_DECRYPT\_FAILED if CIPHER is not a valid cipher text, GPG\_ERR\_BAD\_PASSPHRASE if the passphrase for the secret key could not be retrieved, and passes through any errors that are reported by the crypto engine support routines.

-- Function: gpgme\_error\_t gpgme\_op\_decrypt\_verify\_start  
(gpgme\_ctx\_t CTX, gpgme\_data\_t CIPHER, gpgme\_data\_t PLAIN)

The function gpgme\_op\_decrypt\_verify\_start initiates a gpgme\_op\_decrypt\_verify operation. It can be completed by calling gpgme\_wait on the context. \*Note Waiting For Completion:::

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation could be started successfully, GPG\_ERR\_INV\_VALUE if CTX, CIPHER, PLAIN or R\_STAT is not a valid pointer, and GPG\_ERR\_NO\_DATA if CIPHER does not contain any data to decrypt.



When processing mails it is sometimes useful to extract the actual mail address (the addr-spec) from a string. GPGME provides this helper function which uses the same semantics as the internal functions in GPGME and GnuPG:

-- Function: char \* gpgme\_addrspec\_from\_uid (const char \*UID)

SINCE: 1.7.1

Return the mail address (called addr-spec in RFC-5322) from the string UID which is assumed to be a user id (called address in RFC-5322). All plain ASCII characters (i.e. those with bit 7 cleared) in the result are converted to lowercase. Caller must free the result using gpgme\_free. Returns NULL if no valid address was found (in which case ERRNO is set to EINVAL) or for other errors.

File: gpgme.info, Node: Sign, Next: Encrypt, Prev: Decrypt and Verify, Up: Crypto Operations

#### 7.7.4 Sign

-----

A signature can contain signatures by one or more keys. The set of keys used to create a signatures is contained in a context, and is applied to all following signing operations in this context (until the set is changed).

\* Menu:

- \* Selecting Signers::       How to choose the keys to sign with.
- \* Creating a Signature::    How to create a signature.
- \* Signature Notation Data:: How to add notation data to a signature.

File: gpgme.info, Node: Selecting Signers, Next: Creating a Signature, Up: Sign

##### 7.7.4.1 Selecting Signers

.....

The key or the keys used to create a signature are stored in the context. The following functions can be used to manipulate this list. If no signer has been set into the context a default key is used for signing.

-- Function: void gpgme\_signers\_clear (gpgme\_ctx\_t CTX)

The function gpgme\_signers\_clear releases a reference for each

key on the signers list and removes the list of signers from the context CTX.

Every context starts with an empty list.

-- Function: `gpgme_error_t gpgme_signers_add (gpgme_ctx_t CTX, const gpgme_key_t KEY)`

The function `gpgme_signers_add` adds the key `KEY` to the list of signers in the context `CTX`.

Calling this function acquires an additional reference for the key.

-- Function: `unsigned int gpgme_signers_count (const gpgme_ctx_t CTX)`  
SINCE: 1.4.3

The function `gpgme_signers_count` returns the number of signer keys in the context `CTX`.

-- Function: `gpgme_key_t gpgme_signers_enum (const gpgme_ctx_t CTX, int SEQ)`

The function `gpgme_signers_enum` returns the `SEQ`th key in the list of signers in the context `CTX`. An additional reference is acquired for the user.

If `SEQ` is out of range, `NULL` is returned.

File: `gpgme.info`, Node: Creating a Signature, Next: Signature Notation Data, Prev: Selecting Signers, Up: Sign

#### 7.7.4.2 Creating a Signature

.....

-- Data type: `enum gpgme_sig_mode_t`

The `gpgme_sig_mode_t` type is used to specify the desired type of a signature. The following modes are available:

##### `GPGME_SIG_MODE_NORMAL`

A normal signature is made, the output includes the plaintext and the signature.

##### `GPGME_SIG_MODE_DETACH`

A detached signature is made.

##### `GPGME_SIG_MODE_CLEAR`

A clear text signature is made. The ASCII armor and text mode settings of the context are ignored.

-- Function: `gpgme_error_t gpgme_op_sign (gpgme_ctx_t CTX,`

gpgme\_data\_t PLAIN, gpgme\_data\_t SIG, gpgme\_sig\_mode\_t MODE)

The function `gpgme_op_sign` creates a signature for the text in the data object `PLAIN` and returns it in the data object `SIG`. The type of the signature created is determined by the ASCII armor (or, if that is not set, by the encoding specified for `SIG`), the text mode attributes set for the context `CTX` and the requested signature mode `MODE`.

After the operation completed successfully, the result can be retrieved with `gpgme_op_sign_result`.

If an S/MIME signed message is created using the CMS crypto engine, the number of certificates to include in the message can be specified with `gpgme_set_include_certs`. \*Note Included Certificates::.

The function returns the error code `GPG_ERR_NO_ERROR` if the signature could be created successfully, `GPG_ERR_INV_VALUE` if `CTX`, `PLAIN` or `SIG` is not a valid pointer, `GPG_ERR_NO_DATA` if the signature could not be created, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the secret key could not be retrieved, `GPG_ERR_UNUSABLE_SECKEY` if there are invalid signers, and passes through any errors that are reported by the crypto engine support routines.

-- Function: `gpgme_error_t gpgme_op_sign_start (gpgme_ctx_t CTX, gpgme_data_t PLAIN, gpgme_data_t SIG, gpgme_sig_mode_t MODE)`  
The function `gpgme_op_sign_start` initiates a `gpgme_op_sign` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `CTX`, `PLAIN` or `SIG` is not a valid pointer.

-- Data type: `gpgme_new_signature_t`  
This is a pointer to a structure used to store a part of the result of a `gpgme_op_sign` operation. The structure contains the following members:

`gpgme_new_signature_t next`

This is a pointer to the next new signature structure in the linked list, or `NULL` if this is the last element.

`gpgme_sig_mode_t type`

The type of this signature.

`gpgme_pubkey_algo_t pubkey_algo`

The public key algorithm used to create this signature.

`gpgme_hash_algo_t hash_algo`

The hash algorithm used to create this signature.

`unsigned int sig_class`

The signature class of this signature.

`long int timestamp`

The creation timestamp of this signature.

`char *fpr`

The fingerprint of the key which was used to create this signature.

-- Data type: `gpgme_sign_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_sign` operation. After successfully generating a signature, you can retrieve the pointer to the result with `gpgme_op_sign_result`. The structure contains the following members:

`gpgme_invalid_key_t invalid_signers`

A linked list with information about all invalid keys for which a signature could not be created.

`gpgme_new_signature_t signatures`

A linked list with information about all signatures created.

-- Function: `gpgme_sign_result_t gpgme_op_sign_result (gpgme_ctx_t CTX)`

The function `gpgme_op_sign_result` returns a `gpgme_sign_result_t` pointer to a structure holding the result of a `gpgme_op_sign` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_sign`, `gpgme_op_sign_start`, `gpgme_op_encrypt_sign` or `gpgme_op_encrypt_sign_start` operation. If that operation failed, the function might return a NULL pointer. The returned pointer is only valid until the next operation is started on the context.

File: `gpgme.info`, Node: Signature Notation Data, Prev: Creating a Signature, Up: Sign

#### 7.7.4.3 Signature Notation Data

.....

Using the following functions, you can attach arbitrary notation data to a signature. This information is then available to the user when the signature is verified.

-- Function: void gpgme\_sig\_notation\_clear (gpgme\_ctx\_t CTX)  
SINCE: 1.1.0

The function gpgme\_sig\_notation\_clear removes the notation data from the context CTX. Subsequent signing operations from this context will not include any notation data.

Every context starts with an empty notation data list.

-- Function: gpgme\_error\_t gpgme\_sig\_notation\_add (gpgme\_ctx\_t CTX,  
const char \*NAME, const char \*VALUE,  
gpgme\_sig\_notation\_flags\_t FLAGS)  
SINCE: 1.1.0

The function gpgme\_sig\_notation\_add adds the notation data with the name NAME and the value VALUE to the context CTX.

Subsequent signing operations will include this notation data, as well as any other notation data that was added since the creation of the context or the last gpgme\_sig\_notation\_clear operation.

The arguments NAME and VALUE must be NUL-terminated strings in human-readable form. The flag GPGME\_SIG\_NOTATION\_HUMAN\_READABLE is implied (non-human-readable notation data is currently not supported). The strings must be in UTF-8 encoding.

If NAME is NULL, then VALUE should be a policy URL.

The function gpgme\_sig\_notation\_add returns the error code GPG\_ERR\_NO\_ERROR if the notation data could be added successfully, GPG\_ERR\_INV\_VALUE if CTX is not a valid pointer, or if NAME, VALUE and FLAGS are an invalid combination. The function also passes through any errors that are reported by the crypto engine support routines.

-- Function: gpgme\_sig\_notation\_t gpgme\_sig\_notation\_get  
(const gpgme\_ctx\_t CTX)  
SINCE: 1.1.0

The function gpgme\_sig\_notation\_get returns the linked list of notation data structures that are contained in the context CTX.

If CTX is not a valid pointer, or there is no notation data added for this context, NULL is returned.

File: gpgme.info, Node: Encrypt, Prev: Sign, Up: Crypto Operations

## 7.7.5 Encrypt

-----

One plaintext can be encrypted for several recipients at the same time. The list of recipients is created independently of any context, and then passed to the encryption operation.

\* Menu:

\* Encrypting a Plaintext::     How to encrypt a plaintext.

File: gpgme.info, Node: Encrypting a Plaintext, Up: Encrypt

### 7.7.5.1 Encrypting a Plaintext

.....

-- Function: `gpgme_error_t gpgme_op_encrypt (gpgme_ctx_t CTX,  
          gpgme_key_t RECP[], gpgme_encrypt_flags_t FLAGS,  
          gpgme_data_t PLAIN, gpgme_data_t CIPHER)`

The function `gpgme_op_encrypt` encrypts the plaintext in the data object `PLAIN` for the recipients `RECP` and stores the ciphertext in the data object `CIPHER`. The type of the ciphertext created is determined by the ASCII armor (or, if that is not set, by the encoding specified for `CIPHER`) and the text mode attributes set for the context `CTX`.

`RECP` must be a NULL-terminated array of keys. The user must keep references for all keys during the whole duration of the call (but see `gpgme_op_encrypt_start` for the requirements with the asynchronous variant).

The value in `FLAGS` is a bitwise-or combination of one or multiple of the following bit values:

#### `GPGME_ENCRYPT_ALWAYS_TRUST`

The `GPGME_ENCRYPT_ALWAYS_TRUST` symbol specifies that all the recipients in `RECP` should be trusted, even if the keys do not have a high enough validity in the keyring. This flag should be used with care; in general it is not a good idea to use any untrusted keys.

#### `GPGME_ENCRYPT_NO_ENCRYPT_TO`

SINCE: 1.2.0

The `GPGME_ENCRYPT_NO_ENCRYPT_TO` symbol specifies that no default or hidden default recipients as configured in the

crypto backend should be included. This can be useful for managing different user profiles.

#### GPGME\_ENCRYPT\_NO\_COMPRESS

SINCE: 1.5.0

The GPGME\_ENCRYPT\_NO\_COMPRESS symbol specifies that the plaintext shall not be compressed before it is encrypted.

This is in some cases useful if the length of the encrypted message may reveal information about the plaintext.

#### GPGME\_ENCRYPT\_PREPARE

#### GPGME\_ENCRYPT\_EXPECT\_SIGN

The GPGME\_ENCRYPT\_PREPARE symbol is used with the UI Server protocol to prepare an encryption (i.e. sending the PREP\_ENCRYPT command). With the GPGME\_ENCRYPT\_EXPECT\_SIGN symbol the UI Server is advised to also expect a sign command.

#### GPGME\_ENCRYPT\_SYMMETRIC

SINCE: 1.7.0

The GPGME\_ENCRYPT\_SYMMETRIC symbol specifies that the output should be additionally encrypted symmetrically even if recipients are provided. This feature is only supported for the OpenPGP crypto engine.

#### GPGME\_ENCRYPT\_THROW\_KEYIDS

SINCE: 1.8.0

The GPGME\_ENCRYPT\_THROW\_KEYIDS symbol requests that the identifiers for the decryption keys are not included in the ciphertext. On the receiving side, the use of this flag may slow down the decryption process because all available secret keys must be tried. This flag is only honored for OpenPGP encryption.

#### GPGME\_ENCRYPT\_WRAP

SINCE: 1.8.0

The GPGME\_ENCRYPT\_WRAP symbol specifies that the input is an OpenPGP message and not a plain data. This is the counterpart to GPGME\_DECRYPT\_UNWRAP.

#### GPGME\_ENCRYPT\_WANT\_ADDRESS

SINCE: 1.11.0

The GPGME\_ENCRYPT\_WANT\_ADDRESS symbol requests that all supplied keys or key specifications include a syntactically

valid mail address. If this is not the case the operation is not even tried and the error code `GPG_ERR_INV_USER_ID` is returned. Only the address part of the key specification is conveyed to the backend. As of now the key must be specified using the `RECPSTRING` argument of the extended encrypt functions. This feature is currently only supported for the OpenPGP crypto engine.

If `GPG_ERR_UNUSABLE_PUBKEY` is returned, some recipients in `RECP` are invalid, but not all. In this case the plaintext might be encrypted for all valid recipients and returned in `CIPHER` (if this happens depends on the crypto engine). More information about the invalid recipients is available with `gpgme_op_encrypt_result`.

If `RECP` is `NULL`, symmetric rather than public key encryption is performed. Symmetrically encrypted cipher text can be deciphered with `gpgme_op_decrypt`. Note that in this case the crypto backend needs to retrieve a passphrase from the user. Symmetric encryption is currently only supported for the OpenPGP crypto backend.

The function returns the error code `GPG_ERR_NO_ERROR` if the ciphertext could be created successfully, `GPG_ERR_INV_VALUE` if `CTX`, `RECP`, `PLAIN` or `CIPHER` is not a valid pointer, `GPG_ERR_UNUSABLE_PUBKEY` if `RECP` contains some invalid recipients, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the symmetric key could not be retrieved, and passes through any errors that are reported by the crypto engine support routines.

```
-- Function: gpgme_error_t gpgme_op_encrypt_start (gpgme_ctx_t CTX,  
          gpgme_key_t RECP[], gpgme_encrypt_flags_t FLAGS,  
          gpgme_data_t PLAIN, gpgme_data_t CIPHER)
```

The function `gpgme_op_encrypt_start` initiates a `gpgme_op_encrypt` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

References to the keys only need to be held for the duration of this call. The user can release its references to the keys after this function returns, even if the operation is not yet finished.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `CTX`, `RSET`, `PLAIN` or `CIPHER` is not a valid pointer, and `GPG_ERR_UNUSABLE_PUBKEY` if `RSET` does not contain any valid recipients.

```
-- Function: gpgme_error_t gpgme_op_encrypt_ext (gpgme_ctx_t CTX,  
          gpgme_key_t RECP[], const char *RECPSTRING,  
          gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN,
```



gpgme\_data\_t CIPHER)

SINCE: 1.11.0

This is an extended version of `gpgme_op_encrypt` with `RECPSTRING` as additional parameter. If `RECP` is `NULL` and `RECPSTRING` is not `NULL`, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `RECP` the keys are given directly as strings and there is no need to first create key objects. Leading and trailing white space is removed from each line in `RECPSTRING`. The keys are then passed verbatim to the backend engine.

For the OpenPGP backend several special keywords are supported to modify the operation. These keywords are given instead of a key specification. The currently supported keywords are:

`--hidden`

`--no-hidden`

These keywords toggle between normal and hidden recipients for all following key specifications. When a hidden recipient is requested the `gpg` option `-R` (or `-F` in file mode) is used instead of `-r` (`-f` in file mode).

`--file`

`--no-file`

These keywords toggle between regular and file mode for all following key specification. In file mode the option `-f` or `-F` is passed to `gpg`. At least GnuPG version 2.1.14 is required to handle these options. The `GPGME_ENCRYPT_WANT_ADDRESS` flag is ignored in file mode.

`--`

This keyword disables all keyword detection up to the end of the string. All keywords are treated as verbatim arguments.

To create a `RECPSTRING` it is often useful to employ a `strconcat` style function. For example this function creates a string to encrypt to two keys:

```
char *
xbuild_recstring (const char *key1, const char *key2)
{
    char *result = gpgstrconcat ("--\n", key1, "\n", key2, NULL);
    if (!result)
        { perror ("strconcat failed"); exit (2); }
    return result;
}
```

Note the use of the double dash here; unless you want to specify a keyword, it is a good idea to avoid any possible trouble with key specifications starting with a double dash. The used `strconcat` function is available in `Libgpg-error 1.28` and later; `Libgpg-error` (aka `Gpgmt`) is a dependency of `GPGME`. The number of arguments to `gpgmt_strconcat` is limited to 47 but that should always be sufficient. In case a larger and non-fixed number of keys are to be supplied the following code can be used:

```
char *
xbuild_long_recpstring (void)
{
    gpgmt_stream_t memfp;
    const char *s;
    void *result;

    memfp = gpgmt_fopenmem (0, "w+b");
    if (!memfp)
        { perror ("fopenmem failed"); exit (2); }
    gpgmt_fputs ("--", memfp);
    while ((s = get_next_keyspec ()))
        {
            gpgmt_fputc ('\n', memfp);
            gpgmt_fputs (s, memfp);
        }
    gpgmt_fputc (0, memfp);
    if (gpgmt_ferror (memfp))
        { perror ("writing to memstream failed"); exit (2); }
    if (gpgmt_fclose_snatch (memfp, &result, NULL))
        { perror ("fclose_snatch failed"); exit (2); }
    return result;
}
```

In this example `get_next_keyspec` is expected to return the next key to be added to the string. Please take care: Encrypting to a large number of recipients is often questionable due to security reasons and also for the technicality that all keys are currently passed on the command line to `gpg` which has as a platform specific length limitation.

```
-- Function: gpgme_error_t gpgme_op_encrypt_ext_start (gpgme_ctx_t CTX,
    gpgme_key_t RECP[], const char *RECPSTRING,
    gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN,
    gpgme_data_t CIPHER)
```

SINCE: 1.11.0

This is an extended version of `gpgme_op_encrypt_start` with `RECPSTRING` as additional parameter. If `RECP` is `NULL` and `RECPSTRING` is not `NULL`, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `RECP` the keys are given directly as strings and there is no need to first create key objects. The keys are passed verbatim to the backend engine.

-- Data type: `gpgme_encrypt_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_encrypt` operation. After successfully encrypting data, you can retrieve the pointer to the result with `gpgme_op_encrypt_result`. The structure contains the following members:

`gpgme_invalid_key_t` `invalid_recipients`

A linked list with information about all invalid keys for which the data could not be encrypted.

-- Function: `gpgme_encrypt_result_t gpgme_op_encrypt_result`  
(`gpgme_ctx_t` `CTX`)

The function `gpgme_op_encrypt_result` returns a `gpgme_encrypt_result_t` pointer to a structure holding the result of a `gpgme_op_encrypt` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_encrypt`, `gpgme_op_encrypt_start`, `gpgme_op_sign` or `gpgme_op_sign_start` operation. If this operation failed, this might be a `NULL` pointer. The returned pointer is only valid until the next operation is started on the context.

-- Function: `gpgme_error_t gpgme_op_encrypt_sign` (`gpgme_ctx_t` `CTX`,  
`gpgme_key_t` `RECP[]`, `gpgme_encrypt_flags_t` `FLAGS`,  
`gpgme_data_t` `PLAIN`, `gpgme_data_t` `CIPHER`)

The function `gpgme_op_encrypt_sign` does a combined encrypt and sign operation. It is used like `gpgme_op_encrypt`, but the ciphertext also contains signatures for the signers listed in `CTX`.

The combined encrypt and sign operation is currently only available for the OpenPGP crypto engine.

-- Function: `gpgme_error_t gpgme_op_encrypt_sign_start`  
(`gpgme_ctx_t` `CTX`, `gpgme_key_t` `RECP[]`,  
`gpgme_encrypt_flags_t` `FLAGS`, `gpgme_data_t` `PLAIN`,  
`gpgme_data_t` `CIPHER`)

The function `gpgme_op_encrypt_sign_start` initiates a `gpgme_op_encrypt_sign` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code GPG\_ERR\_NO\_ERROR if the operation could be started successfully, and GPG\_ERR\_INV\_VALUE if CTX, RSET, PLAIN or CIPHER is not a valid pointer.

```
-- Function: gpgme_error_t gpgme_op_encrypt_sign_ext (gpgme_ctx_t CTX,  
    gpgme_key_t RECP[], const char *RECPSTRING,  
    gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN,  
    gpgme_data_t CIPHER)
```

SINCE: 1.11.0

This is an extended version of `gpgme_op_encrypt_sign` with `RECPSTRING` as additional parameter. If `RECP` is `NULL` and `RECPSTRING` is not `NULL`, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `RECP` the keys are given directly as strings and there is no need to first create the key objects. The keys are passed verbatim to the backend engine.

```
-- Function: gpgme_error_t gpgme_op_encrypt_sign_ext_start  
    (gpgme_ctx_t CTX, gpgme_key_t RECP[], const char *RECPSTRING,  
    gpgme_encrypt_flags_t FLAGS, gpgme_data_t PLAIN,  
    gpgme_data_t CIPHER)
```

SINCE: 1.11.0

This is an extended version of `gpgme_op_encrypt_sign_start` with `RECPSTRING` as additional parameter. If `RECP` is `NULL` and `RECPSTRING` is not `NULL`, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `RECP` the keys are given directly as strings and there is no need to first create the key objects. The keys are passed verbatim to the backend engine.

File: `gpgme.info`, Node: Miscellaneous, Next: Run Control, Prev: Crypto Operations, Up: Contexts

## 7.8 Miscellaneous operations

=====

Here are some support functions which are sometimes useful.

\* Menu:

\* Running other Programs:: Running other Programs

\* Using the Assuan protocol:: Using the Assuan protocol

\* Checking for updates:: How to check for software updates

### 7.8.1 Running other Programs

-----

GPGME features an internal subsystem to run the actual backend engines. Along with data abstraction object this subsystem can be used to run arbitrary simple programs which even need not be related to cryptographic features. It may for example be used to run tools which are part of the GnuPG system but are not directly accessible with the GPGME API.

```
-- Function: gpgme_error_t gpgme_op_spawn (gpgme_ctx_t CTX,  
      const char *FILE, const char *ARGV[], gpgme_data_t DATAIN,  
      gpgme_data_t DATAOUT, gpgme_data_t DATAERR,  
      unsigned int FLAGS)
```

SINCE: 1.5.0

The function `gpgme_op_spawn` runs the program `FILE` with the arguments taken from the `NULL` terminated array `ARGV`. If no arguments are required `ARGV` may be given as `NULL`. In the latter case or if `argv[0]` is the empty string, GPGME uses the basename of `FILE` for `argv[0]`. The file descriptors `stdin`, `stdout`, and `stderr` are connected to the data objects `DATAIN`, `DATAOUT`, and `DATAERR`. If `NULL` is passed for one of these data objects the corresponding file descriptor is connected to `/dev/null`.

The value in `FLAGS` is a bitwise-or combination of one or multiple of the following bit values:

`GPGME_SPAWN_DETACHED`

SINCE: 1.5.0

Under Windows this flag inhibits the allocation of a new console for the program. This is useful for a GUI application which needs to call a command line helper tool.

`GPGME_SPAWN_ALLOW_SET_FG`

SINCE: 1.5.0

Under Windows this flag allows the called program to put itself into the foreground.

```
-- Function: gpgme_error_t gpgme_op_spawn_start (gpgme_ctx_t CTX,  
      const char *FILE, const char *ARGV[], gpgme_data_t DATAIN,  
      gpgme_data_t DATAOUT, gpgme_data_t DATAERR,
```

unsigned int FLAGS)

SINCE: 1.5.0

This is the asynchronous variant of `gpgme_op_spawn`.

File: `gpgme.info`, Node: Using the Assuan protocol, Next: Checking for updates, Prev: Running other Programs, Up: Miscellaneous

## 7.8.2 Using the Assuan protocol

-----

The Assuan protocol can be used to talk to arbitrary Assuan servers. By default it is connected to the GnuPG agent, but it may be connected to arbitrary servers by using `gpgme_ctx_set_engine_info`, passing the location of the servers socket as `FILE_NAME` argument, and an empty string as `HOME_DIR` argument.

The Assuan protocol functions use three kinds of callbacks to transfer data:

-- Data type: `gpgme_error_t (*gpgme_assuan_data_cb_t) (void *OPAQUE, const void *DATA, size_t DATALEN)`

SINCE: 1.2.0

This callback receives any data sent by the server. `OPAQUE` is the pointer passed to `gpgme_op_assuan_transact_start`, `DATA` of length `DATALEN` refers to the data sent.

-- Data type: `gpgme_error_t (*gpgme_assuan_inquire_cb_t) (void *OPAQUE, const char *NAME, const char *ARGS, gpgme_data_t *R_DATA)`

SINCE: 1.2.0

This callback is used to provide additional data to the Assuan server. `OPAQUE` is the pointer passed to `gpgme_op_assuan_transact_start`, `NAME` and `ARGS` specify what kind of data the server requested, and `R_DATA` is used to return the actual data.

Note: Returning data is currently not implemented in GPGME.

-- Data type: `gpgme_error_t (*gpgme_assuan_status_cb_t) (void *OPAQUE, const char *STATUS, const char *ARGS)`

SINCE: 1.2.0

This callback receives any status lines sent by the server. OPAQUE is the pointer passed to gpgme\_op\_assuan\_transact\_start, STATUS and ARGS denote the status update sent.

```
-- Function: gpgme_error_t gpgme_op_assuan_transact_start
(gpgme_ctx_t CTX, const char *COMMAND,
 gpgme_assuan_data_cb_t DATA_CB, void * DATA_CB_VALUE,
 gpgme_assuan_inquire_cb_t INQUIRE_CB, void * INQUIRE_CB_VALUE,
 gpgme_assuan_status_cb_t STATUS_CB, void * STATUS_CB_VALUE)
```

SINCE: 1.2.0

Send the Assuan COMMAND and return results via the callbacks. Any callback may be NULL. The result of the operation may be retrieved using gpgme\_wait\_ext.

Asynchronous variant.

```
-- Function: gpgme_error_t gpgme_op_assuan_transact_ext
(gpgme_ctx_t CTX, const char *COMMAND,
 gpgme_assuan_data_cb_t DATA_CB, void * DATA_CB_VALUE,
 gpgme_assuan_inquire_cb_t INQUIRE_CB, void * INQUIRE_CB_VALUE,
 gpgme_assuan_status_cb_t STATUS_CB, void * STATUS_CB_VALUE,
 gpgme_error_t *OP_ERR)
```

Send the Assuan COMMAND and return results via the callbacks. The result of the operation is returned in OP\_ERR.

Synchronous variant.

File: gpgme.info, Node: Checking for updates, Prev: Using the Assuan protocol, Up: Miscellaneous

### 7.8.3 How to check for software updates

-----

The GnuPG Project operates a server to query the current versions of software packages related to GnuPG. GPGME can be used to access this online database and check whether a new version of a software package is available.

```
-- Data type: gpgme_query_swdb_result_t
SINCE: 1.8.0
```

This is a pointer to a structure used to store the result of a gpgme\_op\_query\_swdb operation. After success full call to that function, you can retrieve the pointer to the result with

pggme\_op\_query\_swdb\_result. The structure contains the following member:

name

This is the name of the package.

iversion

The currently installed version or an empty string. This value is either a copy of the argument given to pggme\_op\_query\_swdb or the version of the installed software as figured out by GPGME or GnuPG.

created

This gives the date the file with the list of version numbers has originally be created by the GnuPG project.

retrieved

This gives the date the file was downloaded.

warning

If this flag is set either an error has occurred or some of the information in this structure are not properly set. For example if the version number of the installed software could not be figured out, the update flag may not reflect a required update status.

update

If this flag is set an update of the software is available.

urgent

If this flag is set an available update is important.

noinfo

If this flag is set, no valid information could be retrieved.

unknown

If this flag is set the given name is not known.

toold

If this flag is set the available information is not fresh enough.

error

If this flag is set some other error has occurred.

version

The version string of the latest released version.



reldate

The release date of the latest released version.

-- Function: `gpgme_error_t gpgme_op_query_swdb (gpgme_ctx_t CTX,  
const char *NAME, const char *IVERSION, gpgme_data_t RESERVED)`

SINCE: 1.8.0

Query the software version database for software package NAME and check against the installed version given by IVERSION. If IVERSION is given as NULL a check is only done if GPGME can figure out the version by itself (for example when using "gpgme" or "gnupg"). If NULL is used for NAME the current gpgme version is checked. RESERVED must be set to 0.

-- Function: `gpgme_query_swdb_result_t gpgme_op_query_swdb_result  
(gpgme_ctx_t CTX)`

SINCE: 1.8.0

The function `gpgme_op_query_swdb_result` returns a `gpgme_query_swdb_result_t` pointer to a structure holding the result of a `gpgme_op_query_swdb` operation. The pointer is only valid if the last operation on the context was a successful call to `gpgme_op_query_swdb`. If that call failed, the result might be a NULL pointer. The returned pointer is only valid until the next operation is started on the context CTX.

Here is an example on how to check whether GnuPG is current:

```
#include <gpgme.h>

int
main (void)
{
    gpg_error_t err;
    gpgme_ctx_t ctx;
    gpgme_query_swdb_result_t result;

    gpgme_check_version (NULL);
    err = gpgme_new (&ctx);
    if (err)
        fprintf (stderr, "error creating context: %s\n", gpg_strerror (err));
    else
    {
        gpgme_set_protocol (ctx, GPGME_PROTOCOL_GPGCONF);

        err = gpgme_op_query_swdb (ctx, "gnupg", NULL, 0);
    }
}
```

```

if (err)
    fprintf (stderr, "error querying swdb: %s\n", gpg_strerror (err));
else
    {
    result = gpgme_op_query_swdb_result (ctx);
    if (!result)
        fprintf (stderr, "error querying swdb\n");
    if (!result->warning && !result->update)
        printf ("GnuPG version %s is current\n",
                result->iversion);
    else if (!result->warning && result->update)
        printf ("GnuPG version %s can be updated to %s\n",
                result->iversion, result->version);
    else
        fprintf (stderr, "error finding the update status\n");
    }
    gpgme_release (ctx);
}
return 0;
}

```

File: gpgme.info, Node: Run Control, Prev: Miscellaneous, Up: Contexts

## 7.9 Run Control

=====

GPGME supports running operations synchronously and asynchronously. You can use asynchronous operation to set up a context up to initiating the desired operation, but delay performing it to a later point.

Furthermore, you can use an external event loop to control exactly when GPGME runs. This ensures that GPGME only runs when necessary and also prevents it from blocking for a long time.

\* Menu:

- \* Waiting For Completion::    Waiting until an operation is completed.
- \* Using External Event Loops::   Advanced control over what happens when.
- \* Cancellation::                How to end pending operations prematurely.

File: gpgme.info, Node: Waiting For Completion, Next: Using External Event Loops, Up: Run Control

### 7.9.1 Waiting For Completion

-----

-- Function: gpgme\_ctx\_t gpgme\_wait (gpgme\_ctx\_t CTX,

gpgme\_error\_t \*STATUS, int HANG)

The function `gpgme_wait` continues the pending operation within the context `CTX`. In particular, it ensures the data exchange between GPGME and the crypto backend and watches over the run time status of the backend process.

If `HANG` is true, the function does not return until the operation is completed or cancelled. Otherwise the function will not block for a long time.

The error status of the finished operation is returned in `STATUS` if `gpgme_wait` does not return `NULL`.

The `CTX` argument can be `NULL`. In that case, `gpgme_wait` waits for any context to complete its operation.

`gpgme_wait` can be used only in conjunction with any context that has a pending operation initiated with one of the `gpgme_op_*_start` functions except `gpgme_op_keylist_start` and `gpgme_op_trustlist_start` (for which you should use the corresponding `gpgme_op_*_next` functions). If `CTX` is `NULL`, all of such contexts are waited upon and possibly returned. Synchronous operations running in parallel, as well as key and trust item list operations, do not affect `gpgme_wait`.

In a multi-threaded environment, only one thread should ever call `gpgme_wait` at any time, regardless of whether `CTX` is specified or not. This means that all calls to this function should be fully synchronized by locking primitives. It is safe to start asynchronous operations while a thread is running in `gpgme_wait`.

The function returns the `CTX` of the context which has finished the operation. If `HANG` is false, and the timeout expires, `NULL` is returned and `*status` will be set to 0. If an error occurs, `NULL` is returned and the error is returned in `*status`.

File: `gpgme.info`, Node: Using External Event Loops, Next: Cancellation, Prev: Waiting For Completion, Up: Run Control

### 7.9.2 Using External Event Loops

-----

GPGME hides the complexity of the communication between the library and the crypto engine. The price of this convenience is that the calling thread can block arbitrary long waiting for the data returned by the crypto engine. In single-threaded programs, in particular if they are interactive, this is an unwanted side-effect. OTOH, if `gpgme_wait` is

used without the HANG option being enabled, it might be called unnecessarily often, wasting CPU time that could be used otherwise.

The I/O callback interface described in this section lets the user take control over what happens when. GPGME will provide the user with the file descriptors that should be monitored, and the callback functions that should be invoked when a file descriptor is ready for reading or writing. It is then the users responsibility to decide when to check the file descriptors and when to invoke the callback functions. Usually this is done in an event loop, that also checks for events in other parts of the program. If the callback functions are only called when the file descriptors are ready, GPGME will never block. This gives the user more control over the program flow, and allows to perform other tasks when GPGME would block otherwise.

By using this advanced mechanism, GPGME can be integrated smoothly into GUI toolkits like GTK+ even for single-threaded programs.

\* Menu:

- \* I/O Callback Interface:: How I/O callbacks are registered.
- \* Registering I/O Callbacks:: How to use I/O callbacks for a context.
- \* I/O Callback Example:: An example how to use I/O callbacks.
- \* I/O Callback Example GTK+:: How to use GPGME with GTK+.
- \* I/O Callback Example GDK:: How to use GPGME with GDK.
- \* I/O Callback Example Qt:: How to use GPGME with Qt.

File: gpgme.info, Node: I/O Callback Interface, Next: Registering I/O Callbacks, Up: Using External Event Loops

### 7.9.2.1 I/O Callback Interface

.....

-- Data type: `gpgme_error_t (*gpgme_io_cb_t) (void *DATA, int FD)`

The `gpgme_io_cb_t` type is the type of functions which GPGME wants to register as I/O callback handlers using the `gpgme_register_io_cb_t` functions provided by the user.

DATA and FD are provided by GPGME when the I/O callback handler is registered, and should be passed through to the handler when it is invoked by the user because it noticed activity on the file descriptor FD.

The callback handler always returns 0, but you should consider the return value to be reserved for later use.

-- Data type: `gpgme_error_t (*gpgme_register_io_cb_t) (void *DATA, int FD, int DIR, gpgme_io_cb_t FNC, void *FNC_DATA,`

void \*\*TAG)

The `gpgme_register_io_cb_t` type is the type of functions which can be called by GPGME to register an I/O callback function `FNC` for the file descriptor `FD` with the user. `FNC_DATA` should be passed as the first argument to `FNC` when the handler is invoked (the second argument should be `FD`). If `DIR` is 0, `FNC` should be called by the user when `FD` is ready for writing. If `DIR` is 1, `FNC` should be called when `FD` is ready for reading.

`DATA` was provided by the user when registering the `gpgme_register_io_cb_t` function with GPGME and will always be passed as the first argument when registering a callback function. For example, the user can use this to determine the event loop to which the file descriptor should be added.

GPGME will call this function when a crypto operation is initiated in a context for which the user has registered I/O callback handler functions with `gpgme_set_io_cbs`. It can also call this function when it is in an I/O callback handler for a file descriptor associated to this context.

The user should return a unique handle in `TAG` identifying this I/O callback registration, which will be passed to the `gpgme_register_io_cb_t` function without interpretation when the file descriptor should not be monitored anymore.

-- Data type: void (\*gpgme\_remove\_io\_cb\_t) (void \*TAG)

The `gpgme_remove_io_cb_t` type is the type of functions which can be called by GPGME to remove an I/O callback handler that was registered before. `TAG` is the handle that was returned by the `gpgme_register_io_cb_t` for this I/O callback.

GPGME can call this function when a crypto operation is in an I/O callback. It will also call this function when the context is destroyed while an operation is pending.

-- Data type: enum gpgme\_event\_io\_t

The `gpgme_event_io_t` type specifies the type of an event that is reported to the user by GPGME as a consequence of an I/O operation. The following events are defined:

#### GPGME\_EVENT\_START

The operation is fully initialized now, and you can start to run the registered I/O callback handlers now. Note that registered I/O callback handlers must not be run before this event is signalled. `TYPE_DATA` is `NULL` and reserved for later use.

## GPGME\_EVENT\_DONE

The operation is finished, the last I/O callback for this operation was removed. The accompanying TYPE\_DATA points to a struct gpgme\_io\_event\_done\_data variable that contains the status of the operation that finished. This event is signalled after the last I/O callback has been removed.

## GPGME\_EVENT\_NEXT\_KEY

In a gpgme\_op\_keylist\_start operation, the next key was received from the crypto engine. The accompanying TYPE\_DATA is a gpgme\_key\_t variable that contains the key with one reference for the user.

## GPGME\_EVENT\_NEXT\_TRUSTITEM

In a gpgme\_op\_trustlist\_start operation, the next trust item was received from the crypto engine. The accompanying TYPE\_DATA is a gpgme\_trust\_item\_t variable that contains the trust item with one reference for the user.

-- Data type: void (\*gpgme\_event\_io\_cb\_t) (void \*DATA, gpgme\_event\_io\_t TYPE, void \*TYPE\_DATA)

The gpgme\_event\_io\_cb\_t type is the type of functions which can be called by GPGME to signal an event for an operation running in a context which has I/O callback functions registered by the user.

DATA was provided by the user when registering the gpgme\_event\_io\_cb\_t function with GPGME and will always be passed as the first argument when registering a callback function. For example, the user can use this to determine the context in which this event has occurred.

TYPE will specify the type of event that has occurred. TYPE\_DATA specifies the event further, as described in the above list of possible gpgme\_event\_io\_t types.

GPGME can call this function in an I/O callback handler.

File: gpgme.info, Node: Registering I/O Callbacks, Next: I/O Callback Example, Prev: I/O Callback Interface, Up: Using External Event Loops

### 7.9.2.2 Registering I/O Callbacks

.....

-- Data type: struct gpgme\_io\_cbs

This structure is used to store the I/O callback interface functions described in the previous section. It has the following members:

`gpgme_register_io_cb_t add`

This is the function called by GPGME to register an I/O callback handler. It must be specified.

`void *add_priv`

This is passed as the first argument to the add function when it is called by GPGME. For example, it can be used to determine the event loop to which the file descriptor should be added.

`gpgme_remove_io_cb_t remove`

This is the function called by GPGME to remove an I/O callback handler. It must be specified.

`gpgme_event_io_cb_t event`

This is the function called by GPGME to signal an event for an operation. It must be specified, because at least the start event must be processed.

`void *event_priv`

This is passed as the first argument to the event function when it is called by GPGME. For example, it can be used to determine the context in which the event has occurred.

-- Function: `void gpgme_set_io_cbs (gpgme_ctx_t CTX,  
struct gpgme_io_cbs *IO_CBS)`

The function `gpgme_set_io_cbs` enables the I/O callback interface for the context CTX. The I/O callback functions are specified by IO\_CBS.

If `IO_CBS->add` is NULL, the I/O callback interface is disabled for the context, and normal operation is restored.

-- Function: `void gpgme_get_io_cbs (gpgme_ctx_t CTX,  
struct gpgme_io_cbs *IO_CBS)`

The function `gpgme_get_io_cbs` returns the I/O callback functions set with `gpgme_set_io_cbs` in IO\_CBS.

File: `gpgme.info`, Node: I/O Callback Example, Next: I/O Callback Example GTK+, Prev: Registering I/O Callbacks, Up: Using External Event Loops

### 7.9.2.3 I/O Callback Example

.....

To actually use an external event loop, you have to implement the I/O callback functions that are used by GPGME to register and unregister

file descriptors. Furthermore, you have to actually monitor these file descriptors for activity and call the appropriate I/O callbacks.

The following example illustrates how to do that. The example uses locking to show in which way the callbacks and the event loop can run concurrently. For the event loop, we use a fixed array. For a real-world implementation, you should use a dynamically sized structure because the number of file descriptors needed for a crypto operation in GPGME is not predictable.

```
#include <assert.h>
#include <errno.h>
#include <stdlib.h>
#include <pthread.h>
#include <sys/types.h>
#include <gpgme.h>

/* The following structure holds the result of a crypto operation. */
struct op_result
{
    int done;
    gpgme_error_t err;
};

/* The following structure holds the data associated with one I/O
callback. */
struct one_fd
{
    int fd;
    int dir;
    gpgme_io_cb_t fnc;
    void *fnc_data;
    void *loop;
};

struct event_loop
{
    pthread_mutex_t lock;
#define MAX_FDS 32
    /* Unused slots are marked with FD being -1. */
    struct one_fd fds[MAX_FDS];
};
```

The following functions implement the I/O callback interface.

```
gpgme_error_t
add_io_cb (void *data, int fd, int dir, gpgme_io_cb_t fnc, void *fnc_data,
          void **r_tag)
```



```

{
    struct event_loop *loop = data;
    struct one_fd *fds = loop->fds;
    int i;

    pthread_mutex_lock (&loop->lock);
    for (i = 0; i < MAX_FDS; i++)
    {
        if (fds[i].fd == -1)
        {
            fds[i].fd = fd;
            fds[i].dir = dir;
            fds[i].fnc = fnc;
            fds[i].fnc_data = fnc_data;
            fds[i].loop = loop;
            break;
        }
    }
    pthread_mutex_unlock (&loop->lock);
    if (i == MAX_FDS)
        return gpg_error (GPG_ERR_GENERAL);
    *r_tag = &fds[i];
    return 0;
}

void
remove_io_cb (void *tag)
{
    struct one_fd *fd = tag;
    struct event_loop *loop = fd->loop;

    pthread_mutex_lock (&loop->lock);
    fd->fd = -1;
    pthread_mutex_unlock (&loop->lock);
}

void
event_io_cb (void *data, gpgme_event_io_t type, void *type_data)
{
    struct op_result *result = data;

    /* We don't support list operations here. */
    if (type == GPGME_EVENT_DONE)
    {
        result->done = 1;
        result->err = *type_data;
    }
}

```

The final missing piece is the event loop, which will be presented next. We only support waiting for the success of a single operation.

```
int
do_select (struct event_loop *loop)
{
    fd_set rfd;
    fd_set wfd;
    int i, n;
    int any = 0;
    struct timeval tv;
    struct one_fd *fdlist = loop->fds;

    pthread_mutex_lock (&loop->lock);
    FD_ZERO (&rfd);
    FD_ZERO (&wfd);
    for (i = 0; i < MAX_FDS; i++)
        if (fdlist[i].fd != -1)
            FD_SET (fdlist[i].fd, fdlist[i].dir ? &rfd : &wfd);
    pthread_mutex_unlock (&loop->lock);

    tv.tv_sec = 0;
    tv.tv_usec = 1000;

    do
    {
        n = select (FD_SETSIZE, &rfd, &wfd, NULL, &tv);
    }
    while (n < 0 && errno == EINTR);

    if (n < 0)
        return n; /* Error or timeout. */

    pthread_mutex_lock (&loop->lock);
    for (i = 0; i < MAX_FDS && n; i++)
    {
        if (fdlist[i].fd != -1)
        {
            if (FD_ISSET (fdlist[i].fd, fdlist[i].dir ? &rfd : &wfd))
            {
                assert (n);
                n--;
                any = 1;
                /* The I/O callback handler can register/remove callbacks,
                 so we have to unlock the file descriptor list. */
                pthread_mutex_unlock (&loop->lock);
                (*fdlist[i].fnc) (fdlist[i].fnc_data, fdlist[i].fd);
            }
        }
    }
}
```

```

        pthread_mutex_lock (&loop->lock);
    }
}
}
pthread_mutex_unlock (&loop->lock);
return any;
}

void
wait_for_op (struct event_loop *loop, struct op_result *result)
{
    int ret;

    do
    {
        ret = do_select (loop);
    }
    while (ret >= 0 && !result->done);
}

```

The main function shows how to put it all together.

```

int
main (int argc, char *argv[])
{
    struct event_loop loop;
    struct op_result result;
    gpgme_ctx_t ctx;
    gpgme_error_t err;
    gpgme_data_t sig, text;
    int i;
    pthread_mutexattr_t attr;
    struct gpgme_io_cbs io_cbs =
    {
        add_io_cb,
        &loop,
        remove_io_cb,
        event_io_cb,
        &result
    };

    init_gpgme ();

    /* Initialize the loop structure. */

    /* The mutex must be recursive, since remove_io_cb (which acquires a
       lock) can be called while holding a lock acquired in do_select. */
    pthread_mutexattr_init (&attr);

```

```

pthread_mutexattr_settype (&attr, PTHREAD_MUTEX_RECURSIVE);
pthread_mutex_init (&loop.lock, &attr);
pthread_mutexattr_destroy (&attr);

for (i = 0; i < MAX_FDS; i++)
    loop.fds[i].fd = -1;

/* Initialize the result structure. */
result.done = 0;

err = gpgme_data_new_from_file (&sig, "signature", 1);
if (!err)
    err = gpgme_data_new_from_file (&text, "text", 1);
if (!err)
    err = gpgme_new (&ctx);
if (!err)
    {
        gpgme_set_io_cbs (ctx, &io_cbs);
        err = gpgme_op_verify_start (ctx, sig, text, NULL);
    }
if (err)
    {
        fprintf (stderr, "gpgme error: %s: %s\n",
                gpgme_strerror (err), gpgme_strerror (err));
        exit (1);
    }

wait_for_op (&loop, &result);
if (!result.done)
    {
        fprintf (stderr, "select error\n");
        exit (1);
    }
if (!result.err)
    {
        fprintf (stderr, "verification failed: %s: %s\n",
                gpgme_strerror (result.err), gpgme_strerror (result.err));
        exit (1);
    }
/* Evaluate verify result. */
...
return 0;
}

```

File: gpgme.info, Node: I/O Callback Example GTK+, Next: I/O Callback Example GDK, Prev: I/O Callback Example, Up: Using External Event Loops

#### 7.9.2.4 I/O Callback Example GTK+

.....

The I/O callback interface can be used to integrate GPGME with the GTK+ event loop. The following code snippets shows how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any GTK+ specific setup.

```
#include <gtk/gtk.h>

struct my_gpgme_io_cb
{
    gpgme_io_cb_t fnc;
    void *fnc_data;
    guint input_handler_id
};

void
my_gpgme_io_cb (gpointer data, gint source, GdkInputCondition condition)
{
    struct my_gpgme_io_cb *iocb = data;
    (*(iocb->fnc)) (iocb->data, source);
}

void
my_gpgme_remove_io_cb (void *data)
{
    struct my_gpgme_io_cb *iocb = data;
    gtk_input_remove (data->input_handler_id);
}

void
my_gpgme_register_io_callback (void *data, int fd, int dir, gpgme_io_cb_t fnc,
                               void *fnc_data, void **tag)
{
    struct my_gpgme_io_cb *iocb = g_malloc (sizeof (struct my_gpgme_io_cb));
    iocb->fnc = fnc;
    iocb->data = fnc_data;
    iocb->input_handler_id = gtk_input_add_full (fd, dir
                                                ? GDK_INPUT_READ
                                                : GDK_INPUT_WRITE,
                                                my_gpgme_io_callback,
                                                0, iocb, NULL);

    *tag = iocb;
    return 0;
}
```

### 7.9.2.5 I/O Callback Example GDK

.....

The I/O callback interface can also be used to integrate GPGME with the GDK event loop. The following code snippets shows how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any GDK specific setup.

It is very similar to the GTK+ example in the previous section.

```
#include <gdk/gdk.h>

struct my_gpgme_io_cb
{
    gpgme_io_cb_t fnc;
    void *fnc_data;
    gint tag;
};

void
my_gpgme_io_cb (gpointer data, gint source, GdkInputCondition condition)
{
    struct my_gpgme_io_cb *iocb = data;
    (*(iocb->fnc)) (iocb->data, source);
}

void
my_gpgme_remove_io_cb (void *data)
{
    struct my_gpgme_io_cb *iocb = data;
    gdk_input_remove (data->tag);
}

void
my_gpgme_register_io_callback (void *data, int fd, int dir, gpgme_io_cb_t fnc,
                               void *fnc_data, void **tag)
{
    struct my_gpgme_io_cb *iocb = g_malloc (sizeof (struct my_gpgme_io_cb));
    iocb->fnc = fnc;
    iocb->data = fnc_data;
    iocb->tag = gtk_input_add_full (fd, dir ? GDK_INPUT_READ : GDK_INPUT_WRITE,
```

```

        my_gpgme_io_callback, iocb, NULL);
    *tag = iocb;
    return 0;
}

```

File: gpgme.info, Node: I/O Callback Example Qt, Prev: I/O Callback Example GDK, Up: Using External Event Loops

### 7.9.2.6 I/O Callback Example Qt

.....

The I/O callback interface can also be used to integrate GPGME with the Qt event loop. The following code snippets show how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any Qt specific setup.

```

#include <qsocketnotifier.h>
#include <qapplication.h>

struct IOCB {
    IOCB( GpgmeIOCb f, void * d, QSocketNotifier * n )
        : func( f ), data( d ), notifier( n ) {}
    GpgmeIOCb func;
    void * data;
    QSocketNotifier * notifier;
}

class MyApp : public QApplication {

// ...

static void registerGpgmeIOCallback( void * data, int fd, int dir,
                                     GpgmeIOCb func, void * func_data,
                                     void ** tag ) {
    QSocketNotifier * n =
        new QSocketNotifier( fd, dir ? QSocketNotifier::Read
                            : QSocketNotifier::Write );
    connect( n, SIGNAL(activated(int)),
            qApp, SLOT(slotGpgmeIOCallback(int)) );
    qApp->mIOCBs.push_back( IOCB( func, func_data, n ) );
    *tag = (void*)n;
}

static void removeGpgmeIOCallback( void * tag ) {
    if ( !tag ) return;
}

```

```

QSocketNotifier * n = static_cast<QSocketNotifier*>( tag );
for ( QValueList<IOCB>::iterator it = qApp->mIOCBs.begin() ;
      it != qApp->mIOCBs.end() ; ++it )
if ( it->notifier == n ) {
    delete it->notifier;
    qApp->mIOCBs.erase( it );
    return;
}
}

public slots:
void slotGpgmeIOCallback( int fd ) {
    for ( QValueList<IOCB>::const_iterator it = mIOCBs.begin() ;
          it != mIOCBs.end() ; ++it )
if ( it->notifier && it->notifier->socket() == fd )
    (*(it->func)) ( it->func_data, fd );
}

// ...

private:
    QValueList<IOCB> mIOCBs;
    // ...
};

```

File: gpgme.info, Node: Cancellation, Prev: Using External Event Loops, Up: Run Control

### 7.9.3 Cancellation

-----

Sometimes you do not want to wait for an operation to finish. GPGME provides two different functions to achieve that. The function `gpgme_cancel` takes effect immediately. When it returns, the operation is effectively canceled. However, it has some limitations and can not be used with synchronous operations. In contrast, the function `gpgme_cancel_async` can be used with any context and from any thread, but it is not guaranteed to take effect immediately. Instead, cancellation occurs at the next possible time (typically the next time I/O occurs in the target context).

-- Function: `gpgme_ctx_t gpgme_cancel (gpgme_ctx_t CTX)`  
 SINCE: 0.4.5

The function `gpgme_cancel` attempts to cancel a pending operation in the context `CTX`. This only works if you use the global event loop or your own event loop.



If you use the global event loop, you must not call `gpgme_wait` during cancellation. After successful cancellation, you can call `gpgme_wait` (optionally waiting on `CTX`), and the context `CTX` will appear as if it had finished with the error code `GPG_ERR_CANCEL`.

If you use an external event loop, you must ensure that no I/O callbacks are invoked for this context (for example by halting the event loop). On successful cancellation, all registered I/O callbacks for this context will be unregistered, and a `GPGME_EVENT_DONE` event with the error code `GPG_ERR_CANCEL` will be signalled.

The function returns an error code if the cancellation failed (in this case the state of `CTX` is not modified).

-- Function: `gpgme_ctx_t gpgme_cancel_async (gpgme_ctx_t CTX)`  
SINCE: 1.1.7

The function `gpgme_cancel_async` attempts to cancel a pending operation in the context `CTX`. This can be called by any thread at any time after starting an operation on the context, but will not take effect immediately. The actual cancellation happens at the next time GPGME processes I/O in that context.

The function returns an error code if the cancellation failed (in this case the state of `CTX` is not modified).

File: `gpgme.info`, Node: UI Server Protocol, Next: Debugging, Prev: Contexts, Up: Top

## Appendix A The GnuPG UI Server Protocol

\*\*\*\*\*

This section specifies the protocol used between clients and a User Interface Server (UI server). This protocol helps to build a system where all cryptographic operations are done by a server and the server is responsible for all dialogs. Although GPGME has no direct support for this protocol it is believed that servers will utilize the GPGME library; thus having the specification included in this manual is an appropriate choice. This protocol should be referenced as The GnuPG UI Server Protocol.

A server needs to implement these commands:(1)

\* Menu:

\* UI Server Encrypt::            Encrypt a message.

\* UI Server Sign::                Sign a message.

- \* UI Server Decrypt:: Decrypt a message.
- \* UI Server Verify:: Verify a message.
- \* UI Server Set Input Files:: Specifying the input files to operate on.
- \* UI Server Sign/Encrypt Files:: Encrypting and signing files.
- \* UI Server Verify/Decrypt Files:: Decrypting and verifying files.
- \* UI Server Import/Export Keys:: Managing certificates.
- \* UI Server Checksum Files:: Create and verify checksums for files.
- \* Miscellaneous UI Server Commands:: Commands not related to a specific operation.

----- Footnotes -----

(1) In all examples we assume that the connection has already been established; see the Assuan manual for details.

File: gpgme.info, Node: UI Server Encrypt, Next: UI Server Sign, Up: UI Server Protocol

### A.1 UI Server: Encrypt a Message

=====

Before encryption can be done the recipients must be set using the command:

-- Command: RECIPIENT STRING

Set the recipient for the encryption. STRING is an RFC-2822 recipient name ("mailbox" as per section 3.4). This command may or may not check the recipient for validity right away; if it does not all recipients are expected to be checked at the time of the ENCRYPT command. All RECIPIENT commands are cumulative until a successful ENCRYPT command or until a RESET command. Linefeeds are obviously not allowed in STRING and should be folded into spaces (which are equivalent).

To tell the server the source and destination of the data, the next two commands are to be used:

-- Command: INPUT FD=N

Set the file descriptor for the message to be encrypted to N. The message send to the server is binary encoded.

GpgOL is a Windows only program, thus N is not a libc file descriptor but a regular system handle. Given that the Assuan connection works over a socket, it is not possible to use regular inheritance to make the file descriptor available to the server. Thus DuplicateHandle needs to be used to duplicate a handle to the server process. This is the reason that the server needs to implement the GETINFO pid command. Sending this command a second

time replaces the file descriptor set by the last one.

-- Command: OUTPUT FD=N [--binary]

Set the file descriptor to be used for the output (i.e. the encrypted message) to N. If the option --binary is given the output shall be in binary format; if not given, the output for OpenPGP needs to be ASCII armored and for CMS Base-64 encoded. For details on the file descriptor, see the INPUT command.

The setting of the recipients, the data source and destination may happen in any order, even intermixed. If this has been done the actual encryption operation is called using:

-- Command: ENCRYPT --protocol=NAME

This command reads the plaintext from the file descriptor set by the INPUT command, encrypts it and writes the ciphertext to the file descriptor set by the OUTPUT command. The server may (and should) overlap reading and writing. The recipients used for the encryption are all the recipients set so far. If any recipient is not usable the server should take appropriate measures to notify the user about the problem and may cancel the operation by returning an error code. The used file descriptors are void after this command; the recipient list is only cleared if the server returns success.

Because GpgOL uses a streaming mode of operation the server is not allowed to auto select the protocol and must obey to the mandatory PROTOCOL parameter:

OpenPGP

Use the OpenPGP protocol (RFC-2440).

CMS

Use the CMS (PKCS#7) protocol (RFC-3852).

To support automatically selection of the protocol depending on the selected keys, the server MAY implement the command:

-- Command: PREP\_ENCRYPT [--protocol=NAME] [--expect-sign]

This commands considers all recipients set so far and decides whether it is able to take input and start the actual encryption. This is kind of a dry-run ENCRYPT without requiring or using the input and output file descriptors. The server shall cache the result of any user selection to avoid asking this again when the actual ENCRYPT command is send. The --protocol option is optional; if it is not given, the server should allow the user to select the protocol to be used based on the recipients given or by

any other means.

If --expect-sign is given the server should expect that the message will also be signed and use this hint to present a unified recipient and signer selection dialog if possible and desired. A selected signer should then be cached for the expected SIGN command (which is expected in the same session but possible on another connection).

If this command is given again before a successful ENCRYPT command, the second one takes effect.

Before sending the OK response the server shall tell the client the protocol to be used (either the one given by the argument or the one selected by the user) by means of a status line:

-- Status line: PROTOCOL NAME

Advise the client to use the protocol NAME for the ENCRYPT command. The valid protocol names are listed under the description of the ENCRYPT command. The server shall emit exactly one PROTOCOL status line.

Here is an example of a complete encryption sequence; client lines are indicated by a C:, server responses by S:

```
C: RESET
S: OK
C: RECIPIENT foo@example.net
S: OK
C: RECIPIENT bar@example.com
S: OK
C: PREP_ENCRYPT
S: S PROTOCOL OpenPGP
S: OK
C: INPUT FD=17
S: OK
C: OUTPUT FD=18
S: OK
C: ENCRYPT
S: OK
```

File: gpgme.info, Node: UI Server Sign, Next: UI Server Decrypt, Prev: UI Server Encrypt, Up: UI Server Protocol

A.2 UI Server: Sign a Message

=====

The server needs to implement opaque signing as well as detached signing. Due to the nature of OpenPGP messages it is always required to send the entire message to the server; sending just the hash is not possible. The following two commands are required to set the input and output file descriptors:

-- Command: INPUT FD=N

Set the file descriptor for the message to be signed to N. The message sent to the server is binary encoded. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

-- Command: OUTPUT FD=N [--binary]

Set the file descriptor to be used for the output. The output is either the complete signed message or in case of a detached signature just that detached signature. If the option --binary is given the output shall be in binary format; if not given, the output for OpenPGP needs to be ASCII armored and for CMS Base-64 encoded. For details on the file descriptor, see the INPUT command.

To allow the server the selection of a non-default signing key the client may optionally use the SENDER command, see \*note command SENDER::.

The signing operation is then initiated by:

-- Command: SIGN --protocol=NAME [--detached]

Sign the data set with the INPUT command and write it to the sink set by OUTPUT. NAME is the signing protocol used for the message. For a description of the allowed protocols see the ENCRYPT command. With option --detached given, a detached signature is created; this is actually the usual way the command is used.

The client expects the server to send at least this status information before the final OK response:

-- Status line: MICALG STRING

The STRING represents the hash algorithm used to create the signature. It is used with RFC-1847 style signature messages and defined by PGP/MIME (RFC-3156) and S/MIME (RFC-3851). The GPGME library has a supporting function `gpgme_hash_algo_name` to return the algorithm name as a string. This string needs to be lowercased and for OpenPGP prefixed with "pgp-".

File: gpgme.info, Node: UI Server Decrypt, Next: UI Server Verify, Prev: UI Server Sign, Up: UI Server Protocol

### A.3 UI Server: Decrypt a Message

=====

Decryption may include the verification of OpenPGP messages. This is due to the often used combined signing/encryption modus of OpenPGP. The client may pass an option to the server to inhibit the signature verification. The following two commands are required to set the input and output file descriptors:

-- Command: INPUT FD=N

Set the file descriptor for the message to be decrypted to N. The message send to the server is either binary encoded or in the case of OpenPGP ASCII armored. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

-- Command: OUTPUT FD=N

Set the file descriptor to be used for the output. The output is binary encoded. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

The decryption is started with the command:

-- Command: DECRYPT --protocol=NAME [--no-verify]  
[--export-session-key]

NAME is the encryption protocol used for the message. For a description of the allowed protocols see the ENCRYPT command.

This argument is mandatory. If the option --no-verify is given, the server should not try to verify a signature, in case the input data is an OpenPGP combined message. If the option --export-session-key is given and the underlying engine knows how to export the session key, it will appear on a status line

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For files:

- cJSON.c, cJSON.h

#+begin\_quote

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#+end\_quote

Just GNU it!

2011-12-02 Werner Koch <wk@g10code.com>

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-10-25 Marcus Brinkmann <marcus@g10code.com>

\* m4/pth.m4: Removed.

\* configure.ac: Remove check for pth and automake conditional HAVE\_PTH.

2011-06-16 Marcus Brinkmann <marcus@g10code.com>

Release 1.3.1

\* configure.ac: Set LT version to C19/A8/R0.

2011-05-06 Marcus Brinkmann <marcus@g10code.com>

\* Makefile.am (SUBDIRS): Remove complus.

\* configure.ac (AC\_CONFIG\_FILES): Remove complus/Makefile.  
(BUILD\_COMPLUS): Remove AM\_CONDITIONAL.

\* complus/: Remove very old and stale component.

\* acinclude.m4 (GNUPG\_FIX\_HDR\_VERSION): Remove.

2011-04-14 Werner Koch <wk@g10code.com>

\* configure.ac: Require automake 1.11.

2011-04-06 Werner Koch <wk@g10code.com>

\* autogen.sh (--build-w32): Support option --build-w64.

\* configure.ac (HAVE\_W64\_SYSTEM): Define.

(INSERT\_\_TYPEDEFS\_FOR\_GPGME\_H): New.

(GPGME\_CONFIG\_HOST): New.

2011-02-02 Marcus Brinkmann <mb@g10code.com>

\* configure.ac (NEED\_LIBASSUAN\_VERSION): Bump to 2.0.2 for system hooks.

2010-12-30 Werner Koch <wk@g10code.com>

\* configure.ac: Support a git revision.

2010-11-03 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_CHECK\_HEADERS): Check for sys/types.h and sys.stat.h.

2010-11-02 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_CHECK\_HEADERS): Check for sys.time.h.

2010-08-19 Werner Koch <wk@g10code.com>

\* configure.ac (AH\_BOTTOM): Define GPG\_ERR\_ENABLE\_ERRNO\_MACROS.

2010-05-12 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for setlocale.

2010-05-07 Werner Koch <wk@g10code.com>

\* configure.ac: Change checks to always require libassuan.

2010-05-07 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh: Update the thing.



\* configure.ac: Check for locale.h.

2010-05-06 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Detect Windows CE.

(HAVE\_W32CE\_SYSTEM): New symbol and automake conditional.

\* ltmain.sh, m4/libtool.m4: Patch so that it works for Windows CE.

\* configure.ac: Require libgpg-error 1.8.

2010-03-15 Werner Koch <wk@g10code.com>

\* configure.ac (emacs\_local\_vars\_begin)

(emacs\_local\_vars\_read\_only, emacs\_local\_vars\_end): New.

2010-01-22 Werner Koch <wk@g10code.com>

\* autogen.sh (--build-w32): Add --with-libassuan-prefix.

2010-01-11 Marcus Brinkmann <marcus@g10code.de>

Release 1.3.0.

2009-12-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Do not use echo -n. Test for \_\_thread.

2009-12-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Make largefile check more robust.

2009-12-10 Werner Koch <wk@g10code.com>

\* configure.ac: Check for getgid and getegid.

2009-12-08 Marcus Brinkmann <marcus@g10code.de>

Update to libtool 2.2.6a.

\* configure.ac: Invoke AC\_CONFIG\_MACRO\_DIR.

(AC\_LIBTOOL\_WIN32\_DLL, AC\_LIBTOOL\_RC): Replace by ...

(LT\_PREREQ, LT\_INIT, LT\_LANG): ... these.

\* config.guess, config.sub, install-sh, ltmain.sh, m4/libtool.m4:

Updated to libtool 2.2.6a.

\* m4/ltoptions.m4, m4/ltsugar.m4, m4/ltversion.m4,

m4/lt~obsolete.m4: New files from libtool 2.2.6a.

2009-11-10 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Activate UIserver if FD passing is enabled and Assuan is available.

2009-10-30 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for argp.h and error\_t.

2009-10-26 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (NEED\_GPG\_VERSION\_DEFAULT): Bump to 1.4.0 as 1.3.0 was development versions only.

2009-10-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add support for G13.

2009-10-20 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_CONFIG\_FILES): Remove assuan/Makefile.

2009-10-20 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Replace internal libassuan by external libassuan.

\* m4/libassuan.m4: New file.

\* Makefile.am (assuan): Remove variable.

(SUBDIRS): Remove \${assuan}.

\* assuan/: Removed.

2009-06-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add AC\_TYPE\_UINTPTR\_T.

\* assuan/assuan.h [\_ASSUAN\_IN\_GPGME\_BUILD\_ASSUAN]: Declare \_gpgme\_io\_connect.

2009-06-18 Marcus Brinkmann <marcus@g10code.de>

Released GPGME 1.2.0.

\* configure.ac (my\_version): Set to 1.2.0.

(LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump.

(LIBGPGME\_LT\_REVISION): Reset.

2009-05-05 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add infrastructure for compile time check of \_FILE\_OFFSET\_BITS.

2009-04-19 Moritz <moritz@gnu.org>

\* Makefile.am (DISTCHECK\_CONFIGURE\_FLAGS): Specify --with-gpg.

2009-03-06 Marcus Brinkmann <marcus@g10code.de>

\* assuan/: Update to libassuan SVN 2009-03-06.

2009-01-26 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_CONFIG\_FILES): Add tests/opassuan/Makefile.

2008-12-08 Marcus Brinkmann <marcus@g10code.de>

Release GPGME 1.1.8.

\* configure.ac: Bump API revision.

2008-11-03 Marcus Brinkmann <marcus@g10code.com>

\* configure.ac: Replace gpgme paths with src.

\* gpgme: Move to ...

\* src: ... this new directory.

2008-10-20 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_CONFIG\_FILES): Add gpgme.h.

(GNUPG\_FIX\_HDR\_VERSION): Remove.

2008-10-17 Marcus Brinkmann <marcus@g10code.com>

Release GPGME 1.1.7.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump for release.

2008-09-19 Moritz <moritz@gnu.org>

\* configure.ac: Remove bogus "esac".

2008-09-16 Marcus Brinkmann <marcus@g10code.com>

\* configure.ac (\_XOPEN\_SOURCE) [apple-darwin]: Define it.

2008-07-04 Werner Koch <wk@g10code.com>

\* config.guess, config.sub: Update to 2007-11-19. Also update missing et al scripts.

2008-04-01 Werner Koch <wk@g10code.com>

\* configure.ac (AC\_INIT): Fix quoting.

2008-01-30 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Bump required version of automake up to 1.10.

\* autogen.sh: Fix aclocal check.

2008-01-04 Marcus Brinkmann <marcus@g10code.de>

Release GPGME 1.1.6.

\* configure.ac: Support gpgconf.

2007-09-27 Marcus Brinkmann <marcus@g10code.de>

\* assuan-pipe-connect.c (pipe\_connect\_gpgme): Do not close process handle here. Use this function also on Unix systems.

\* assuan-pipe-connect.c (pipe\_connect\_gpgme): Fix last change.

\* assuan-pipe-connect.c (pipe\_connect\_gpgme): New function, use it if \_ASSUAN\_IN\_GPGME\_BUILD\_ASSUAN.

2007-09-17 Werner Koch <wk@g10code.com>

\* configure.ac: Use the svn version magic.

2007-09-07 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for C++, Qt and support --enable-w32-qt.

\* m4/pkg.m4: New file.

2007-08-21 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (--enable-w32-glib): Use --enableval, not --withval.

2007-07-16 Marcus Brinkmann <marcus@g10code.de>

\* assuan/assuan-socket.c (\_assuan\_close): Always use close().

\* assuan/assuan.h (\_gpgme\_io\_close): New prototype.

(close): New macro, define as \_gpgme\_io\_close.

2007-07-13 Marcus Brinkmann <marcus@g10code.de>

\* assuan/assuan-io.c (\_assuan\_simple\_read, \_assuan\_simple\_write):

Always use read/write (which means `_gpgme_io_read` and `_gpgme_io_write`).

2007-07-09 Marcus Brinkmann <marcus@g10code.de>

Released 1.1.5.

\* `configure.ac` (`LIBGPGME_LT_REVISION`): Bump for release.

2007-07-08 Marcus Brinkmann <marcus@g10code.de>

\* `configure.ac` (`PGSM_DEFAULT`) [`*-mingw32*`]: Initialize it.  
(`HAVE_ASSUAN_H`): Set to 1 if we have it.  
(`funopen`): Use `AC_REPLACE_FUNCS`.  
(`USE_DESCRIPTOR_PASSING`): Define to 1 if we have it. Do not define it at all if we don't.  
(`NETLIBS`) [`have_w32_system`]: Add `-lws2_32`.  
(`DIRSEP_C`, `DIRSEP_S`, `EXPSEP_C`, `EXPSEP_S`, `PATHSEP_S`)  
(`HAVE_DOSISH_SYSTEM`): Remove definitions.

\* `assuan/assuan.h` (`_assuan_funopen`): Define to `_gpgme_funopen`.  
\* `assuan/funopen.c`: Move to `../gpgme/funopen.c`.  
\* `assuan/Makefile.am` (`libassuan_la_SOURCES`): Remove `funopen.c`.

2007-07-04 Marcus Brinkmann <marcus@g10code.de>

\* `assuan/Makefile.am` (`INCLUDES`): Include `$(top_srcdir)/gpgme`.  
\* `assuan/assuan.h`: Include `<ath.h>` instead of trying to duplicate the definitions.

\* `assuan/`: Update files to 2007-07-04 version of `assuan`.

\* `autogen.sh`: Use `=` not `==` in test.

2007-03-05 Werner Koch <wk@g10code.com>

Released 1.1.4.

\* `configure.ac` (`LIBGPGME_LT_REVISION`): Bump for release.

\* `autogen.sh`: New option `--force`.

2007-01-29 Marcus Brinkmann <marcus@g10code.de>

Released 1.1.3.

\* `configure.ac` (`LIBGPGME_LT_REVISION`): Bump for release.

2007-01-26 Werner Koch <wk@g10code.com>

\* configure.ac: Changed gpg and gpgsm version checks to work with arbitrary names of the gpg binary. New option --disable-gpg-test and --disable-gpgsm-test.

2007-01-09 Werner Koch <wk@g10code.com>

\* configure.ac (NEED\_GPG\_VERSION, NEED\_GPGSM\_VERSION): Must define after it may have been changed by an option.

2007-01-08 Werner Koch <wk@g10code.com>

\* configure.ac: Require gpg-error 1.4 due to the use of gpg\_error\_from\_syserror.  
(HAVE\_ASSUAN\_H): New.

2007-01-05 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add options --with-gpg-version and --with-gpgsm-version to allow overriding the minimum version requirements.

2006-12-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Fix two typos in last change.

2006-12-03 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Use descriptor passing only if --enable-fd-passing is provided.

\* configure.ac: Add check for use of descriptor passing.

2006-11-29 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (NEED\_GPG\_VERSION): Bump to 1.3.0.

2006-09-19 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Turn stpcpy into a replacement function.  
Check for unistd.h and add setenv as replacement function.

2006-07-29 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for network libraries and set NETLIBS.

2006-07-06 Marcus Brinkmann <marcus@g10code.de>

- \* lang, lang/cl: New subdirectories.
- \* lang/Makefile.am, lang/README: New files.
- \* configure.ac (AC\_CONFIG\_FILES): Add lang/Makefile, lang/cl/Makefile and lang/cl/gpgme.asd.
- \* Makefile.am (SUBDIRS): Add lang.

2006-03-02 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac (LIBGPGME\_LT\_REVISION): Bump for release.

2006-02-22 Marcus Brinkmann <marcus@g10code.de>

Released 1.1.1.

- \* configure.ac (LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump for release.
- (LIBGPGME\_LT\_REVISION): Reset to 0 for release.

2006-01-05 Werner Koch <wk@g10code.com>

- \* configure.ac: Test for inline feature.
- (AH\_BOTTOM): New to define the pure attribute.

2006-01-03 Werner Koch <wk@g10code.com>

- \* configure.ac: Append SVN revision to the version.

2005-11-18 Werner Koch <wk@g10code.com>

- \* configure.ac (BUILD\_REVISION): New.

2005-11-17 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac: Add support for --enable-w32-glib (disabled by default). Invoke AM\_PATH\_GLIB\_2\_0.

2005-11-16 Werner Koch <wk@g10code.com>

- \* configure.ac (CFLAGS) [W32]: Make sure that -mms-bitfields are used.

2005-11-15 Werner Koch <wk@g10code.com>

- \* configure.ac: Create BUILD\_FILEVERSION from SVN Revision.
- \* autogen.sh [W32]: Build shared and static versions of the library.

2005-10-20 Marcus Brinkmann <marcus@g10code.de>

\* w32-dll/ChangeLog, w32-dll/build-dll, w32-dll/gpgme.def: Remove files.

\* configure.ac: Instead checking for windres and dlltool, invoke AC\_LIBTOOL\_WIN32\_DLL and AC\_LIBTOOL\_RC.

\* src/Makefile.am [HAVE\_W32\_SYSTEM]: Use libtool, which simplifies the rules.

2005-10-01 Marcus Brinkmann <marcus@g10code.de>

Released 1.1.0.

\* configure.ac (LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump for release.

(LIBGPGME\_LT\_REVISION): Reset to 0 for release.

2005-09-12 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (HAVE\_PTH): Don't add \$PTH\_CFLAGS to \$CFLAGS here.

2005-08-26 Werner Koch <wk@g10code.com>

\* configure.ac (SEPCONSTANTS): New to define DIRSEP\_C et al.

2005-08-19 Werner Koch <wk@g10code.com>

\* configure.ac [W32]: Create values for versioninfo.rc and list substitute versioninfo.rc.

\* configure.ac: Define ENABLE\_GPGSM.

2005-08-08 Werner Koch <wk@g10code.com>

\* configure.ac (stpcpy): Changed from replace to test.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AH\_BOTTOM): Removed.

2005-03-09 Werner Koch <wk@g10code.com>

\* acinclude.m4 (GNUPG\_CHECK\_VA\_COPY): Assume no when cross-compiling.

\* Makefile.am (EXTRA\_DIST): Include autogen.sh

\* autogen.sh: Added the usual code to build for W32 (--build-w32).

\* configure.ac: Fixed the mingw32 host string, removed OS/2 stuff.



(HAVE\_DRIVE\_LETTERS): Removed.  
(HAVE\_W32\_SYSTEM): Added.  
(AC\_GNU\_SOURCE): New to replace the identical AH\_VERBATIM.  
(AH\_BOTTOM): Added.

2004-12-28 Werner Koch <wk@g10code.com>

Released 1.0.2.

\* Makefile.am (AUTOMAKE\_OPTIONS): Build bzip 2 version.  
(ACLOCAL\_AMFLAGS): Add -I m4.  
\* configure.ac: Require automake 1.9.3 and autoconf 2.59.  
\* acinclude.m4: Changed quoting for automake 1.9.  
\* README: Use SHA1 instead of MD5.

2004-12-11 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Replace ttyname\_r if it doesn't exist (and warn in that case).

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* README: Refer to COPYING.LESSER and "each file" instead of COPYING.  
\* COPYING.LESSER: New file.  
\* gpgme.spec.in (%doc): Add COPYING.LESSER.  
\* acinclude.m4, configure.ac, Makefile.am: Change license to LGPL 2.1 or later.  
\* TODO: Add copyright notice.  
\* README.CVS: Likewise.  
  
\* configure.ac (GPGSM\_VERSION): Fix filter to get it.

2004-10-22 Marcus Brinkmann <marcus@g10code.de>

Released 1.0.1.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump up to 2.  
(AC\_INIT): Set version to 1.0.1.  
  
\* configure.ac: Set HAVE\_GPGSM to true only if \$GPGSM is not "no".

2004-09-30 Marcus Brinkmann <marcus@g10code.de>

Released 1.0.0.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump up to 1.  
(AC\_INIT): Set version to 1.0.0.

\* Makefile.am (EXTRA\_DIST): Remove README-alpha.

\* README-alpha: Remove file.

2004-09-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Disable AC\_CONFIG\_MACRO\_DIR for now.

2004-09-14 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Improve diagnostics with version check.

\* configure.ac: Print diagnostics about found thread libraries at the end. Check for the versions of GPG and GPGSM and print the found versions at the end.

(HAVE\_GPGSM): Do not require GPGSM to exist and be readable.

(AC\_CONFIG\_MACRO\_DIR): Invoke with argument m4.

\* acinclude.m4: Add copyright notice.

(jm\_GLIBC21, AM\_PATH\_GPG\_ERROR, \_AC\_PTH\_ERROR, \_AC\_PTH\_VERBOSE, AC\_CHECK\_PTH): Removed.

2004-06-23 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Check for <sys/uio.h>.

2004-06-08 Marcus Brinkmann <marcus@g10code.de>

Released 0.9.0.

\* configure.ac (AC\_INIT): Set version number to 0.9.0.

(LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump up by one.

(LIBGPGME\_LT\_REVISION): Reset to zero.

2004-05-21 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (GPGME\_CONFIG\_API\_VERSION): New variable, substitute it.

2004-04-29 Marcus Brinkmann <marcus@g10code.de>

Released 0.4.7.

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump it up.

2004-04-02 Thomas Schwinge <schwinge@nic-nac-project.de>

\* autogen.sh: Added ACLOCAL\_FLAGS.

2004-04-06 Werner Koch <wk@gnupg.org>

Released 0.4.6.

\* config.guess, config.sub, ltmain.sh: Updated to those from libtools 1.5.4.

2004-03-07 Marcus Brinkmann <marcus@g10code.de>

Released 0.4.5.

\* configure.ac (NEED\_GPGSM\_VERSION): Bump up to 1.9.6.

\* Makefile.am (EXTRA\_DIST): Remove autogen.sh and README.CVS.

2004-02-18 Werner Koch <wk@gnupg.org>

\* configure.ac: Make the check for funopen fail with just a warning.

2004-02-11 Werner Koch <wk@gnupg.org>

\* autogen.sh (check\_version): Removed bashism and simplified.

2004-02-10 Werner Koch <wk@gnupg.org>

\* configure.ac: Fixed funopen test change.

2004-02-06 Moritz Schulte <mo@g10code.com>

\* configure.ac: Fix funopen replacement mechanism.

2004-01-31 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add invocation of AC\_SYS\_LARGEFILE, AC\_TYPE\_OFF\_T and AC\_FUNC\_FSEEKO.

2004-01-12 Werner Koch <wk@gnupg.org>

Released 0.4.4.

\* configure.ac: Bumbed LT\_Revision; now at C12/A1/R1.

(NEED\_GPGSM\_VERSION): Set to 1.9.3.

(min\_automake\_version): Added.

\* README.CVS: New.

\* Makefile.am (EXTRA\_DIST): Added README.CVS.

\* autogen.sh: Updated.

2003-11-19 Werner Koch <wk@gnupg.org>

- \* acinclude.m4: Add AM\_PATH\_GPG\_ERROR.
- \* configure.ac: Check for timegm. Made warning messages more prominent.

2003-10-06 Marcus Brinkmann <marcus@g10code.de>

Released 0.4.3.

- \* configure.ac (LIBGPGME\_LT\_CURRENT, LIBGPGME\_LT\_AGE): Bump up by 1. (LIBGPGME\_LT\_REVISION): Set to 0.

2003-09-13 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac: Require libgpg-error 0.5.
- \* acinclude.m4: Remove libtool cruft, add jm\_GLIBC21.
- \* configure.ac: Add check for getenv\_r, and call jm\_GLIBC21. Define HAVE\_THREAD\_SAFE\_GETENV if appropriate.

2003-09-03 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac: Remove GPGME\_CONFIG\_LIBS and GPGME\_CONFIG\_CFLAGS.

2003-09-02 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac: Move invocation of AC\_CANONICAL\_HOST up to suppress warning by autoconf.

2003-08-30 Robert Schiele <rschiele@uni-mannheim.de>

- \* gpgme.spec.in: % {\_infodir}/dir is not packaged, remove to prevent checking failure.

2003-08-18 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac: If building Assuan, check for funopen and fopencookie, and make isascii, putc\_unlocked and memrchr replacement functions. (AM\_PATH\_GPG\_ERROR): Require 0.3.

2003-07-31 Marcus Brinkmann <marcus@g10code.de>

- \* configure.ac (AC\_INIT): Bump version to 0.4.3.

2003-07-30 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (LIBGPGME\_LT\_REVISION): Bump up to 1.

Released 0.4.2.

2003-07-08 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Complain if libgpg-error is not found.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Bump version to 0.4.2.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (LIBGPGME\_LT\_CURRENT): Bump up to 11.

\* configure.ac: Use AM\_PATH\_GPG\_ERROR.

\* configure.ac: Check for libgpg-error. Define  
GPG\_ERR\_SOURCE\_DEFAULT.

2003-05-26 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (NEED\_GPG\_VERSION): Bump up to 1.2.2.

2003-05-18 Marcus Brinkmann <marcus@g10code.de>

In all files, replace the Gpgme\* type names with the new gpgme\_\*  
type names.

2003-02-01 Marcus Brinkmann <marcus@g10code.de>

\* assuan/: Update files to 2002-11-10 version of assuan.

2003-01-29 Marcus Brinkmann <marcus@g10code.de>

\* bonobo/gpgme.c, bonobo/main.c, bonobo/main.h, bonobo/Makefile,  
bonobo/Makefile.am, bonobo/Makefile.in: Dead files removed.

\* configure.ac: Remove automake conditional BUILD\_BONOBO  
(AC\_CONFIG\_FILES): Remove bonobo/Makefile.

\* Makefile.am (bonobo): Remove variable.  
(SUBDIRS): Remove \${bonobo}.

\* configure.ac: Remove all uses of GNUPG\_CHECK\_TYPEDEF, for byte,  
ushort, ulong, u16 and u32.

\* acinclude.m4 (GNUPG\_CHECK\_TYPEDEF): Remove macro.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: New conditional HAVE\_LD\_VERSION\_SCRIPT.  
Call AC\_CANONICAL\_HOST, use host instead target.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Bump up to 0.4.1.

Released 0.4.0.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh (automake\_vers): Require 1.7 (really 1.7.1) for the  
conditional source distribution bug fix.

2002-12-08 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (LIBGPGME\_LT\_CURRENT): Increase by one.  
(LIBGPGME\_LT\_AGE, LIBGPGME\_LT\_REVISION): Set to 0.

2002-11-28 Marcus Brinkmann <marcus@g10code.de>

\* NEWS: Add note about moving "gpgmeplug" to the "cryptplug"  
package.  
\* README: Remove instructions related to "gpgmeplug".  
\* configure.ac: Remove enable option "gpgmeplug" and automake  
conditional BUILD\_GPGMEPLUG, as well as the status info about it.  
(GPGMEPLUG): Remove variable.  
\* Makefile.am (gpgmeplug): Remove variable.  
(SUBDIRS): Remove \${gpgmeplug}.  
\* cryptplug.h, gpgme-openpgp.c, gpgmeplug.dox, gpgme-smime.c,  
Makefile.am, gpgmeplug.c, ChangeLog: Files removed.

2002-11-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Disable GPGSM for all dosish systems.

2002-10-12 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add automake conditional HAVE\_GPGSM.

2002-10-08 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Bump version up to 0.4.0.  
(NEED\_GPG\_VERSION): Bump up to 1.2.0.  
(NEED\_GPGSM\_VERSION): Bump up to 0.9.0.  
\* README: Update version numbers.

\* NEWS: Start entry for 0.4.0.

2002-09-20 Werner Koch <wk@gnupg.org>

Released 0.3.11.

\* configure.ac: Bump up LIBGPGME\_LT\_REVISION.

\* configure.ac (AC\_CHECK\_HEADERS): Check for sys/select.h.

2002-09-04 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh (autoconf\_vers): Bump up to 2.53 to get the @&t@  
quadrigraph. Always cutting the edge!

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Create and substitute LTLIBOBS.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

Released 0.3.10.

\* NEWS: Update for 0.3.9 release.

\* configure.ac: Bump up LIBGPGME\_LT\_REVISION.

2002-08-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.spec.in: Changed user name in Wojciech Polak's email  
address from ghostface to polak per request by himself.

2002-08-28 Werner Koch <wk@gnupg.org>

\* acinclude.m4 (GNUPG\_CHECK\_VA\_COPY): New.

\* configure.ac: Use it.

2002-08-23 Werner Koch <wk@gnupg.org>

\* configure.ac (GPGME\_CONFIG\_CFLAGS): Renamed from GPGME\_CFLAGS  
and removed the libpath because it is set by the config script.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Bump version number to 0.3.10.

\* NEWS: Add template for development version.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

Released 0.3.9.

- \* NEWS: Update for 0.3.9 release.
- \* Makefile.am (EXTRA\_DIST): Add gpgme.spec.in.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

- \* jnlib/argparse.c, jnlib/argparse.h, jnlib/ChangeLog, jnlib/dotlock.c, jnlib/dotlock.h, jnlib/libjnlib-config.h, jnlib/logging.c, jnlib/logging.h, jnlib/Makefile.am, jnlib/mischelp.h, jnlib/README, jnlib/stringhelp.c, jnlib/stringhelp.h, jnlib/strlist.c, jnlib/strlist.h, jnlib/types.h, jnlib/xmalloc.c, jnlib/xmalloc.h: Remove files.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (SUBDIRS): Remove jnlib.
- \* configure.ac: Don't check for unsigned short or unsigned long. Don't check for memicmp, strtoul, memmove, stricmp. Make stpcpy a replaced function. Don't define HAVE\_JNLIB\_LOGGING. Don't generate jnlib/Makefile.

2002-07-02 Werner Koch <wk@gnupg.org>

- \* configure.ac: Bumped version number to 0.3.9; add a comment on when to change it.
- \* gpgme.spec.in: New. Contributed by Wojciech Polak.
- \* Makefile.am (dist-hook): New.
- \* AUTHORS: Added Wojciech and bug reporting addresses.

2002-06-25 Werner Koch <wk@gnupg.org>

Released 0.3.8.

- \* configure.ac: Bumped LT version to 9/3/0. (NEED\_GPGSM\_VERSION): Need 0.3.8 due to fixed export command.

2002-06-04 Marcus Brinkmann <marcus@g10code.de>

Released 0.3.7.

- \* configure.ac (AC\_INIT): Set version to 0.3.7. (LIBGPGME\_LT\_REVISION): Add one.



\* README: Document version requirement correctly.

2002-06-02 Marcus Brinkmann <marcus@g10code.de>

\* acinclude.m4: Fix Pth check so that it doesn't error out if pth is not found.

2002-06-02 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add checks for Pth and pthreads.

\* acinclude.m4: Add slightly hacked check for pth (seems to be an autoconf version problem).

2002-05-21 Werner Koch <wk@gnupg.org>

\* configure.ac (NEED\_GPGSM\_VERSION): We need gpgsm 0.3.7.

2002-05-03 Werner Koch <wk@gnupg.org>

Released 0.3.6.

2002-04-05 Marcus Brinkmann <marcus@g10code.de>

\* acconfig.h: File removed.

\* configure.ac (NEED\_GPG\_VERSION): Add description.

(NEED\_GPGSM\_VERSION): Likewise.

(HAVE\_DOSISH\_SYSTEM): Likewise.

(HAVE\_DRIVE\_LETTERS): Likewise.

(GPG\_PATH): Likewise.

(GPGSM\_PATH): Likewise.

\* acinclude.m4 (GNUPG\_CHECK\_TYPEDEF): Likewise.

2002-04-01 Werner Koch <wk@gnupg.org>

Released 0.3.5.

2002-03-17 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac: Add automake conditional HAVE\_DOSISH\_SYSTEM.

2002-03-04 Werner Koch <wk@gnupg.org>

\* configure.ac: Bumbed version to 0.3.4-cvs to continue development.

Released 0.3.4.

\* configure.ac: Bumbed LT version numbers to (7,1,0), requires

gpgsm 0.3.1.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Change version number to snapshot CVS version.

2002-02-13 Werner Koch <wk@gnupg.org>

\* configure.ac (vasprintf,fopencookie): Add checks.

2002-02-12 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_INIT): Bump version to 0.3.3.  
\* jnlib/Makefile.am: Revert to older version that includes xmalloc but not dotlock and some other files. Reported by Stphane Corthsy.

2002-02-10 Marcus Brinkmann <marcus@g10code.de>

\* Released 0.3.2.

\* configure.ac (AC\_INIT): Bump version to 0.3.2.  
\* jnlib/libjnlibconfig.h: Revert to older version that doesn't expect libgcrypt. Reported by Jose Carlos Garcia Sogo <jsogo@debian.org>.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

\* Released 0.3.1.

\* configure.ac (LIBGPGME\_LT\_CURRENT): Bump it up to 6!  
(NEED\_GPGSM\_VERSION): Bump it up to 0.3.0!  
(AC\_INIT): Bump version to 0.3.1

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (HAVE\_JNLIB\_LOGGING): Define always for assuan.

2001-12-19 Werner Koch <wk@gnupg.org>

\* configure.ac (VERSION,PACKAGE): Defined and subst. Used for AM\_INIT\_AUTOMAKE and moved all version number more to the top.

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh (libtool\_vers): Bump to 1.4.

\* configure.ac (LIBGPGME\_LT\_CURRENT): Increment.

(LIBGPGME\_LT\_AGE): Reset.

Improve comment.

Fix wrong comment character.

2001-12-18 Werner Koch <wk@gnupg.org>

\* acinclude.m4 (GNUPG\_FIX\_HDR\_VERSION): Fixed for new automake.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (GPG): Substitute this variable.

(GPGSM): Likewise.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (AC\_CONFIG\_FILES): Add tests/gpg/Makefile and tests/gpgsm/Makefile.

2001-11-21 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (gpgmeplug): New variable, set to gpgmeplug if [BUILD\_GPGMEPLUG].

\* configure.ac (AC\_CONFIG\_FILES): Add gpgmeplug/Makefile. Support --enable-gpgmeplug.

2001-11-21 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh: Tighten version dependencies.

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (SUBDIRS): Support building the assuan library (currently if GPGSM\_PATH is set)..

\* configure.ac: Support building the assuan library.

\* assuan: New directory, populated with the Assuan library (copied from the newpg repository).

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

\* configure.ac (NEED\_GPGSM\_VERSION): New variable. Treat it similarly to NEED\_GPG\_VERSION.

\* acconfig.h: Likewise.

2001-11-18 Marcus Brinkmann <marcus@g10code.de>

\* configure.in: Renamed to ...

\* configure.ac: ... this. Update to autoconf 2.52. Lots of small changes in the transition. Support --with-gpg=PATH and

--with-gpgsm=PATH options. Check if test suites can be run.

\* acconfig.h: Add GPGSM\_PATH.

\* Makefile.am: New variable `tests', set to `tests' if  
RUN\_GPG\_TESTS.

(SUBDIRS): Replace string `tests' with variable `tests'.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

\* autogen.sh: Invoke automake with `-a' (add missing files).

Do not invoke configure.

2001-09-17 Werner Koch <wk@gnupg.org>

Released 0.2.3.

\* configure.in (NEED\_GPG\_VERSION): Set to 1.0.6. Incremented LT  
current and age.

\* Makefile.am (SUBDIRS): Add doc

2001-06-12 Werner Koch <wk@gnupg.org>

Released 0.2.2.

2001-04-05 Werner Koch <wk@gnupg.org>

\* configure.in (NEED\_GPG\_VERSION): Set to 1.0.4g

2001-04-02 Werner Koch <wk@gnupg.org>

Released 0.2.1.

Changed the copyright notices all over the place.

2001-02-28 Werner Koch <wk@gnupg.org>

Released 0.2.0.

2001-01-18 Werner Koch <wk@gnupg.org>

\* autogen.sh: Added option --build-w32.

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INFO-DIR-SECTION GNU Libraries

START-INFO-DIR-ENTRY

\* GPGME: (gpgme). Adding support for cryptography to your program.

END-INFO-DIR-ENTRY

This file documents the GPGME library.

This is Edition 1.12.1-beta100, last updated 3 December 2018, of The  
GnuPG Made Easy Reference Manual, for Version 1.12.1-beta100.

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Public License for more details.

File: gpgme.info, Node: UI Server Verify, Next: UI Server Set Input Files, Prev: UI Server Decrypt, Up: UI  
Server Protocol

A.4 UI Server: Verify a Message

=====

The server needs to support the verification of opaque signatures as well as detached signatures. The kind of input sources controls what kind message is to be verified.

-- Command: MESSAGE FD=N

This command is used with detached signatures to set the file descriptor for the signed data to N. The data is binary encoded (used verbatim). For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

-- Command: INPUT FD=N

Set the file descriptor for the opaque message or the signature part of a detached signature to N. The message send to the server is either binary encoded or in the case of OpenPGP ASCII armored. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

-- Command: OUTPUT FD=N

Set the file descriptor to be used for the output. The output is binary encoded and only used for opaque signatures. For details on the file descriptor, see the description of INPUT in the ENCRYPT section.

The verification is then started using:

-- Command: VERIFY --protocol=NAME [--silent]

NAME is the signing protocol used for the message. For a description of the allowed protocols see the ENCRYPT command. This argument is mandatory. Depending on the combination of MESSAGE INPUT and OUTPUT commands, the server needs to select the appropriate verification mode:

MESSAGE and INPUT

This indicates a detached signature. Output data is not applicable.

INPUT

This indicates an opaque signature. As no output command has been given, the server is only required to check the signature.

INPUT and OUTPUT

This indicates an opaque signature. The server shall write the signed data to the file descriptor set by the output command. This data shall even be written if the signatures cant be verified.

With --silent the server shall not display any dialog; this is for example used by the client to get the content of opaque signed messages.

The client expects the server to send at least this status information before the final OK response:

-- Status line: SIGSTATUS FLAG DISPLAYSTRING

Returns the status for the signature and a short string explaining the status. Valid values for FLAG are:

none

The message has a signature but it could not not be verified due to a missing key.

green

The signature is fully valid.

yellow

The signature is valid but additional information was shown regarding the validity of the key.

red

The signature is not valid.

DISPLAYSTRING is a percent-and-plus-encoded string with a short human readable description of the status. For example

S SIGSTATUS green Good+signature+from+Keith+Moon+<keith@example.net>

Note that this string needs to fit into an Assuan line and should be short enough to be displayed as short one-liner on the clients window. As usual the encoding of this string is UTF-8 and it should be send in its translated form.

The server shall send one status line for every signature found on the message.

File: gpgme.info, Node: UI Server Set Input Files, Next: UI Server Sign/Encrypt Files, Prev: UI Server Verify, Up: UI Server Protocol

A.5 UI Server: Specifying the input files to operate on.

=====

All file related UI server commands operate on a number of input files or directories, specified by one or more FILE commands:

-- Command: FILE [--clear] NAME

Add the file or directory NAME to the list of pathnames to be processed by the server. The parameter NAME must be an absolute path name (including the drive letter) and is percent escaped (in particular, the characters %, = and white space characters are always escaped). If the option --clear is given, the list of files is cleared before adding NAME.

Historical note: The original spec did not define --clear but the keyword --continued after the file name to indicate that more files are to be expected. However, this has never been used and thus removed from the specs.

File: gpgme.info, Node: UI Server Sign/Encrypt Files, Next: UI Server Verify/Decrypt Files, Prev: UI Server Set Input Files, Up: UI Server Protocol

#### A.6 UI Server: Encrypting and signing files.

=====

First, the input files need to be specified by one or more FILE commands. Afterwards, the actual operation is requested:

-- Command: ENCRYPT\_FILES --nohup

-- Command: SIGN\_FILES --nohup

-- Command: ENCRYPT\_SIGN\_FILES --nohup

Request that the files specified by FILE are encrypted and/or signed. The command selects the default action. The UI server may allow the user to change this default afterwards interactively, and even abort the operation or complete it only on some of the selected files and directories.

What it means to encrypt or sign a file or directory is specific to the preferences of the user, the functionality the UI server provides, and the selected protocol. Typically, for each input file a new file is created under the original filename plus a protocol specific extension (like .gpg or .sig), which contain the encrypted/signed file or a detached signature. For directories, the server may offer multiple options to the user (for example ignore or process recursively).

The ENCRYPT\_SIGN\_FILES command requests a combined sign and encrypt operation. It may not be available for all protocols (for example, it is available for OpenPGP but not for CMS).

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

File: gpgme.info, Node: UI Server Verify/Decrypt Files, Next: UI Server Import/Export Keys, Prev: UI Server Sign/Encrypt Files, Up: UI Server Protocol

#### A.7 UI Server: Decrypting and verifying files.



=====

First, the input files need to be specified by one or more FILE commands. Afterwards, the actual operation is requested:

- Command: DECRYPT\_FILES --nohup
- Command: VERIFY\_FILES --nohup
- Command: DECRYPT\_VERIFY\_FILES --nohup

Request that the files specified by FILE are decrypted and/or verified. The command selects the default action. The UI server may allow the user to change this default afterwards interactively, and even abort the operation or complete it only on some of the selected files and directories.

What it means to decrypt or verify a file or directory is specific to the preferences of the user, the functionality the UI server provides, and the selected protocol. Typically, for decryption, a new file is created for each input file under the original filename minus a protocol specific extension (like .gpg) which contains the original plaintext. For verification a status is displayed for each signed input file, indicating if it is signed, and if yes, if the signature is valid. For files that are signed and encrypted, the VERIFY command transiently decrypts the file to verify the enclosed signature. For directories, the server may offer multiple options to the user (for example ignore or process recursively).

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

File: gpgme.info, Node: UI Server Import/Export Keys, Next: UI Server Checksum Files, Prev: UI Server Verify/Decrypt Files, Up: UI Server Protocol

#### A.8 UI Server: Managing certificates.

=====

First, the input files need to be specified by one or more FILE commands. Afterwards, the actual operation is requested:

- Command: IMPORT\_FILES --nohup
- Request that the certificates contained in the files specified by FILE are imported into the local certificate databases.

For directories, the server may offer multiple options to the user (for example ignore or process recursively).

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

FIXME: It may be nice to support an EXPORT command as well, which is enabled by the context menu of the background of a directory.

File: gpgme.info, Node: UI Server Checksum Files, Next: Miscellaneous UI Server Commands, Prev: UI Server Import/Export Keys, Up: UI Server Protocol

#### A.9 UI Server: Create and verify checksums for files.

=====

First, the input files need to be specified by one or more FILE commands. Afterwards, the actual operation is requested:

-- Command: CHECKSUM\_CREATE\_FILES --nohup

Request that checksums are created for the files specified by FILE. The choice of checksum algorithm and the destination storage and format for the created checksums depend on the preferences of the user and the functionality provided by the UI server. For directories, the server may offer multiple options to the user (for example ignore or process recursively).

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup is present, the server always returns OK promptly, and completes the operation asynchronously.

-- Command: CHECKSUM\_VERIFY\_FILES --nohup

Request that checksums are created for the files specified by FILE and verified against previously created and stored checksums. The choice of checksum algorithm and the source storage and format for previously created checksums depend on the preferences of the user and the functionality provided by the UI server. For directories, the server may offer multiple options to the user (for example ignore or process recursively).

If the source storage of previously created checksums is available to the user through the Windows shell, this command may also accept such checksum files as FILE arguments. In this case, the UI server should instead verify the checksum of the referenced files as if they were given as INPUT files.

The option --nohup is mandatory. It is currently unspecified what should happen if --nohup is not present. Because --nohup

is present, the server always returns OK promptly, and completes the operation asynchronously.

File: gpgme.info, Node: Miscellaneous UI Server Commands, Prev: UI Server Checksum Files, Up: UI Server Protocol

## A.10 Miscellaneous UI Server Commands

=====

The server needs to implement the following commands which are not related to a specific command:

-- Command: GETINFO WHAT

This is a multi purpose command, commonly used to return a variety of information. The required subcommands as described by the WHAT parameter are:

pid

Return the process id of the server in decimal notation using an Assuan data line.

To allow the server to pop up the windows in the correct relation to the client, the client is advised to tell the server by sending the option:

-- Command option: window-id NUMBER

The NUMBER represents the native window ID of the clients current window. On Windows systems this is a windows handle (HWND) and on X11 systems it is the X Window ID. The number needs to be given as a hexadecimal value so that it is easier to convey pointer values (e.g. HWND).

A client may want to fire up the certificate manager of the server. To do this it uses the Assuan command:

-- Command: START\_KEYMANAGER

The server shall pop up the main window of the key manager (aka certificate manager). The client expects that the key manager is brought into the foreground and that this command immediately returns (does not wait until the key manager has been fully brought up).

A client may want to fire up the configuration dialog of the server. To do this it uses the Assuan command:

-- Command: START\_CONFDIALOG

The server shall pop up its configuration dialog. The client expects that this dialog is brought into the foreground and that

this command immediately returns (i.e. it does not wait until the dialog has been fully brought up).

When doing an operation on a mail, it is useful to let the server know the address of the sender:

-- Command: SENDER [--info] [--protocol=NAME] EMAIL  
EMAIL is the plain ASCII encoded address ("addr-spec" as per RFC-2822) enclosed in angle brackets. The address set with this command is valid until a successful completion of the operation or until a RESET command. A second command overrides the effect of the first one; if EMAIL is not given and --info is not used, the server shall use the default signing key.

If option --info is not given, the server shall also suggest a protocol to use for signing. The client may use this suggested protocol on its own discretion. The same status line as with PREP\_ENCRYPT is used for this.

The option --protocol may be used to give the server a hint on which signing protocol should be preferred.

To allow the UI-server to visually identify a running operation or to associate operations the server MAY support the command:

-- Command: SESSION NUMBER [STRING]  
The NUMBER is an arbitrary value, a server may use to associate simultaneous running sessions. It is a 32 bit unsigned integer with 0 as a special value indicating that no session association shall be done.

If STRING is given, the server may use this as the title of a window or, in the case of an email operation, to extract the senders address. The string may contain spaces; thus no plus-escaping is used.

This command may be used at any time and overrides the effect of the last command. A RESET undoes the effect of this command.

File: gpgme.info, Node: Debugging, Next: Deprecated Functions, Prev: UI Server Protocol, Up: Top

## Appendix B How to solve problems

\*\*\*\*\*

Everyone knows that software often does not do what it should do and thus there is a need to track down problems. This is in particular true for applications using a complex library like GPGME and of course also

for the library itself. Here we give a few hints on how to solve such problems.

First of all you should make sure that the keys you want to use are installed in the GnuPG engine and are usable. Thus the first test is to run the desired operation using `gpg` or `gpgsm` on the command line. If you cant figure out why things dont work, you may use GPGMEs built in trace feature. This feature is either enabled using the environment variable `GPGME_DEBUG` or, if this is not possible, by calling the function `gpgme_set_global_flag`. The value is the trace level and an optional file name. If no file name is given the trace output is printed to `stderr`.

For example

```
GPGME_DEBUG=9:/home/user/mygpgme.log
```

(Note that under Windows you use a semicolon in place of the colon to separate the fields.)

A trace level of 9 is pretty verbose and thus you may want to start off with a lower level. The exact definition of the trace levels and the output format may change with any release; you need to check the source code for details. In any case the trace log should be helpful to understand what is going on. **Warning:** The trace log may reveal sensitive details like passphrases or other data you use in your application. If you are asked to send a log file, make sure that you run your tests only with play data.

File: [gpgme.info](#), Node: [Deprecated Functions](#), Next: [Library Copying](#), Prev: [Debugging](#), Up: [Top](#)

## Appendix C Deprecated Functions

\*\*\*\*\*

For backward compatibility GPGME has a number of functions, data types and constants which are deprecated and should not be used anymore. We document here those which are really old to help understanding old code and to allow migration to their modern counterparts.

**\*Warning:\*** These interfaces will be removed in a future version of GPGME.

-- Function: `void gpgme_key_release (gpgme_key_t KEY)`

The function `gpgme_key_release` is equivalent to `gpgme_key_unref`.

-- Function: `void gpgme_trust_item_release (gpgme_trust_item_t ITEM)`

The function `gpgme_trust_item_release` is an alias for `gpgme_trust_item_unref`.

-- Function: `gpgme_error_t gpgme_op_import_ext (gpgme_ctx_t CTX,  
gpgme_data_t KEYDATA, int *NR)`  
SINCE: 0.3.9

The function `gpgme_op_import_ext` is equivalent to:

```
gpgme_error_t err = gpgme_op_import (ctx, keydata);  
if (!err)  
{  
    gpgme_import_result_t result = gpgme_op_import_result (ctx);  
    *nr = result->considered;  
}
```

-- Data type: `gpgme_error_t (*gpgme_edit_cb_t) (void *HANDLE,  
gpgme_status_code_t STATUS, const char *ARGS, int FD)`  
The `gpgme_edit_cb_t` type is the type of functions which GPGME calls if it a key edit operation is on-going. The status code `STATUS` and the argument line `ARGS` are passed through by GPGME from the crypto engine. The file descriptor `FD` is -1 for normal status messages. If `STATUS` indicates a command rather than a status message, the response to the command should be written to `FD`. The `HANDLE` is provided by the user at start of operation.

The function should return `GPG_ERR_FALSE` if it did not handle the status code, 0 for success, or any other error value.

-- Function: `gpgme_error_t gpgme_op_edit (gpgme_ctx_t CTX,  
gpgme_key_t KEY, gpgme_edit_cb_t FNC, void *HANDLE,  
gpgme_data_t OUT)`  
SINCE: 0.3.9

Note: This function is deprecated, please use `gpgme_op_interact` instead.

The function `gpgme_op_edit` processes the key `KEY` interactively, using the edit callback function `FNC` with the handle `HANDLE`. The callback is invoked for every status and command request from the crypto engine. The output of the crypto engine is written to the data object `OUT`.

Note that the protocol between the callback function and the crypto engine is specific to the crypto engine and no further support in implementing this protocol correctly is provided by GPGME.

The function returns the error code `GPG_ERR_NO_ERROR` if the edit operation completes successfully, `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer, and any error returned by the crypto engine

or the edit callback handler.

-- Function: `gpgme_error_t gpgme_op_edit_start (gpgme_ctx_t CTX, gpgme_key_t KEY, gpgme_edit_cb_t FNC, void *HANDLE, gpgme_data_t OUT)`

SINCE: 0.3.9

Note: This function is deprecated, please use `gpgme_op_interact_start` instead.

The function `gpgme_op_edit_start` initiates a `gpgme_op_edit` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation was started successfully, and `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer.

-- Function: `gpgme_error_t gpgme_op_card_edit (gpgme_ctx_t CTX, gpgme_key_t KEY, gpgme_edit_cb_t FNC, void *HANDLE, gpgme_data_t OUT)`

Note: This function is deprecated, please use `gpgme_op_interact` with the flag `GPGME_INTERACT_CARD` instead.

The function `gpgme_op_card_edit` is analogous to `gpgme_op_edit`, but should be used to process the smart card corresponding to the key `KEY`.

-- Function: `gpgme_error_t gpgme_op_card_edit_start (gpgme_ctx_t CTX, gpgme_key_t KEY, gpgme_edit_cb_t FNC, void *HANDLE, gpgme_data_t OUT)`

Note: This function is deprecated, please use `gpgme_op_interact_start` with the flag `GPGME_INTERACT_CARD` instead.

The function `gpgme_op_card_edit_start` initiates a `gpgme_op_card_edit` operation. It can be completed by calling `gpgme_wait` on the context. \*Note Waiting For Completion::.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation was started successfully, and `GPG_ERR_INV_VALUE` if `CTX` or `KEY` is not a valid pointer.

-- Function: `gpgme_error_t gpgme_data_new_with_read_cb (gpgme_data_t *DH, int (*READFUNC) (void *HOOK, char *BUFFER, size_t COUNT, size_t *NREAD), void *HOOK_VALUE)`

The function `gpgme_data_new_with_read_cb` creates a new

gpgme\_data\_t object and uses the callback function READFUNC to retrieve the data on demand. As the callback function can supply the data in any way it wants, this is the most flexible data type GPGME provides. However, it can not be used to write data.

The callback function receives HOOK\_VALUE as its first argument whenever it is invoked. It should return up to COUNT bytes in BUFFER, and return the number of bytes actually read in NREAD. It may return 0 in NREAD if no data is currently available. To indicate EOF the function should return with an error code of -1 and set NREAD to 0. The callback function may support to reset its internal read pointer if it is invoked with BUFFER and NREAD being NULL and COUNT being 0.

The function returns the error code GPG\_ERR\_NO\_ERROR if the data object was successfully created, GPG\_ERR\_INV\_VALUE if DH or READFUNC is not a valid pointer, and GPG\_ERR\_ENOMEM if not enough memory is available.

-- Function: gpgme\_error\_t gpgme\_data\_rewind (gpgme\_data\_t DH)  
The function gpgme\_data\_rewind is equivalent to:

```
return (gpgme_data_seek (dh, 0, SEEK_SET) == -1)
? gpgme_error_from_errno (errno) : 0;
```

-- Data type: gpgme\_attr\_t  
The gpgme\_attr\_t type is used to specify a key or trust item attribute. The following attributes are defined:

#### GPGME\_ATTR\_KEYID

This is the key ID of a sub key. It is representable as a string.

For trust items, the trust item refers to the key with this ID.

#### GPGME\_ATTR\_FPR

This is the fingerprint of a sub key. It is representable as a string.

#### GPGME\_ATTR\_ALGO

This is the crypto algorithm for which the sub key can be used. It is representable as a string and as a number. The numbers correspond to the enum gcry\_pk\_algos values in the gcrypt library.

#### GPGME\_ATTR\_LEN

This is the key length of a sub key. It is representable as a



number.

#### GPGME\_ATTR\_CREATED

This is the timestamp at creation time of a sub key. It is representable as a number.

#### GPGME\_ATTR\_EXPIRE

This is the expiration time of a sub key. It is representable as a number.

#### GPGME\_ATTR\_OTRUST

XXX FIXME (also for trust items)

#### GPGME\_ATTR\_USERID

This is a user ID. There can be more than one user IDs in a GPGME\_KEY\_T object. The first one (with index 0) is the primary user ID. The user ID is representable as a number.

For trust items, this is the user ID associated with this trust item.

#### GPGME\_ATTR\_NAME

This is the name belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_EMAIL

This is the email address belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_COMMENT

This is the comment belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_VALIDITY

This is the validity belonging to a user ID. It is representable as a string and as a number. See below for a list of available validities.

For trust items, this is the validity that is associated with this trust item.

#### GPGME\_ATTR\_UID\_REVOKED

This specifies if a user ID is revoked. It is representable as a number, and is 1 if the user ID is revoked, and 0 otherwise.

#### GPGME\_ATTR\_UID\_INVALID

This specifies if a user ID is invalid. It is representable

as a number, and is 1 if the user ID is invalid, and 0 otherwise.

#### GPGME\_ATTR\_LEVEL

This is the trust level of a trust item.

#### GPGME\_ATTR\_TYPE

This returns information about the type of key. For the string function this will either be "PGP" or "X.509". The integer function returns 0 for PGP and 1 for X.509. It is also used for the type of a trust item.

#### GPGME\_ATTR\_IS\_SECRET

This specifies if the key is a secret key. It is representable as a number, and is 1 if the key is revoked, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_REVOKED

This specifies if a sub key is revoked. It is representable as a number, and is 1 if the key is revoked, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_INVALID

This specifies if a sub key is invalid. It is representable as a number, and is 1 if the key is invalid, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_EXPIRED

This specifies if a sub key is expired. It is representable as a number, and is 1 if the key is expired, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_DISABLED

This specifies if a sub key is disabled. It is representable as a number, and is 1 if the key is disabled, and 0 otherwise.

#### GPGME\_ATTR\_KEY\_CAPS

This is a description of the capabilities of a sub key. It is representable as a string. The string contains the letter e if the key can be used for encryption, s if the key can be used for signatures, and c if the key can be used for certifications.

#### GPGME\_ATTR\_CAN\_ENCRYPT

This specifies if a sub key can be used for encryption. It is representable as a number, and is 1 if the sub key can be used for encryption, and 0 otherwise.

#### GPGME\_ATTR\_CAN\_SIGN

This specifies if a sub key can be used to create data signatures. It is representable as a number, and is 1 if the sub key can be used for signatures, and 0 otherwise.

#### GPGME\_ATTR\_CAN\_CERTIFY

This specifies if a sub key can be used to create key certificates. It is representable as a number, and is 1 if the sub key can be used for certifications, and 0 otherwise.

#### GPGME\_ATTR\_SERIAL

The X.509 issuer serial attribute of the key. It is representable as a string.

#### GPGME\_ATTR\_ISSUE

The X.509 issuer name attribute of the key. It is representable as a string.

#### GPGME\_ATTR\_CHAINID

The X.509 chain ID can be used to build the certification chain. It is representable as a string.

-- Function: `const char * gpgme_key_get_string_attr (gpgme_key_t KEY, gpgme_attr_t WHAT, const void *RESERVED, int IDX)`

The function `gpgme_key_get_string_attr` returns the value of the string-representable attribute `WHAT` of key `KEY`. If the attribute is an attribute of a sub key or an user ID, `IDX` specifies the sub key or user ID of which the attribute value is returned. The argument `RESERVED` is reserved for later use and should be `NULL`.

The string returned is only valid as long as the key is valid.

The function returns 0 if an attribute cant be returned as a string, `KEY` is not a valid pointer, `IDX` out of range, or `RESERVED` not `NULL`.

-- Function: `unsigned long gpgme_key_get_ulong_attr (gpgme_key_t KEY, gpgme_attr_t WHAT, const void *RESERVED, int IDX)`

The function `gpgme_key_get_ulong_attr` returns the value of the number-representable attribute `WHAT` of key `KEY`. If the attribute is an attribute of a sub key or an user ID, `IDX` specifies the sub key or user ID of which the attribute value is returned. The argument `RESERVED` is reserved for later use and should be `NULL`.

The function returns 0 if the attribute cant be returned as a number, `KEY` is not a valid pointer, `IDX` out of range, or `RESERVED` not `NULL`.

The signatures on a key are only available if the key was retrieved via a listing operation with the `GPGME_KEYLIST_MODE_SIGS` mode enabled, because it is expensive to retrieve all signatures of a key.

So, before using the below interfaces to retrieve the signatures on a key, you have to make sure that the key was listed with signatures enabled. One convenient, but blocking, way to do this is to use the function `gpgme_get_key`.

-- Data type: `gpgme_attr_t`

The `gpgme_attr_t` type is used to specify a key signature attribute. The following attributes are defined:

#### `GPGME_ATTR_KEYID`

This is the key ID of the key which was used for the signature. It is representable as a string.

#### `GPGME_ATTR_ALGO`

This is the crypto algorithm used to create the signature. It is representable as a string and as a number. The numbers correspond to the enum `gcry_pk_algos` values in the `gcrypt` library.

#### `GPGME_ATTR_CREATED`

This is the timestamp at creation time of the signature. It is representable as a number.

#### `GPGME_ATTR_EXPIRE`

This is the expiration time of the signature. It is representable as a number.

#### `GPGME_ATTR_USERID`

This is the user ID associated with the signing key. The user ID is representable as a number.

#### `GPGME_ATTR_NAME`

This is the name belonging to a user ID. It is representable as a string.

#### `GPGME_ATTR_EMAIL`

This is the email address belonging to a user ID. It is representable as a string.

#### `GPGME_ATTR_COMMENT`

This is the comment belonging to a user ID. It is representable as a string.

#### GPGME\_ATTR\_KEY\_REVOKED

This specifies if a key signature is a revocation signature. It is representable as a number, and is 1 if the key is revoked, and 0 otherwise.

#### GPGME\_ATTR\_SIG\_CLASS

This specifies the signature class of a key signature. It is representable as a number. The meaning is specific to the crypto engine.

#### GPGME\_ATTR\_SIG\_CLASS

This specifies the signature class of a key signature. It is representable as a number. The meaning is specific to the crypto engine.

#### GPGME\_ATTR\_SIG\_STATUS

This is the same value as returned by `gpgme_get_sig_status`.

-- Function: `const char * gpgme_key_sig_get_string_attr`  
(`gpgme_key_t KEY`, `int UID_IDX`, `gpgme_attr_t WHAT`,  
`const void *RESERVED`, `int IDX`)

The function `gpgme_key_sig_get_string_attr` returns the value of the string-representable attribute `WHAT` of the signature `IDX` on the user ID `UID_IDX` in the key `KEY`. The argument `RESERVED` is reserved for later use and should be `NULL`.

The string returned is only valid as long as the key is valid.

The function returns 0 if an attribute can't be returned as a string, `KEY` is not a valid pointer, `UID_IDX` or `IDX` out of range, or `RESERVED` not `NULL`.

-- Function: `unsigned long gpgme_key_sig_get_ulong_attr`  
(`gpgme_key_t KEY`, `int UID_IDX`, `gpgme_attr_t WHAT`,  
`const void *RESERVED`, `int IDX`)

The function `gpgme_key_sig_get_ulong_attr` returns the value of the number-representable attribute `WHAT` of the signature `IDX` on the user ID `UID_IDX` in the key `KEY`. The argument `RESERVED` is reserved for later use and should be `NULL`.

The function returns 0 if an attribute can't be returned as a string, `KEY` is not a valid pointer, `UID_IDX` or `IDX` out of range, or `RESERVED` not `NULL`.

Trust items have attributes which can be queried using the interfaces below. The attribute identifiers are shared with those for key attributes. \*Note Information About Keys::

-- Function: `const char * gpgme_trust_item_get_string_attr`  
(`gpgme_trust_item_t ITEM`, `gpgme_attr_t WHAT`,  
`const void *RESERVED`, `int IDX`)

The function `gpgme_trust_item_get_string_attr` returns the value of the string-representable attribute `WHAT` of trust item `ITEM`. The arguments `IDX` and `RESERVED` are reserved for later use and should be 0 and `NULL` respectively.

The string returned is only valid as long as the key is valid.

The function returns 0 if an attribute can't be returned as a string, `KEY` is not a valid pointer, `IDX` out of range, or `RESERVED` not `NULL`.

-- Function: `int gpgme_trust_item_get_int_attr`  
(`gpgme_trust_item_t ITEM`, `gpgme_attr_t WHAT`,  
`const void *RESERVED`, `int IDX`)

The function `gpgme_trust_item_get_int_attr` returns the value of the number-representable attribute `WHAT` of trust item `ITEM`. If the attribute occurs more than once in the trust item, the index is specified by `IDX`. However, currently no such attribute exists, so `IDX` should be 0. The argument `RESERVED` is reserved for later use and should be `NULL`.

The function returns 0 if the attribute can't be returned as a number, `KEY` is not a valid pointer, `IDX` out of range, or `RESERVED` not `NULL`.

-- Data type: `enum gpgme_sig_stat_t`

The `gpgme_sig_stat_t` type holds the result of a signature check, or the combined result of all signatures. The following results are possible:

`GPGME_SIG_STAT_NONE`

This status should not occur in normal operation.

`GPGME_SIG_STAT_GOOD`

This status indicates that the signature is valid. For the combined result this status means that all signatures are valid.

`GPGME_SIG_STAT_GOOD_EXP`

This status indicates that the signature is valid but expired. For the combined result this status means that all signatures are valid and expired.

`GPGME_SIG_STAT_GOOD_EXPKEY`

This status indicates that the signature is valid but the key

used to verify the signature has expired. For the combined result this status means that all signatures are valid and all keys are expired.

#### GPGME\_SIG\_STAT\_BAD

This status indicates that the signature is invalid. For the combined result this status means that all signatures are invalid.

#### GPGME\_SIG\_STAT\_NOKEY

This status indicates that the signature could not be verified due to a missing key. For the combined result this status means that all signatures could not be checked due to missing keys.

#### GPGME\_SIG\_STAT\_NOSIG

This status indicates that the signature data provided was not a real signature.

#### GPGME\_SIG\_STAT\_ERROR

This status indicates that there was some other error which prevented the signature verification.

#### GPGME\_SIG\_STAT\_DIFF

For the combined result this status means that at least two signatures have a different status. You can get each keys status with `gpgme_get_sig_status`.

-- Function: `const char * gpgme_get_sig_status (gpgme_ctx_t CTX, int IDX, gpgme_sig_stat_t *R_STAT, time_t *R_CREATED)`

The function `gpgme_get_sig_status` is equivalent to:

```
gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
{
    sig = sig->next;
    idx--;
}
if (!sig || idx)
    return NULL;

if (r_stat)
{
```

```

    switch (gpg_err_code (sig->status))
    {
case GPG_ERR_NO_ERROR:
    *r_stat = GPGME_SIG_STAT_GOOD;
    break;

case GPG_ERR_BAD_SIGNATURE:
    *r_stat = GPGME_SIG_STAT_BAD;
    break;

case GPG_ERR_NO_PUBKEY:
    *r_stat = GPGME_SIG_STAT_NOKEY;
    break;

case GPG_ERR_NO_DATA:
    *r_stat = GPGME_SIG_STAT_NOSIG;
    break;

case GPG_ERR_SIG_EXPIRED:
    *r_stat = GPGME_SIG_STAT_GOOD_EXP;
    break;

case GPG_ERR_KEY_EXPIRED:
    *r_stat = GPGME_SIG_STAT_GOOD_EXPKEY;
    break;

default:
    *r_stat = GPGME_SIG_STAT_ERROR;
    break;
    }
    }
    if (r_created)
        *r_created = sig->timestamp;
    return sig->fpr;

```

-- Function: const char \* gpgme\_get\_sig\_string\_attr (gpgme\_ctx\_t CTX,  
int IDX, gpgme\_attr\_t WHAT, int WHATIDX)

The function gpgme\_get\_sig\_string\_attr is equivalent to:

```

gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
{
    sig = sig->next;

```



```

    idx--;
}
if (!sig || idx)
    return NULL;

switch (what)
{
case GPGME_ATTR_FPR:
    return sig->fpr;

case GPGME_ATTR_ERRTOK:
    if (whatidx == 1)
        return sig->wrong_key_usage ? "Wrong_Key_Usage" : "";
    else
        return "";
default:
    break;
}

return NULL;

```

-- Function: const char \* gpgme\_get\_sig\_ulong\_attr (gpgme\_ctx\_t CTX,  
int IDX, gpgme\_attr\_t WHAT, int WHATIDX)

The function gpgme\_get\_sig\_ulong\_attr is equivalent to:

```

gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
{
    sig = sig->next;
    idx--;
}
if (!sig || idx)
    return 0;

switch (what)
{
case GPGME_ATTR_CREATED:
    return sig->timestamp;

case GPGME_ATTR_EXPIRE:
    return sig->exp_timestamp;

case GPGME_ATTR_VALIDITY:

```

```

    return (unsigned long) sig->validity;

    case GPGME_ATTR_SIG_STATUS:
        switch (sig->status)
        {
        case GPG_ERR_NO_ERROR:
            return GPGME_SIG_STAT_GOOD;

        case GPG_ERR_BAD_SIGNATURE:
            return GPGME_SIG_STAT_BAD;

        case GPG_ERR_NO_PUBKEY:
            return GPGME_SIG_STAT_NOKEY;

        case GPG_ERR_NO_DATA:
            return GPGME_SIG_STAT_NOSIG;

        case GPG_ERR_SIG_EXPIRED:
            return GPGME_SIG_STAT_GOOD_EXP;

        case GPG_ERR_KEY_EXPIRED:
            return GPGME_SIG_STAT_GOOD_EXPKEY;

        default:
            return GPGME_SIG_STAT_ERROR;
        }

    case GPGME_ATTR_SIG_SUMMARY:
        return sig->summary;

    default:
        break;
    }
    return 0;

```

-- Function: const char \* gpgme\_get\_sig\_key (gpgme\_ctx\_t CTX, int IDX, gpgme\_key\_t \*R\_KEY)

The function gpgme\_get\_sig\_key is equivalent to:

```

gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
{
    sig = sig->next;

```

```
    idx--;  
    }  
    if (!sig || idx)  
        return gpg_error (GPG_ERR_EOF);  
  
    return gpgme_get_key (ctx, sig->fpr, r_key, 0);
```

File: gpgme.info, Node: Library Copying, Next: Copying, Prev: Deprecated Functions, Up: Top

## GNU Lesser General Public License

\*\*\*\*\*

Version 2.1, February 1999

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=====

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* gpgme_op_export:	Exporting Keys. (line 50)
* gpgme_op_export_ext:	Exporting Keys. (line 83)
* gpgme_op_export_ext_start:	Exporting Keys. (line 105)
* gpgme_op_export_keys:	Exporting Keys. (line 117)
* gpgme_op_export_keys_start:	Exporting Keys. (line 144)
* gpgme_op_export_start:	Exporting Keys. (line 71)
* gpgme_op_genkey:	Generating Keys. (line 304)
* gpgme_op_genkey_result:	Generating Keys. (line 418)
* gpgme_op_genkey_start:	Generating Keys. (line 369)
* gpgme_op_getauditlog:	Additional Logs. (line 9)
* gpgme_op_getauditlog_start:	Additional Logs. (line 54)
* gpgme_op_import:	Importing Keys. (line 9)
* gpgme_op_import_ext:	Deprecated Functions. (line 22)
* gpgme_op_import_keys:	Importing Keys. (line 35)
* gpgme_op_import_keys_start:	Importing Keys. (line 65)
* gpgme_op_import_result:	Importing Keys. (line 174)
* gpgme_op_import_start:	Importing Keys. (line 24)
* gpgme_op_interact:	Advanced Key Editing. (line 23)
* gpgme_op_interact_start:	Advanced Key Editing. (line 53)
* gpgme_op_keylist_end:	Listing Keys. (line 111)
* gpgme_op_keylist_ext_start:	Listing Keys. (line 34)
* gpgme_op_keylist_from_data_start:	Listing Keys. (line 67)
* gpgme_op_keylist_next:	Listing Keys. (line 94)
* gpgme_op_keylist_result:	Listing Keys. (line 166)
* gpgme_op_keylist_start:	Listing Keys. (line 6)
* gpgme_op_keysign:	Signing Keys. (line 12)
* gpgme_op_keysign_start:	Signing Keys. (line 73)
* gpgme_op_passwd:	Changing Passphrases. (line 6)
* gpgme_op_passwd_start:	Changing Passphrases. (line 21)
* gpgme_op_query_swdb:	Checking for updates. (line 68)
* gpgme_op_query_swdb_result:	Checking for updates. (line 80)
* gpgme_op_revuid:	Generating Keys. (line 224)
* gpgme_op_revuid_start:	Generating Keys. (line 252)
* gpgme_op_set_uid_flag_start:	Generating Keys. (line 293)
* gpgme_op_set_ui_flag:	Generating Keys. (line 261)
* gpgme_op_sign:	Creating a Signature.

	(line 21)
* gpgme_op_sign_result:	Creating a Signature. (line 99)
* gpgme_op_sign_start:	Creating a Signature. (line 47)
* gpgme_op_spawn:	Running other Programs. (line 13)
* gpgme_op_spawn_start:	Running other Programs. (line 45)
* gpgme_op_tofu_policy:	Changing TOFU Data. (line 29)
* gpgme_op_tofu_policy_start:	Changing TOFU Data. (line 43)
* gpgme_op_trustlist_end:	Listing Trust Items. (line 44)
* gpgme_op_trustlist_next:	Listing Trust Items. (line 27)
* gpgme_op_trustlist_start:	Listing Trust Items. (line 6)
* gpgme_op_verify:	Verify. (line 6)
* gpgme_op_verify_result:	Verify. (line 290)
* gpgme_op_verify_start:	Verify. (line 26)
* gpgme_passphrase_cb_t:	Passphrase Callback. (line 10)
* gpgme_pinentry_mode_t:	Pinentry Mode. (line 26)
* gpgme_progress_cb_t:	Progress Meter Callback. (line 8)
* gpgme_protocol_t:	Protocols and Engines. (line 17)
* gpgme_protocol_t <1>:	Engine Information. (line 7)
* gpgme_pubkey_algo_name:	Public Key Algorithms. (line 58)
* gpgme_pubkey_algo_string:	Public Key Algorithms. (line 68)
* gpgme_pubkey_algo_t:	Public Key Algorithms. (line 10)
* gpgme_query_swdb_result_t:	Checking for updates. (line 11)
* gpgme_recipient_t:	Decrypt. (line 75)
* gpgme_register_io_cb_t:	I/O Callback Interface. (line 23)
* gpgme_release:	Destroying Contexts. (line 6)
* gpgme_result_ref:	Result Management. (line 15)
* gpgme_result_unref:	Result Management. (line 23)
* gpgme_set_armor:	ASCII Armor. (line 6)
* gpgme_set_ctx_flag:	Context Flags. (line 6)
* gpgme_set_engine_info:	Engine Configuration. (line 11)
* gpgme_set_global_flag:	Library Version Check. (line 44)
* gpgme_set_include_certs:	Included Certificates. (line 6)
* gpgme_set_io_cbs:	Registering I/O Callbacks. (line 35)



\* gpgme\_set\_keylist\_mode: Key Listing Mode. (line 6)

\* gpgme\_set\_locale: Locale. (line 14)

\* gpgme\_set\_offline: Offline Mode. (line 6)

\* gpgme\_set\_passphrase\_cb: Passphrase Callback. (line 40)

\* gpgme\_set\_pinentry\_mode: Pinentry Mode. (line 6)

\* gpgme\_set\_progress\_cb: Progress Meter Callback.  
(line 16)

\* gpgme\_set\_protocol: Protocol Selection. (line 6)

\* gpgme\_set\_sender: Setting the Sender. (line 13)

\* gpgme\_set\_status\_cb: Status Message Callback.  
(line 17)

\* gpgme\_set\_textmode: Text Mode. (line 6)

\* gpgme\_signature\_t: Verify. (line 92)

\* gpgme\_signers\_add: Selecting Signers. (line 18)

\* gpgme\_signers\_clear: Selecting Signers. (line 11)

\* gpgme\_signers\_count: Selecting Signers. (line 25)

\* gpgme\_signers\_enum: Selecting Signers. (line 31)

\* gpgme\_sign\_result\_t: Creating a Signature.  
(line 85)

\* gpgme\_sig\_mode\_t: Creating a Signature.  
(line 7)

\* gpgme\_sig\_notation\_add: Signature Notation Data.  
(line 19)

\* gpgme\_sig\_notation\_clear: Signature Notation Data.  
(line 10)

\* gpgme\_sig\_notation\_get: Signature Notation Data.  
(line 45)

\* gpgme\_sig\_notation\_t: Verify. (line 38)

\* gpgme\_sig\_stat\_t: Deprecated Functions.  
(line 442)

\* gpgme\_ssize\_t: Exchanging Data. (line 32)

\* gpgme\_status\_cb\_t: Status Message Callback.  
(line 8)

\* gpgme\_strerror: Error Strings. (line 6)

\* gpgme\_strerror\_r: Error Strings. (line 15)

\* gpgme\_strerror: Error Strings. (line 26)

\* gpgme\_subkey\_t: Key objects. (line 112)

\* gpgme\_tofu\_info\_t: Key objects. (line 275)

\* gpgme\_tofu\_policy\_t: Changing TOFU Data. (line 13)

\* gpgme\_trust\_item\_get\_int\_attr: Deprecated Functions.  
(line 426)

\* gpgme\_trust\_item\_get\_string\_attr: Deprecated Functions.  
(line 411)

\* gpgme\_trust\_item\_ref: Manipulating Trust Items.  
(line 6)

\* gpgme\_trust\_item\_release: Deprecated Functions.  
(line 18)

\* gpgme\_trust\_item\_t: Trust Item Management.

(line 8)

\* `gpgme_trust_item_unref`: Manipulating Trust Items.  
(line 10)

\* `gpgme_user_id_t`: Key objects. (line 217)

\* `gpgme_validity_t`: Information About Keys.  
(line 9)

\* `gpgme_verify_result_t`: Verify. (line 268)

\* `gpgme_wait`: Waiting For Completion.  
(line 6)

\* `IMPORT_FILES`: UI Server Import/Export Keys.  
(line 9)

\* `INPUT`: UI Server Encrypt. (line 23)

\* `INPUT <1>`: UI Server Sign. (line 12)

\* `INPUT <2>`: UI Server Decrypt. (line 12)

\* `INPUT <3>`: UI Server Verify. (line 16)

\* `MESSAGE`: UI Server Verify. (line 10)

\* `MICALG`: UI Server Sign. (line 43)

\* `off_t (*gpgme_data_seek_cb_t) (void *HANDLE, off_t OFFSET, int WHENCE)`: Callback Based Data Buffers.  
(line 43)

\* `OUTPUT`: UI Server Encrypt. (line 36)

\* `OUTPUT <1>`: UI Server Sign. (line 18)

\* `OUTPUT <2>`: UI Server Decrypt. (line 19)

\* `OUTPUT <3>`: UI Server Verify. (line 23)

\* `PREP_ENCRYPT`: UI Server Encrypt. (line 72)

\* `PROTOCOL`: UI Server Encrypt. (line 98)

\* `RECIPIENT`: UI Server Encrypt. (line 9)

\* `SENDER`: Miscellaneous UI Server Commands.  
(line 50)

\* `SESSION`: Miscellaneous UI Server Commands.  
(line 69)

\* `SIGN`: UI Server Sign. (line 33)

\* `SIGN_FILES`: UI Server Sign/Encrypt Files.  
(line 10)

\* `SIGSTATUS`: UI Server Verify. (line 56)

\* `ssize_t (*gpgme_data_read_cb_t) (void *HANDLE, void *BUFFER, size_t SIZE)`: Callback Based Data Buffers.  
(line 10)

\* `ssize_t (*gpgme_data_write_cb_t) (void *HANDLE, const void *BUFFER, size_t SIZE)`: Callback Based Data Buffers.  
(line 27)

\* `START_CONFDialog`: Miscellaneous UI Server Commands.  
(line 41)

\* `START_KEYMANAGER`: Miscellaneous UI Server Commands.  
(line 31)

\* `struct gpgme_data_cbs`: Callback Based Data Buffers.  
(line 59)

\* `struct gpgme_io_cbs`: Registering I/O Callbacks.  
(line 6)

\* `VERIFY`: UI Server Verify. (line 31)

```

* VERIFY_FILES:                UI Server Verify/Decrypt Files.
                                (line 10)
* void (*gpgme_data_release_cb_t) (void *HANDLE): Callback Based Data Buffers.
                                (line 54)
* void (*gpgme_event_io_cb_t) (void *DATA, gpgme_event_io_t TYPE, void *TYPE_DATA): I/O Callback
Interface.
                                (line 89)
* void (*gpgme_progress_cb_t)(void *HOOK, const char *WHAT, int TYPE, int CURRENT, int TOTAL):
Progress Meter Callback.
                                (line 6)
* void (*gpgme_remove_io_cb_t) (void *TAG): I/O Callback Interface.
                                (line 48)
* window-id:                    Miscellaneous UI Server Commands.
                                (line 21)

# -*- mode: org -*-
#+TITLE: Maintenance Mode
#+AUTHOR: Ben McGinnes
#+LATEX_COMPILER: xelatex
#+LATEX_CLASS: article
#+LATEX_CLASS_OPTIONS: [12pt]
#+LATEX_HEADER: \usepackage{xltextra}
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
#+LATEX_HEADER: \author{Ben McGinnes <ben@gnupg.org>}

```

```

* Maintenance Mode from 2019
:PROPERTIES:
:CUSTOM_ID: maintenance-mode
:END:

```

```

| Version:      | 0.0.1          |
| GPGME Version: | 1.13.0        |
| Author:       | Ben McGinnes <ben@gnupg.org> |
| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |
| Language:     | Australian English, British English |
| xml:lang:     | en-AU, en-GB, en |

```

From the beginning of 2019 the Python bindings to GPGME will enter maintenance mode, meaning that new features will not be added and only bug fixes and security fixes will be made. This also means that documentation beyond that existing at the end of 2018 will not be developed further except to correct errors.

Though use of these bindings appears to have been quite well received, there has been no indication of what demand there is, if any for either financial backing of the current Python bindings development or support contracts with g10code GmbH citing the necessity of including

the bindings.

\*\* Maintainer from 2019 onward

```
:PROPERTIES:  
:CUSTOM_ID: maintenance-mode-bm  
:END:
```

How does this affect the position of GnuPG Python Bindings Maintainer?

Well, I will remain as maintainer of the bindings; but without funding for that position, the amount of time I will be able to dedicate solely to this task will be limited and reduced to volunteered time. As with all volunteered time and effort in free software projects, this will be subject to numerous external imperatives.

\*\* Using the Python Bindings from 2019 and beyond

```
:PROPERTIES:  
:CUSTOM_ID: maintenance-mode-blade-runner  
:END:
```

For most, if not all, Python developers using these bindings; they will continue to just work the same as they always have. Expansions of GPGME itself are usually handled by SWIG with the existing code and thus bindings are generated properly when the bindings are installed alongside GPGME and when the latter is built from source.

In the rare circumstances where that is not enough to address some new addition to GPGME, then that is a bug and thus subject to the maintenance mode provisions (i.e. it will be fixed following a bug report being raised and your humble author will need to remember where the timesheet template was filed, depending on how many years off such an event is).

All the GPGME functionality will continue to be accessible via the lower level, dynamically generated methods which match the GPGME C documentation. While the more intuitively Pythonic higher level layer already covers the vast majority of functionality people require with key generation, signatures, certifications (key signing), encryption, decryption, verification, validation, trust levels and so on.

Any wanted features lacking in the Python bindings are usually lacking because they are missing from GPGME itself (e.g. revoking keys via the API) and in such cases they are usually deliberately excluded. More discussion of these issues can be found in the archives of the [\[\[https://lists.gnupg.org/mailman/listinfo/gnupg-devel\]\]](https://lists.gnupg.org/mailman/listinfo/gnupg-devel) [gnupg-devel mailing list].

Any features existing in the dynamically generated layer for which people want a specific, higher level function included to make it more Pythonic (e.g. to avoid needing to learn or memorise cryptographic mode values or GnuPG status code numbers), would be a feature request and /not/ a bug.

It is still worthwhile requesting it, but the addition of such a feature would not be guaranteed and provided on a purely volunteer basis. Expediting such a request would require funding that request.

Those with a commercial interest in expediting such a feature request already know how to [[<https://gnupg.org/cgi-bin/procdonate.cgi?mode=preset>][expedite it]] (use the message field to state what feature is being requested).

\*\* Documentation formats

```
:PROPERTIES:  
:CUSTOM_ID: docs  
:END:
```

The documentation has been written in Org mode for GNU Emacs, with both Texinfo and reStructuredText formats generated from that. The Texinfo files are intended for use with the rest of the GnuPG documentation; while the reStructuredText files are intended for use with Docutils and Sphinx, as with other Python projects.

\*\*\* Cautionary Notes regarding Sphinx and EPUB

```
:PROPERTIES:  
:CUSTOM_ID: sphinx-made-epubs-suck  
:END:
```

Though Python's Docutils in conjunction with Sphinx is capable of generating some very useful HTML sites, as proven by [[<https://readthedocs.org/>][Read the Docs]] and the [[<https://docs.python.org/>][Python documentation]], there are a number of output formats it does not handle well. At the top of the list of things it manages to break so atrociously as to be embarrassing is the [[<http://idpf.org/epub/>][EPUB 3]] format.

The automatically generated EPUB of the CPython documentation always contains hundreds of validation errors and even the modest amount of documentation here [[<https://files.au.adversary.org.s3.amazonaws.com/crypto/gpgme-python/rst/epub/GPGMEPythonBindings.epub>][produced a file]] with approximately thirty validation errors. As the volume of documentation content increases, so does the induced errors. Whereas Texinfo doesn't produce EPUB output at all, nor does Org-mode.

Should there ever be genuine demand for this format, lodge a

[[<https://dev.gnupg.org/maniphest/task/edit/form/4/>][feature request]] case marked for [[<https://dev.gnupg.org/p/BenM/>][my]] attention. The means of generating such files flawlessly is already available, but is not yet part of the GnuPG build system. Nor is it integrated with a means of converting Org mode input files to the relevant base format automatically, as can already be done when converting Org to reStructuredText or Org to Texinfo. As a certain amount of work would be required to get it done, there would need to be clear demand for that work to be done.  
2011-12-02 Werner Koch <wk@g10code.com>

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-05-11 Marcus Brinkmann <marcus@g10code.com>

- \* gpgsm/Makefile.am (DISTCLEANFILES): Move to ... (CLEANFILES): ... here.
- (clean-local): New rule.
- \* gpg/Makefile.am (DISTCLEANFILES): Move to ... (CLEANFILES): ... here.

2011-05-05 Marcus Brinkmann <marcus@g10code.com>

- \* gpg/Makefile.am: Unset GPG\_AGENT\_INFO when setting up local configuration.
- (clean-local): Shut down local gpg-agent.

2011-05-04 Marcus Brinkmann <marcus@g10code.com>

- \* gpg/t-import.c (check\_result): Complete secret key pair counting and disable status check, as GPG 2.1 currently emits two IMPORT\_OK lines and we only look at the first.

2011-04-27 Marcus Brinkmann <marcus@g10code.com>

- \* gpg/Makefile.am (DISTCLEANFILES): Add S.gpg-agent.
- (mkdemodirs, ./Alpha/Secret.gpg): Remove targets.
- (GNUPGHOME): Export as absolute build directory (for gpg-agent).
- (./pubring.gpg): Remove --homedir option, import secdemo.asc.
- (clean-local): Rewrite.
- \* gpg/secdemo.asc: New file.
- \* gpg/pubkey-1.asc, gpg/seckey-1.asc: Change passphrase to "abc" (now needed as GnuPG 2.1 asks for secret key passphrase on import).
- \* gpg/t-keylist.c (keys): Update key info for Joe Random Hacker.
- (main): Disable check for can\_encrypt, as this is now in a

different subkey.

\* gpg/t-encrypt-sign.c (check\_result): Allow RMD160 hash algorithm.

\* gpg/t-import.c (check\_result): One secret key pair now counts as two secret keys, allow that.

2009-11-03 Werner Koch <wk@g10code.com>

\* run-support.h (fail\_if\_err): Include program name.

\* run-sign.c (main): Add option --uiserver.

2009-10-26 Marcus Brinkmann <marcus@g10code.de>

\* opassuan/t-command.c: Update to new interface.

2009-10-15 Werner Koch <wk@g10code.com>

\* run-verify.c: New.

2009-08-06 Werner Koch <wk@g10code.com>

\* run-sign.c: New.

2009-07-07 Werner Koch <wk@g10code.com>

\* run-keylist.c (main): Add options --cms and --openpgp.

\* gpg/pgp-keylist.c: Rename to ...

\* run-keylist.c: ... this.

\* gpg/pgp-import.c: Rename to ...

\* run-import.c: ... this.

\* gpg/pgp-export.c: Rename to ...

\* run-export.c: ... this.

\* run-support.h: New. Copied from gpg/t-support.h.

\* gpg/Makefile.am (noinst\_PROGRAMS): Remove them.

\* Makefile.am (noinst\_PROGRAMS): Add them.

(noinst\_HEADERS): New.

2009-06-22 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-support.h (passphrase\_cb): Implement write() according to the book to silence compiler warning.

\* gpgsm/t-support.h (passphrase\_cb): Likewise.

2009-06-16 Werner Koch <wk@g10code.com>

\* gpg/pgp-import.c: New.

\* gpg/t-support.h (print\_import\_result, nonnull): Factored out from other tools.

\* gpg/pgp-export.c, gpg/pgp-keylist.c: New.

2009-06-09 Werner Koch <wk@g10code.com>

\* gpg/Makefile.am (./pubring.gpg): Ignore errors in case of already imported keys. Add --no-permission-warning and remove obsolete --allow-secret-key-import.

\* gpg/mkdemodirs.in (GPG): Add --no-permission-warning.

\* gpg/t-edit.c (edit\_fnc): Use gpgme\_io\_write.

2009-04-19 Moritz <moritz@gnu.org>

\* gpg/Makefile.am (EXTRA\_DIST): Replaced mkdemodirs with mkdemodirs.in. (mkdemodirs): New target.

(clean-local): Added command for removing mkdemodirs script.

(./Alpha/Secret.gpg): Added dependency on mkdemodirs.

\* gpg/mkdemodirs: Renamed to ...

\* gpg/mkdemodirs.in: ... here.

\* gpg/mkdemodirs.in (GPG): Derive value from @GPG@ instead of hard-coding "gpg".

2009-02-24 Werner Koch <wk@g10code.com>

\* opassuan/t-command.c: Adjust for changed new op\_assuan interface.

2009-02-03 Werner Koch <wk@g10code.com>

\* gpg/t-keylist.c (main): Check that new fields is\_cardkey and card\_number are not set.

2009-01-26 Werner Koch <wk@g10code.com>

\* opassuan/: New.

\* opassuan/Makefile.am: New.

\* opassuan/t-command.c: New.

2008-12-03 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (INCLUDES): Fix path to include file.

\* gpg/Makefile.am (INCLUDES), gpgsm/Makefile.am (INCLUDES): Likewise.

2008-11-18 Werner Koch <wk@g10code.com>



\* gpgsm/cms-decrypt.c: New.

2008-11-03 Marcus Brinkmann <marcus@g10code.com>

\* gpgsm/Makefile.am (INCLUDES, LDADD): Replace gpgme path with src.

\* gpg/Makefile.am (INCLUDES, LDADD, t\_thread1\_LDADD): Likewise.

\* Makefile.am (LDADD): Likewise.

2008-10-30 Werner Koch <wk@g10code.com>

\* gpgsm/cms-keylist.c: New.

2008-06-19 Werner Koch <wk@g10code.com>

\* gpg/t-gpgconf.c (dump\_arg): Add new types. Print strings in quotes.

2008-01-28 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (DISTCLEANFILES): Add pubring.kbx~.

2008-01-10 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-gpgconf.c (main): Allow for dirmngr not to be available.

\* gpg/Makefile.am (./gpg-agent.conf): Correct pinentry path.

\* gpg/pinentry: New file.

\* gpg/Makefile.am (DISTCLEANFILES, all-local): Add gpg-agent.conf

(./gpg-agent.conf): New target.

(EXTRA\_DIST): Add pinentry.

\* gpg/t-gpgconf.c (main): Exit early if compiled without gpgconf.

2008-01-04 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (CLEANFILES): Add pubring.kbx and dirmngr.conf.

\* Makefile.am (TESTS\_ENVIRONMENT): Use absolute path for GNUPGHOME.

\* gpg/Makefile.am (TESTS\_ENVIRONMENT): Use absolute path for GNUPGHOME.

\* gpgsm/Makefile.am (TESTS\_ENVIRONMENT): Use absolute path for GNUPGHOME.

\* gpg/Makefile.am (TESTS): Add t-gpgconf.

t-gpgconf.c: New file.

2007-11-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-verify.c (show\_auditlog): Check for GPG\_ERR\_ASS\_UNKNOWN\_CMD.

2007-11-23 Werner Koch <wk@g10code.com>

\* gpgsm/t-verify.c (check\_result): Don't exit on error but set a flag.

(main): Consult flag for return value.

(show\_auditlog): New.

(main): Use it.

2007-09-27 Marcus Brinkmann <marcus@g10code.de>

\* t-engine-info.c (check\_engine\_info): Fix debug output.

\* gpg/Makefile.am (tests\_unix): New variable.

(TESTS): Use it.

\* gpg/t-support.h (passphrase\_cb) [HAVE\_W32\_SYSTEM]: Use WriteFile instead of write.

\* gpg/t-wait.c [HAVE\_W32\_SYSTEM]: Define sleep as \_sleep.

2007-09-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-verify.c (main): Release TEXT and SIG.

2007-07-12 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (key\_id): Change := into =.

2007-07-12 Werner Koch <wk@g10code.com>

\* gpgsm/t-support.h (init\_gpgme) [W32]: Do not init the locales as the constants are not available.

2007-02-26 Werner Koch <wk@g10code.com>

\* gpg/t-verify.c (double\_plaintext\_sig): New.

(main): Check it.

2006-12-02 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (main): Skip unknown keys. Newer versions of GPGSM import more keys than older ones.

2005-12-06 Werner Koch <wk@g10code.com>

\* gpg/t-keylist.c (main): Changed for that secondary keys now have a fingerprint.

\* gpg/t-keylist-sig.c (main): Ditto.

\* gpgsm/t-keylist.c (main): Ditto. The test used to be wrong.

2005-10-18 Werner Koch <wk@g10code.com>

- \* gpg/pubdemo.asc, gpg/secdemo.asc: Add 2 expired subkeys to Whisky.
- \* gpg/t-keylist.c: Reordered list to match new demo keyring. Add arg for number of subkeys and for extra checking function.
- (main): Enhanced a few error outputs. Changed subkey counting. Call extra checking function.
- (check\_whisky): New.

2005-10-07 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/t-keylist.c (main): Allow for an email address as a second uid.
- \* gpg/t-sig-notation.c: Change critical notation to something GnuPG understands.

2005-10-01 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/Makefile.am (EXTRA\_DIST): Remove gpg.conf.
- (DISTCLEANFILES): Add gpg.conf.
- (all-local): Add gpg.conf.
- (./gpg.conf): New target.
- \* gpg/gpg.conf: Remove file.
- \* gpg/Makefile.am (EXTRA\_DIST): Add gpg.conf.
- \* gpg/Makefile.am (TESTS): Add t-sig-notation.
- \* gpg/t-sig-notation.c (check\_result): New file.
- \* gpg/t-verify.c (check\_result): Also check the length of the notation data.
- \* gpg/gpg.conf: New file.

2005-09-30 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/Makefile.am (TESTS): Add t-filename.
- \* gpg/t-filename.c: New file.

2005-09-23 Werner Koch <wk@g10code.com>

- \* gpg/t-support.h (init\_gpgme) [W32]: Don't use LC\_MESSAGES.
- \* gpg/t-encrypt-large.c: New test.
- \* gpg/Makefile.am (TESTS): Add t-encrypt-large.

2005-06-03 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (TESTS): Add t-wait.

\* gpg/t-wait.c (main): New test.

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* gpg/mkdemodirs: Add copyright notice.

\* gpgsm/Makefile.am, gpgsm/t-support.h, gpgsm/t-decrypt.c,  
gpgsm/t-encrypt.c, gpgsm/t-export.c, gpgsm/t-genkey.c,  
gpgsm/t-import.c, gpgsm/t-keylist.c, gpgsm/t-sign.c,  
gpgsm/t-verify.c, gpg/Makefile.am, gpg/t-decrypt.c,  
gpg/t-decrypt-verify.c, gpg/t-edit.c, gpg/t-encrypt.c,  
gpg/t-encrypt-sign.c, gpg/t-encrypt-sym.c, gpg/t-eventloop.c,  
gpg/t-export.c, gpg/t-genkey.c, gpg/t-import.c, gpg/t-keylist.c,  
gpg/t-keylist-sig.c, gpg/t-sign.c, gpg/t-signers.c,  
gpg/t-support.h, gpg/t-thread1.c, gpg/t-trustlist.c,  
gpg/t-verify.c, Makefile.am, t-data.c, t-engine-info.c,  
t-version.c: Change license to LGPL.

2004-08-17 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (struct): Add new fields VALIDITY and  
KEY\_LENGTH.

(main): Use them.

\* gpgsm/t-import.c (check\_result): New argument total\_stat.

(main): Pass this argument. Reduce number of total considered  
keys to 1 for the second test.

2004-04-05 Werner Koch <wk@gnupg.org>

\* gpgsm/Makefile.am: Changed the faked system time to 20011213T12000.

2004-03-07 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c: Add chain IDs.

2004-03-03 Werner Koch <wk@gnupg.org>

\* gpgsm/t-export.c (main): Also check exporting 2 certificates.

2004-02-17 Werner Koch <wk@gnupg.org>

\* gpgsm/t-import.c (check\_result): gpgsm does now return info in  
the result->imports; adjust for that.

\* gpgsm/Makefile.am (TESTS\_ENVIRONMENT): Reset the GPG\_AGENT\_INFO.

Include config.h at the top of each C source. This is required

due to LFS support.

- \* gpg/t-keylist-sig.c (main): s/class/sig\_class/.
- \* gpg/t-signers.c (check\_result): Ditto.
- \* gpg/t-sign.c (check\_result): Ditto.
- \* gpg/t-encrypt-sign.c (check\_result): Ditto.
- \* gpgsm/t-sign.c (check\_result): Ditto.

2004-01-12 Werner Koch <wk@gnupg.org>

- \* gpg/t-keylist-sig.c (main): Temporary disabled one test due top gpg 1.3.4 problems.
- \* gpg/t-import.c (check\_result): Likewise.

2003-11-19 Werner Koch <wk@gnupg.org>

- \* gpg/t-support.h (DIM): Added.
- \* gpg/t-verify.c (check\_result): Rewrote test for notations because the order of notations is not guaranteed.
- \* gpgsm/t-support.h (fail\_if\_err): Also print the numeric values.

2003-10-06 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-eventloop.c: Include <sys/types.h> for old systems.
- \* gpgsm/Makefile.am (DISTCLEANFILES): Add random\_seed.
- \* gpg/t-thread1.c (thread\_one): Do not call initialize\_gpgme. Likewise.

2003-09-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-thread1.c (main): Call init\_gpgme here. (initialize\_gpgme): Function removed.
- \* gpg/t-thread1.c: New file.
- \* gpg/Makefile.am (TESTS): Add t-thread1.c. (t\_thread1\_LDADD): New variable. (LDADD): Remove GPG Error lib.
- \* gpgsm/Makefile.am (LDADD): Likewise.
- \* gpg/t-import.c (main): Likewise.
- \* gpg/t-keylist-sig.c (main): Likewise.
- \* gpg/t-keylist.c (main): Likewise.
- \* gpg/t-sign.c (main): Likewise.
- \* gpg/t-signers.c (main): Likewise.

- \* gpg/t-trustlist.c (main): Likewise.
- \* gpgsm/t-support.h: Include <stdlib.h> and <locale.h>.
- (init\_gpgme): New function.
- \* gpg/t-support.h: Likewise.
- \* gpgsm/t-verify.c (main): Call init\_gpgme.
- \* gpgsm/t-decrypt.c (main): Likewise.
- \* gpgsm/t-encrypt.c (main): Likewise.
- \* gpgsm/t-export.c (main): Likewise.
- \* gpgsm/t-genkey.c (main): Likewise.
- \* gpgsm/t-import.c (main): Likewise.
- \* gpgsm/t-keylist.c (main): Likewise.
- \* gpgsm/t-sign.c (main): Likewise.
- \* gpg/t-verify.c (main): Call init\_gpgme.
- \* gpg/t-decrypt-verify.c (main): Likewise.
- \* gpg/t-decrypt.c (main): Likewise.
- \* gpg/t-edit.c (main): Likewise.
- \* gpg/t-encrypt-sign.c (main): Likewise.
- \* gpg/t-encrypt-sym.c (main): Likewise.
- \* gpg/t-encrypt.c (main): Likewise.
- \* gpg/t-eventloop.c (main): Likewise.
- \* gpg/t-export.c (main): Likewise.
- \* gpg/t-genkey.c (main): Likewise.

2003-08-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-sign.c (check\_result): Change output format for signature class to unsigned int.
- \* gpg/t-signers.c (check\_result): Likewise.
- \* gpg/t-encrypt-sign.c (check\_result): Likewise.
- \* gpgsm/t-sign.c (check\_result): Likewise.

2003-07-31 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-verify.c (check\_result): Change type of SUMMARY to unsigned int.
- \* gpg/t-decrypt-verify.c (check\_verify\_result): Likewise.
- \* gpg/t-keylist-sig.c (keys): Change type of member CLASS to unsigned int.
- \* t-data.c (read\_cb): Change type of AMOUNT to unsigned int.
- \* t-version.c (version): Remove unused variable.

2003-07-22 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (AM\_CPPFLAGS): New variable.
- (LDADD): Add @GPG\_ERROR\_LIBS@.
- \* gpg/Makefile.am (AM\_CPPFLAGS): New variable.
- (LDADD): Add @GPG\_ERROR\_LIBS@.
- \* gpgsm/Makefile.am (AM\_CPPFLAGS): New variable.

(LDADD): Add @GPG\_ERROR\_LIBS@.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

Everywhere: Use libgpg-error error codes.

- \* gpg/Makefile.am (noinst\_HEADERS): New variable.
- \* gpg/t-support.h: New file.
- \* gpgsm/Makefile.am (noinst\_HEADERS): New variable.
- \* gpgsm/t-support.h: New file.

2003-05-29 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-encrypt-sym.c (main): Adapt to new syntax.
- \* gpg/t-encrypt.c (main): Likewise.
- \* gpg/t-eventloop.c (main): Likewise.
- \* gpg/t-encrypt-sign.c (main): Likewise.
- \* gpgsm/t-export.c (main): Likewise.
- \* gpgsm/t-encrypt.c (main): Likewise.

2003-05-28 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-eventloop.c (main): Rewrite recipient management.
- \* gpg/t-encrypt-sign.c (main): Likewise.
- \* gpg/t-encrypt.c (main): Likewise.
- \* gpg/t-export.c (main): Likewise.
- \* gpgsm/t-encrypt.c (main): Likewise.
- \* gpgsm/t-export.c (main): Likewise.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/Makefile.am (TESTS): Order t-keylist and t-keylist-sig after t-import.
- \* gpg/t-edit.c (edit\_fnc): Fix primary UID for keylisting tests.
- \* gpg/t-keylist.c: Change order of user IDs.
- \* gpg/t-keylist-sig.c: Likewise.
- \* gpg/t-import.c: Add support for gpg in CVS.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

- \* t-data.c: Remove TEST\_OUT\_CB.  
(main): Likewise.
- \* gpg/t-trustlist.c (main): Access ITEM directly.
- \* (t-decrypt-verify.c, t-decrypt.c, t-edit.c, t-encrypt-sign.c, t-encrypt-sym.c, t-sign.c, t-signers.c): Include <unistd.h>.  
(passphrase\_cb): Rewritten.
- \* t-edit.c (edit\_fnc): Rewritten.

2003-05-04 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-keylist-sig.c (main): Remove timestamp check.

\* gpgsm/t-keylist.c: Add check for timestamp.

\* gpg/Makefile.am (TESTS): Add t-keylist-sig.

\* gpg/t-keylist-sig.c: New file.

2003-04-30 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-eventloop.c (main): Do not call print\_op\_info.

(print\_op\_info): Function removed.

\* gpg/t-keylist.c: Rewritten.

\* gpgsm/t-keylist.c (main): Rewritten.

\* gpg/t-edit.c (main): Do not use gpgme\_key\_get\_as\_xml. Use gpgme\_key\_unref instead gpgme\_key\_release.

\* gpg/t-signers.c (main): Use gpgme\_key\_unref instead gpgme\_key\_release.

2003-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-trustlist.c: Rewritten.

\* gpg/t-verify.c (main): Rewritten.

\* gpg/t-decrypt-verify.c: Rewritten.

\* gpgsm/t-verify.c (main): Rewritten.

2003-04-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-decrypt.c (main): Rewritten.

\* gpg/t-decrypt.c: Rewritten.

\* gpg/t-signers.c: Rewritten.

2003-04-27 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-encrypt-sign.c (check\_result): Rewritten.

\* gpg/t-sign.c: Rewritten.

\* gpgsm/t-sign.c: Rewritten.

\* gpg/t-encrypt.c: Check for invalid recipients.

\* gpgsm/t-encrypt.c: Likewise.

\* gpg/t-import.c (check\_result): Really use FPR.



\* gpgsm/t-import.c (check\_result): Rewritten.

2003-04-25 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-import.c: Rewritten.

\* gpgsm/t-genkey.c: Rewritten.

\* gpgsm/Makefile.am (noinst\_PROGRAMS): Add t-genkey.

\* gpg/t-genkey.c: Include <stdlib.h>.

(main): Check result->fpr before checking its length.

2003-04-24 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-genkey.c: Rewritten to match new semantics.

2003-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-decrypt.c (passphrase\_cb): Fix to new prototype.

\* gpg/t-decrypt-verify.c (passphrase\_cb): Likewise.

\* gpg/t-edit.c (passphrase\_cb): Likewise.

\* gpg/t-encrypt-sign.c (passphrase\_cb): Likewise.

\* gpg/t-encrypt-sym.c (passphrase\_cb): Likewise.

\* gpg/t-sign.c (passphrase\_cb): Likewise.

\* gpg/t-signers.c (passphrase\_cb): Likewise.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

\* t-engine-info.c: Use file\_name instead path throughout.

\* Makefile.am (TESTS): Add t-engine-info.

\* t-engine-info.c: New file.

\* gpg/t-encrypt.c (main): Don't print engine info.

\* gpg/t-eventloop.c (main): Likewise.

\* gpg/t-encrypt-sign.c (main): Likewise.

\* gpgsm/t-encrypt.c (main): Likewise.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-verify.c (main): Adjust caller of gpgme\_op\_verify.

\* gpg/t-verify.c (main): Likewise.

\* gpg/t-decrypt-verify.c (main): Likewise for  
gpgme\_op\_decrypt\_verify.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (./gpgsm.conf): Add a faked system time to  
avoid certification's expiry.

\* gpgsm/t-encrypt.c (main): Use the short certification name.

2002-11-19 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-genkey.c (main): Add missing argument to gpgme\_op\_genkey invocation.

2002-10-09 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-decrypt.c (print\_data): Update to new gpgme\_data\_read interface, and use gpgme\_engine\_check\_version instead gpgme\_check\_version.

\* gpg/t-decrypt-verify.c (print\_data): Likewise.

\* gpg/t-edit.c (main): Likewise.

\* gpg/t-encrypt.c (print\_data): Likewise.

\* gpg/t-encrypt-sign.c (print\_data): Likewise.

\* gpg/t-encrypt-sym.c (print\_data): Likewise.

\* gpg/t-eventloop.c (print\_data): Likewise.

\* gpg/t-export.c (print\_data): Likewise.

\* gpg/t-sign.c (print\_data): Likewise.

\* gpg/t-signers.c (print\_data): Likewise.

\* gpgsm/t-decrypt.c (print\_data): Likewise.

\* gpgsm/t-encrypt.c (print\_data): Likewise.

\* gpgsm/t-export.c (print\_data): Likewise.

\* gpgsm/t-sign.c (print\_data): Likewise.

\* gpg/t-verify.c (main): Likewise for gpgme\_op\_verify.

\* gpgsm/t-verify.c (main): Likewise for gpgme\_op\_verify.

\* t-data.c (read\_once\_test): Likewise.

(write\_test): Update for new behaviour of data objects.

(main): Remove type test.

2002-09-30 Werner Koch <wk@gnupg.org>

\* gpgsm/t-keylist.c (doit): Add arg SECRET.

(main): Add option --secret.

2002-09-28 Marcus Brinkmann <marcus@g10code.de>

\* t-version.c: Include <string.h>. Reported by Stphane Corthsy.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-keylist.c (main): Test PATTERN for NULL before printing.

Reported by Dr. Stefan Dalibor <Dr.Stefan.Dalibor@bfa.de>.

2002-08-01 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-edit.c: Also add a test for the expire command (testing the passphrase callback).

2002-07-28 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-edit.c: New file.
- \* gpg/Makefile (TESTS): Add t-edit.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-encrypt-sym.c (main): Change type of I to size\_t and rename to LEN.
- \* gpg/t-verify.c (main): Likewise. Submitted by Stphane Corttsy.

2002-07-03 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/t-eventloop.c: New file.
- \* gpg/Makefile (TESTS): Add t-eventloop.

2002-06-26 Werner Koch <wk@gnupg.org>

- \* gpgsm/t-import.c (print\_op\_info): New.  
(main): Print operation info.

2002-06-25 Werner Koch <wk@gnupg.org>

- \* gpgsm/Makefile.am (DISTCLEANFILES): new.

2002-06-25 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/Makefile.am (TESTS): Add t-export.  
gpgsm/t-export.c: New file.

2002-06-20 Werner Koch <wk@gnupg.org>

- \* gpgsm/t-sign.c (main): Also test a normal signature.
- \* gpg/Makefile (TESTS\_ENVIRONMENT): Set GPG\_AGENT\_INFO empty.
- \* gpg/t-signers.c, gpg/t-sign.c, gpg/t-encrypt-sym.c
- \* gpg/t-encrypt-sign.c, gpg/t-decrypt.c
- \* gpg/t-decrypt-verify.c (main): Changed the GPG\_AGENT\_INFO check to match the one in ../gpgme/rungpg.c.

2002-06-12 Werner Koch <wk@gnupg.org>

- \* gpgsm/t-keylist.c (doit): Print operation info if available.

2002-06-10 Werner Koch <wk@gnupg.org>

\* gpgsm/t-verify.c (print\_sig\_stat): Print the error token.

2002-06-04 Werner Koch <wk@gnupg.org>

\* gpgsm/t-encrypt.c (main): Add a simple option parser and allow to specify an encryption key.

2002-05-26 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (all-local): Remove dependency on ./secring.gpg.  
(./secring.gpg): Remove target, and move all rules for this target to ...  
(./pubring.gpg): ... here. This was necessary because GnuPG 1.0.7 does create an empty secring.gpg file when importing public keys.

2002-05-08 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-verify.c (validity\_string): New.  
(print\_sig\_stat): Print expire time and validity.  
(status\_string): Add new expired stati.

2002-05-03 Werner Koch <wk@gnupg.org>

\* gpg/t-verify.c (validity\_string): New.  
(print\_sig\_stat): Print expire time and validity.  
(status\_string): Add new expired stati.

2002-04-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (./trustlist.txt): Put more into this file to prevent use of gpg-agent.  
(./gpg-agent.conf): Remove target.  
(all-local): Remove ./gpg-agent.conf.

2002-04-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (main): Use gpgme\_engine\_check\_version instead gpgme\_check\_engine.  
\* gpgsm/t-encrypt.c (main): Likewise.

2002-03-06 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-encrypt-sym.c: New file.  
\* gpg/Makefile.am (TESTS): Add t-encrypt-sym.

2002-03-05 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (CLEANFILES): Remove random\_seed, which is now

in DISTCLEANFILES.

2002-03-04 Werner Koch <wk@gnupg.org>

\* gpg/Makefile.am (DISTCLEANFILES): Added.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-verify.c (main): Add a few more sanity checks, and a check for normal signatures.

2002-02-26 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-encrypt-sign.c: New file.  
\* gpg/Makefile.am (TESTS): Add t-encrypt-sign.

2002-02-13 Werner Koch <wk@gnupg.org>

\* gpgsm/Makefile.am (private-keys-v1.d): Don't fail when the directory already exists.

2002-02-12 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (CLEANFILES): New target.  
(distclean-local): Rename to ...  
(clean-local): ... this.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (./private-keys-v1.d/\$(key\_id).key): Fix rule.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-genkey.c: New file (not added to Makefile.am because of gpg-agent bug).

2002-02-08 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (key\_id): Update value.  
(all-local): Add .key to keyid filename.  
(./private-keys-v1.d/\$(key\_id)): Renamed to ...  
(./private-keys-v1.d/\$(key\_id).key): ... this.  
(all-local): Add ./gpgsm.conf, ./trustlist.txt.  
(./gpgsm.conf, ./trustlist.txt): New target.  
\* gpgsm/567064FE6D14A17B2D811ABB407728BC558AA455: Renamed to ...  
\* gpgsm/32100C27173EF6E9C4E9A25D3D69F86D37A4F939: ... this.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-import.c (print\_op\_info): New function.  
(main): Use it.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-signers.c (passphrase\_cb): Change type of r\_hd to void\*\*.  
\* gpg/t-sign.c (passphrase\_cb): Likewise.  
\* gpg/t-decrypt-verify.c (passphrase\_cb): Likewise.  
\* gpg/t-decrypt.c (passphrase\_cb): Likewise.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

\* gpg/t-decrypt-verify.c: Don't include `mcheck.h'. Reported by  
Stphane Corthsy.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

\* gpg/Makefile.am (EXTRA\_DIST): Add missing line continuation.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile.am (EXTRA\_DIST): Add \$(key\_id).

2001-12-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/Makefile: Rename `pubcerts.kbx' to `pubring.kbx'.

2001-12-15 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-keylist.c (check\_two\_contexts): Set protocols.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-sign.c: New file.  
\* gpgsm/Makefile.am (TESTS): Add t-sign.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgsm/t-decrypt.c: New file.  
\* gpgsm/567064FE6D14A17B2D811ABB407728BC558AA455: Likewise.  
\* gpgsm/Makefile.am (TESTS): Add t-decrypt.  
(key\_id): New variable.  
(all-local): New target ./private-keys-v1.d/\$(key\_id) added.  
(./private-keys-v1.d/\$(key\_id)): New target.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/t-verify.c: New file.
- \* gpgsm/Makefile.am (TESTS): Add t-verify.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/Makefile.am (GPG): Set to @GPG\_PATH@.
- (./pubring.gpg): Use \$(GPG) instead gpg.
- (./secring.gpg): Likewise.

- \* gpgsm/t-import.c (main): Remove third test case.
- \* gpgsm/Makefile.am (GPGSM): Set to @GPGSM@.
- (all-local): New target.
- (./pubcerts.kbx): Likewise.
- \* gpgsm/t-encrypt.c: New file.
- \* gpgsm/Makefile.am (TESTS): Add t-encrypt.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/t-keylist.c: New file.
- \* gpgsm/Makefile.am (TESTS): Add t-keylist.

2001-12-13 Marcus Brinkmann <marcus@g10code.de>

- \* gpgsm/cert\_dfn\_pca01.der: New file.
- \* gpgsm/cert\_dfn\_pca15.der: Likewise.
- \* gpgsm/cert\_g10code\_test1.der: Likewise.
- \* gpgsm/t-import.c: Likewise.
- \* gpgsm/Makefile.am (EXTRADIST): Add new files.
- (TESTS): Add t-import.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

- \* gpg/: New directory.
- \* Makefile.am, t-verify.c, t-encrypt.c, t-signers.c, t-trustlist.c, t-sign.c, t-keylist.c, t-import.c, t-genkey.c, t-export.c, t-decrypt-verify.c, t-decrypt.c, t-version.c, t-data.c, mkdemodirs. cipher-1.asc, cipher-2.asc, geheim.txt, pubdemo.asc, pubkey-1.asc, secdemo.asc, seckey-1.asc): Move to sub directory gpg/.
- \* gpg/Makefile.am (INCLUDES): Include gpgme/, not include/ and intl/.
- (LDD): Correct relative path to gpgme library.
- (TESTS): Remove t-version and t-data.
- \* gpg/t-verify.c, gpg/t-encrypt.c, gpg/t-signers.c, gpg/t-trustlist.c, gpg/t-sign.c, gpg/t-keylist.c, gpg/t-import.c, gpg/t-genkey.c, gpg/t-export.c, gpg/t-decrypt-verify.c, gpg/t-decrypt.c, t-version.c, t-data.c): Include gpgme.h, not "../gpgme/gpgme.h".

- \* Makefile.am: New file.
- \* gpgsm/: New directory.
- \* gpgsm/Makefile.am: New file.

2001-11-16 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (TESTS): Add t-decrypt-verify.
- \* t-decrypt-verify.c: New file.
- \* cipher-2.asc: Likewise.

2001-11-02 Marcus Brinkmann <marcus@g10code.de>

- \* t-data.c: Include stddef.h.
- (read\_once\_test): Change type of READ to size\_t.
- (read\_test): Likewise.
- (write\_test): Likewise.

2001-10-29 Marcus Brinkmann <marcus@g10code.de>

- \* t-signers.c: New file.
- \* Makefile.am (TESTS): Add t-signers.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (TEST\_ENVIRONMENT): Revert last change.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (TEST\_ENVIRONMENT): Set environment to \$(srcdir), not current directory.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

- \* t-data.c (write\_test): New function.
- (main): Invoke write\_test for all rounds except TEST\_OUT\_CB.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (INCLUDES): Remove spurious duplicate to silence automake.

2001-10-16 Marcus Brinkmann <marcus@g10code.de>

- \* t-version.c: New file.
- \* t-data.c: Likewise.
- \* t-data-1.txt: Likewise.
- \* t-data-2.txt: Likewise.
- \* Makefile.am (TESTS): Add t-version, t-data.



2001-09-17 Werner Koch <wk@gnupg.org>

\* t-keylist.c (check\_two\_contexts): New.

2001-09-03 Werner Koch <wk@gnupg.org>

\* t-encrypt.c (print\_op\_info): New and use it after each operation.

2001-08-28 Werner Koch <wk@gnupg.org>

\* t-sign.c (print\_op\_info): New and use it after each operation.

2001-03-15 Werner Koch <wk@gnupg.org>

\* t-keylist.c (doit): List subkeys too, show caps.

2001-02-13 Werner Koch <wk@gnupg.org>

\* t-verify.c (print\_sig\_stat): Repaled along by unsigned long because we don't use the config stuff here.

2001-02-12 Werner Koch <wk@gnupg.org>

\* tests/t-verify.c (print\_sig\_stat): Print info about the keys.

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Version 2.1, February 1999

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library `Frob' (a library for tweaking knobs) written by James  
Random Hacker.

<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

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+<[A|F)F%

ZiRaW=OC,,meKW@J-\*<,L}:Bnm-kv

EYBmu tt[-%,R+n0j0U00U0U{upz\*D\

v0Ux0v09753http://www.pca.dfn.de/dfnpca/certify/ssl/dfnpca.crx09753http://www.pca.dfn.de/dfnpca/certify/ssl/dfn

pca.crl0 `HB0) `HBhttps://mystic.pca.dfn.de/0A `HB42http://www.pca.dfn.de/dfnpca/policy/wwwpolicy.html0 `HB

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,)h?c(MeM44=Qe/\_^^JyYN/61&jPFXifP&#;/KZ

1 xOK?ps

# \*- mode: org \*-

#+TITLE: What's New in the GPGME Python Bindings and Documentation

#+AUTHOR: Ben McGinnes

#+LATEX\_COMPILER: xelatex

```
#+LATEX_CLASS: article
#+LATEX_CLASS_OPTIONS: [12pt]
#+LATEX_HEADER: \usepackage{xltextra}
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
#+LATEX_HEADER: \author{Ben McGinnes <ben@gnupg.org>}
```

\* What's New

:PROPERTIES:

:CUSTOM\_ID: new-stuff

:END:

```
| Version:      | 0.0.1          |
| GPGME Version: | 1.13.0        |
| Author:       | Ben McGinnes <ben@gnupg.org> |
| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |
| Language:     | Australian English, British English |
| xml:lang:     | en-AU, en-GB, en |
```

Last time the most obviously new thing was adding the /What's New/ section to the HOWTO. Now it's moving it out of the HOWTO.

\*\* New in GPGME 1130

:PROPERTIES:

:CUSTOM\_ID: new-stuff-1-13-0

:END:

Additions since GPGME 1.12.0 include:

- Moving the /What's New/ section out of the basic [\[\[file:gnupgme-python-howto.org\]\]](http://file:gnupgme-python-howto.org) [HOWTO] document and into its own file so as to more readily include other documents beyond that HOWTO.
- Moving the preceding, archival, segments into [\[\[file:what-was-new.org\]\]](http://file:what-was-new.org) [another file].
- Added `=gpg.version.versionintlist=` to make it easier for Python developers to check for a specific version number, even with beta versions (it will drop the "-betaN" part).
- Added expanded detail on issues pertaining to installing for Windows users.
- Bindings enter [\[\[file:maintenance-mode\]\]](http://file:maintenance-mode) [maintenance mode] from January, 2019.
- Added documentation on maintenance mode and what changes can be made to the code when in that status. Essentially that boils down to bug fixes only and no feature requests.
- The `import-keys-hkp.py` example script, which uses the `=hkp4py=` module to search the SKS servers for a key, has been tightened up to search for both hexadecimal key IDs and user ID strings with reduced chance of unnecessary repetition. There may still be some

repetition if a key includes a user ID matching the hexadecimal value of a key ID.

```
1543830060
##Sketch 1 2
document()
layout('A4',1)
fp((0,0,0))
ft(1)
Fn('Helvetica-Bold')
Fs(18)
dstyle('Text')
fp((0,1,0.498))
ft(1)
lp((0,0,0))
lw(0.283465)
lc(1)
lj(0)
ld()
la1()
la2()
dstyle('Application Box')
layer('Layer 1',1,1,0,0,(0,0,0))
lw(1)
r(0,0,0,0,688.145,44.1554)
lw(1)
r(0,0,0,0,682.363,85.0359)
lp((0.392,0.584,0.929))
lw(4.25197)
b()
bs(605.383,329.758,0)
bs(605.383,230.546,0)
lw(1)
r(0,0,0,0,807.414,53.6148)
lp((0.392,0.584,0.929))
lw(4.25)
b()
bs(480.134,240.945,0)
bs(480.358,325.277,0)
lp((0.392,0.584,0.929))
lw(3.25)
ld((1, 1))
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(474.803,432.284,0)
bs(475.334,360.243,0)
lw(3.25)
ld((1, 1))
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
```

b()  
bs(354.331,432.284,0)  
bs(352.806,361.417,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(212.598,432.284,0)  
bs(212.598,361.417,0)  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5968,0,0,-56.6929,191.608,488.976,0.0603744,0.151107)  
lw(1)  
r(0,0,0,0,88.5492,390.805)  
lp((0.392,0.584,0.929))  
lw(4.25197)  
b()  
bs(226.772,524.409,0)  
bs(226.772,488.976,0)  
lp((0.392,0.584,0.929))  
lw(4.25)  
b()  
bs(403.937,528.718,0)  
bs(403.937,488.976,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(240.945,432.284,0)  
bs(240.574,394.994,0)  
bs(595.276,396.85,0)  
bs(595.276,361.417,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(333.071,432.284,0)  
bs(333.07,425.196,0)  
bs(333.07,382.677,0)  
bs(240.945,382.677,0)  
bs(240.945,361.417,0)  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.347,318.897,354.331,0.0670228,0.151107)

```

fp((0,0,0))
le()
lw(1)
Fn('Helvetica-Bold')
Fs(10)
txt('GPG',(1,0,0,0.905764,344.004,335.686))
G_()
G()
fp((0.999,1,0.4))
lw(0.283465)
r(70.5589,0,0,-28.3464,446.763,354.33,0.0670228,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('GpgConf',(0.552654,0,0,0.500564,481.802,340.184),1,1)
G_()
G()
fp((0.999,1,0.4))
lw(0.283465)
r(70.5589,0,0,-28.347,191.338,354.331,0.0670228,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('GpgSM',(0.552654,0,0,0.500574,226.376,340.185),1,1)
G_()
lp((0.392,0.584,0.929))
lw(4.25)
b()
bs(347.244,325.984,0)
bs(347.244,325.984,0)
bs(347.244,255.118,0)
bs(304.724,255.118,0)
bs(304.724,226.771,0)
lp((0.392,0.584,0.929))
lw(4.25)
b()
bs(233.858,325.984,0)
bs(233.858,255.118,0)
bs(276.378,255.118,0)
bs(276.378,226.771,0)
fp((0,0,0))
le()

```



lw(1)  
Fn('Palatino-Roman')  
txt('2008-07-17',(0.608301,0,0,0.608301,708.661,65.8308))  
lw(1)  
r(0,0,0,0,750.427,153.265)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))  
b()  
bs(219.685,325.984,0)  
bs(219.685,198.425,0)  
bs(219.685,162.992,0)  
G()  
fp((1,1,1))  
lw(0.283465)  
r(113.386,0,0,-42.5196,35.4333,162.992,0.0670228,0.151107)  
fp((0,0,0))  
lw(0.283465)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('LDAP Server',(0.552654,0,0,0.552654,92.1261,148.819),1,1)  
fp((0,0,0))  
lw(0.283465)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('(CRLs, Certificates)',(0.552654,0,0,0.552654,92.1261,134.646),1,1)  
G\_  
G()  
fp((1,1,1))  
lw(0.283465)  
r(113.386,0,0,-42.5196,35.4331,99.2125,0.0670228,0.151107)  
fp((0,0,0))  
lw(0.283465)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('HTTP Server',(0.552654,0,0,0.552654,92.1259,85.0394),1,1)  
fp((0,0,0))  
lw(0.283465)

Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('(CRLs)',(0.552654,0,0,0.552654,92.1259,70.8662),1,1)  
G\_()  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.866,0,0,-31.2962,191.338,158.855,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('DirMgr',(0.552654,0,0,0.552654,224.02,142.978),1,1)  
G\_()  
lw(2)  
ld((1, 1))  
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))  
b()  
bs(219.15,126.18,0)  
bs(219.685,77.9528,0)  
bs(155.906,77.9528,0)  
lp((0.392,0.584,0.929))  
lw(3)  
b()  
bs(233.858,127.559,0)  
bs(233.858,99.2125,0)  
bs(276.378,99.2125,0)  
bs(276.378,85.0393,0)  
lp((0.392,0.584,0.929))  
lw(3)  
b()  
bs(248.031,127.559,0)  
bs(248.031,113.386,0)  
bs(375.59,113.386,0)  
bs(375.59,85.0393,0)  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(99.2124,0,0,-28.3464,333.07,85.0393,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')

```

Fs(14)
style('Text')
Fn('Helvetica-Bold')
Fs(18)
txt('Certificate Cache',(0.552654,0,0,0.552654,382.606,69.8548),1,1)
fp((1,0.647,0.31))
lw(0.283465)
r(70.5589,0,0,-28.3464,248.031,85.0393,0.0670228,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('CRL Cache',(0.552654,0,0,0.552654,284.147,70.6936),1,1)
G_()
lw(1)
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(503.149,240.945,0)
bs(503.149,283.464,0)
bs(588.189,283.465,0)
bs(588.189,325.984,0)
lw(1)
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(503.149,283.464,0)
bs(503.149,283.464,0)
bs(361.417,283.464,0)
bs(361.417,325.984,0)
lw(1)
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(361.417,283.464,0)
bs(205.512,283.465,0)
bs(205.512,325.984,0)
lw(1)
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(574.015,85.0393,0)
bs(574.015,141.732,0)
bs(262.204,141.732,0)
lw(1)
la2([( (-4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0) ], 1))
b()
bs(602.361,85.0393,0)
bs(602.361,170.079,0)
bs(439.37,170.079,0)

```

bs(439.37,311.811,0)  
bs(460.629,311.811,0)  
bs(460.629,325.984,0)  
lw(1)  
ld((5, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(389.763,240.945,0)  
bs(389.763,269.291,0)  
bs(290.551,269.291,0)  
bs(290.551,340.157,0)  
bs(262.204,340.157,0)  
lw(1)  
ld((5, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(389.763,269.291,0)  
bs(559.843,269.291,0)  
bs(559.843,333.071,0)  
bs(574.016,333.071,0)  
lw(1)  
ld((5, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(488.976,85.0393,0)  
bs(488.976,127.559,0)  
bs(389.763,127.559,0)  
bs(389.763,212.598,0)  
lw(2)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(205.512,127.559,0)  
bs(205.512,113.386,0)  
bs(170.079,113.386,0)  
bs(170.079,141.732,0)  
bs(155.906,141.732,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))  
b()  
bs(622.961,356.76,0)  
bs(622.961,518.503,0)  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.3459,573.199,354.33,0.0670228,0.151107)

fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('GpgAgent',(0.552654,0,0,0.500554,608.238,340.185),1,1)  
G\_()  
lp((0.392,0.584,0.929))  
lw(4.25)  
b()  
bs(721.712,467.717,0)  
bs(721.712,297.838,0)  
G()  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-28.3464,686.278,297.637,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('SCdaemon',(0.552654,0,0,0.500564,721.316,283.492),1,1)  
G\_()  
fp((1,0.647,0.31))  
lw(0.283465)  
lj(1)  
r(86.162,0,0,-117.493,679.192,566.929,0.181818,0.333333)  
G()  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Smartcard',(0.552654,0,0,0.552654,698.127,491.036))  
fp((0.999,1,0.4))  
lw(0.283465)  
r(70.5589,0,0,-31.2962,686.279,557.593,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('Card Reader',(0.552654,0,0,0.552654,721.318,541.975),1,1)  
G\_()  
G()

```
fp((0.999,1,0.4))
lw(0.283465)
r(73.6353,0,0,-41.2944,587.066,565.703,0.0670228,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('PIN Entry',(0.57675,0,0,0.729211,623.632,545.097),1,1)
G_()
lp((0.392,0.584,0.929))
lw(3.25)
ld((1, 1))
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))
b()
bs(643.758,340.157,0)
bs(643.758,340.157,0)
bs(707.539,340.158,0)
bs(707.539,304.724,0)
lw(1)
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))
b()
bs(574.016,283.465,0)
bs(587.066,283.464,0)
bs(686.278,283.464,0)
G()
lp((0.392,0.584,0.929))
lw(4.25197)
b()
bs(98.9053,325.985,0)
bs(98.9053,240.945,0)
G()
fp((0.999,1,0.4))
lw(0.283465)
r(70.5589,0,0,-28.3464,63.7795,354.331,0.0670228,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
txt('WatchGnuPG',(0.552654,0,0,0.552654,98.8185,338.713),1,1)
G_()
G()
fp((1,0.647,0.31))
lw(0.283465)
r(70.5589,0,0,-28.1194,63.7795,240.718,0.0670228,0.168178)
```

fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('Log Socket',(0.552654,0,0,0.552654,98.8175,225.1),1,1)  
G\_()  
G\_()  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(85.0392,0,0,-28.3464,446.457,240.945,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Config Files',(0.552654,0,0,0.552654,485.621,226.772),1,1)  
G\_()  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(85.0392,0,0,-28.3464,545.669,85.0394,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Config Files',(0.552654,0,0,0.552654,584.834,70.8662),1,1)  
G\_()  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(84.6546,0,0,-27.3609,347.245,239.959,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')

Fs(18)  
txt('Help Files',(0.552654,0,0,0.552654,388.252,224.705),1,1)  
G\_  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(84.6546,0,0,-27.3609,446.457,85.0394,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Help Files',(0.552654,0,0,0.552654,487.464,69.7854),1,1)  
G\_  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(85.0392,0,0,-28.3464,248.032,240.945,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Keybox Files',(0.552654,0,0,0.552654,289.59,226.322),1,1)  
G\_  
G()  
fp((1,0.647,0.31))  
lw(0.283465)  
r(70.866,0,0,-28.3464,574.016,240.945,0.0670228,0.151107)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
Fn('Helvetica-Bold')  
Fs(18)  
txt('Private Keys',(0.552654,0,0,0.552654,609.449,226.772),1,1)  
G\_  
G()  
fp((0,0,0))  
le()



```
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
Fn('Helvetica-Bold')
Fs(24)
txt('Scute',(0.552654,0,0,0.599958,224.978,465.775),1,1)
fp((0,0,0))
le()
lw(1)
Fn('Times-Roman')
Fs(10)
txt('(pkcs#11)',(1,0,0,1.08559,206.081,445.011))
G_()
G()
fp((0.999,1,0.4))
lw(0.283465)
r(198.827,0,0,-56.6929,304.322,488.976,0.0603744,0.151107)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
Fs(14)
style('Text')
Fn('Helvetica-Bold')
Fs(36)
txt('GPGME Library',(0.552654,0,0,0.552654,404.952,457.853),1,1)
G_()
G()
lw(1)
style('Application Box')
r(197.598,0,0,-42.5187,304.724,566.928,0.0152672,0.0677968)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
txt('GPGME aware Application',(0.98062,0,0,0.937018,334.892,540.985))
G_()
G()
lw(1)
style('Application Box')
r(127.829,0,0,-41.7496,162.992,566.159,0.0152672,0.0677968)
fp((0,0,0))
le()
lw(1)
Fn('Helvetica')
txt('Legacy Application',(174.688,540.01))
G_()
```

G()  
G()  
lp((0.392,0.584,0.929))  
lw(4.25197)  
b()  
bs(749.296,162.296,0)  
bs(705.89,162.296,0)  
lw(3.25)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))  
b()  
bs(705.89,100.083,0)  
bs(744.472,100.083,0)  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))  
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)], 1))  
b()  
bs(705.89,131.189,0)  
bs(744.472,131.189,0)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('execute/access',(0.31891,0,0,0.280771,726.951,87.3768),1,1)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('closely linked',(0.31891,0,0,0.280771,724.715,149.589),1,1)  
fp((0,0,0))  
le()  
lw(1)  
Fn('Helvetica')  
Fs(14)  
style('Text')  
txt('Assuan protocol',(0.31891,0,0,0.280771,728.535,118.483),1,1)  
G\_  
lw(1)  
r(56.6929,0,0,-92.126,701.575,170.079)  
G\_  
lp((0.392,0.584,0.929))  
lw(3.25)  
ld((1, 1))

```
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))
b()
bs(248.031,325.984,0)
bs(248.031,297.638,0)
bs(538.583,297.638,0)
bs(538.583,340.157,0)
bs(566.929,340.157,0)
lp((0.392,0.584,0.929))
lw(3.25)
ld((1, 1))
la2((( -4.0, 3.0), (2.0, 0.0), (-4.0, -3.0), (-4.0, 3.0)), 1))
b()
bs(375.591,325.984,0)
bs(375.591,304.724,0)
bs(531.496,304.724,0)
bs(531.496,347.244,0)
bs(566.929,347.244,0)
guidelayer('Guide Lines',1,0,0,1,(0,0,1))
grid((0,0,7.08661,7.08661),1,(0,0,1),'Grid')
2011-12-02 Werner Koch <wk@g10code.com>
```

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-10-25 Marcus Brinkmann <marcus@g10code.com>

- \* Makefile.am: Remove build rules for libgpgme-pth.
- \* gpgme.m4: Remove support for libgpgme-pth.

2011-05-26 Marcus Brinkmann <marcus@g10code.com>

- \* decrypt.c (gpgme\_op\_decrypt\_start, gpgme\_op\_decrypt): Check CTX.
- \* decrypt-verify.c (gpgme\_op\_decrypt\_verify\_start (gpgme\_op\_decrypt\_verify): Likewise.
- \* delete.c (gpgme\_op\_delete\_start, gpgme\_op\_delete): Likewise.
- \* edit.c (gpgme\_op\_edit\_start, gpgme\_op\_edit (gpgme\_op\_card\_edit\_start, gpgme\_op\_card\_edit): Likewise.
- \* encrypt.c (gpgme\_op\_encrypt\_start, gpgme\_op\_encrypt): Likewise.
- \* encrypt-sign.c (gpgme\_op\_encrypt\_sign\_start (gpgme\_op\_encrypt\_sign): Likewise.
- \* export.c (gpgme\_op\_export\_start, gpgme\_op\_export (gpgme\_op\_export\_ext\_start, gpgme\_op\_export\_ext (gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): Likewise.
- \* genkey.c (gpgme\_op\_genkey\_start, gpgme\_op\_genkey): Likewise.
- \* getauditlog.c (gpgme\_op\_getauditlog\_start (gpgme\_op\_getauditlog): Likewise.

\* gpgconf.c (gpgme\_op\_conf\_load, gpgme\_op\_conf\_save): Likewise.  
\* import.c (gpgme\_op\_import\_start, gpgme\_op\_import\_keys\_start)  
(gpgme\_op\_import\_keys, gpgme\_op\_import): Likewise.  
\* keylist.c (gpgme\_op\_keylist\_start, gpgme\_op\_keylist\_ext\_start):  
Likewise.  
\* opassuan.c (gpgme\_op\_assuan\_transact\_start)  
(gpgme\_op\_assuan\_transact\_ext): Likewise.  
\* passwd.c (gpgme\_op\_passwd\_start, gpgme\_op\_passwd): Likewise.  
\* sign.c (gpgme\_op\_sign\_start, gpgme\_op\_sign): Likewise.  
\* trustlist.c (gpgme\_op\_trustlist\_start)  
(gpgme\_op\_trustlist\_next): Likewise.  
\* verify.c (gpgme\_op\_verify\_start, gpgme\_get\_sig\_key): Likewise.  
\* op-support.c (\_gpgme\_op\_data\_lookup): Likewise.  
\* vfs-create.c (gpgme\_op\_vfs\_transact, gpgme\_op\_vfs\_create): Likewise.  
\* vfs-mount.c (gpgme\_op\_vfs\_mount, gpgme\_op\_vfs\_transact): Likewise.  
\* gpgme.c (gpgme\_set\_protocol)  
(gpgme\_set\_sub\_protocol)  
(gpgme\_set\_armor, gpgme\_set\_include\_certs)  
(gpgme\_set\_keylist\_mode, gpgme\_set\_passphrase\_cb)  
(gpgme\_set\_progress\_cb, gpgme\_set\_io\_cbs, gpgme\_set\_locale)  
(gpgme\_ctx\_set\_engine\_info, gpgme\_sig\_notation\_clear): Likewise.  
\* gpgme.c (gpgme\_new): Check for valid R\_CTX.  
(gpgme\_cancel, gpgme\_cancel\_async, gpgme\_release): Likewise.

2011-04-06 Werner Koch <wk@g10code.com>

\* gpgme-config.in: Add option --host. Change options --cflags and  
--libs to collapse duplicate include and lib dirs. Try to put  
extra libs at the end.

\* gpgme.h.in: Use INSERT\_\_TYPEDEFS\_FOR\_GPGME\_H to include platform  
specific typedefs.

2011-02-03 Werner Koch <wk@g10code.com>

\* extra-stati.h: New.  
\* mkstatus: Extend to also process extra-stati.h  
\* Makefile.am (main\_sources): Add extra-stati.h  
(status-table.h): Depend on extra-stati.h and adjust rule.

2011-02-03 Marcus Brinkmann <marcus@g10code.com>

\* w32-io.c (\_gpgme\_io\_socket): Return fd, not res.

2011-02-02 Marcus Brinkmann <mb@g10code.com>

\* assuan-support.c (my\_socket, my\_connect): New functions.  
(\_gpgme\_assuan\_system\_hooks): Add my\_Socket, my\_connect.

\* priv-io.h (\_gpgme\_io\_socket): New prototype.  
\* w32-io.c (pid\_to\_handle, handle\_to\_oid, fd\_to\_handle): Remove macros.  
(is\_socket): Remove function.  
(\_gpgme\_io\_spawn) [HAVE\_W32CE\_SYSTEM]: Remove some dead code.  
(\_gpgme\_io\_spawn): Translate handles before DuplicateHandle them.

2011-02-02 Marcus Brinkmann <mb@g10code.com>

\* w32-util.c (mkstemp): Don't use CreateFile instead of open (the function is not used on Windows CE, and the callers were not adjusted).

2011-01-21 Marcus Brinkmann <mb@g10code.com>

\* engine-gpgconf.c (\_gpgme\_conf\_opt\_change): Fix the case that is not self-assignment.

2010-12-08 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (strcpy\_escaped\_plus): New.  
(DIM, xtoi\_1, xtoi\_2): New.  
(cmd\_keylist): Allow for multiple patterns.

2010-11-23 Marcus Brinkmann <mb@g10code.com>

\* w32-io.c (create\_reader, create\_writer): Use small stack size on Windows CE.

2010-11-23 Marcus Brinkmann <mb@g10code.com>

\* gpgme.h.in (gpgme\_conf\_arg\_new): Make VALUE arg const void \*.  
\* gpgconf.c (\_gpgme\_conf\_arg\_new): Likewise.  
(gpgme\_conf\_arg\_new): Likewise.  
\* engine-gpgconf.c (\_gpgme\_conf\_arg\_new): Likewise.  
(gpgconf\_write): Remove debug hack.

2010-11-19 Marcus Brinkmann <mb@g10code.com>

\* engine-gpgconf.c (\_gpgme\_conf\_opt\_change): Support self-assignment. Requested by Marc Mutz.

2010-11-17 Marcus Brinkmann <mb@g10code.com>

\* vasprintf.c (int\_vasprintf) [HAVE\_W32CE\_SYSTEM]: Just use a fixed size buffer, as va\_copy is not easy to fake.

2010-11-15 Marcus Brinkmann <mb@g10code.com>

- \* w32-ce.h (strcasecmp, strdup) [\_MSC\_VER]: Define.
- \* genkey.c, passphrase.c: Include util.h.
  
- \* w32-util.c (\_gpgme\_w32ce\_get\_debug\_envvar): Fix return value.

2010-11-15 Werner Koch <wk@g10code.com>

- \* data-compat.c (gpgme\_data\_new\_from\_filepart)  
(gpgme\_data\_new\_from\_file) [W32CE && \_MSC\_VER]: Return not  
GPG\_ERR\_NOT\_IMPLEMENTED.
  
- \* w32-ce.h (HKEY\_PERFORMANCE\_DATA, HKEY\_CURRENT\_CONFIG, \_IOLBF)  
(abort) [\_MSC\_VER]: Provide these macros.
  
- \* ath.h [W32CE && \_MSC\_VER]: Include winsock2.h.
  
- \* ath.c (ath\_read, ath\_write) [W32CE && \_MSC\_VER]: Do not call  
non-available functions.

2010-11-04 Werner Koch <wk@g10code.com>

- \* w32-ce.h [\_MSC\_VER && W32CE]: Undef leave.
- \* export.c: Include util.h so that we get the above undef.
  
- \* memrchr.c: Remove. Used to be a replacement function required  
by the formerly included assuan code.

2010-11-03 Werner Koch <wk@g10code.com>

- \* debug.c (\_gpgme\_debug) [W32CE]: Replace localtime by GetLocalTime.
  
- \* signers.c (gpgme\_signers\_clear): Remove useless return.  
Reported by Patrick Spendrin.
  
- \* w32-util.c: s/\_\_\_inline\_\_\_/GPG\_ERR\_INLINE/
  
- \* setenv.c: Include string.h due to our strerror replacement.
  
- \* w32-ce.h (access, bsearch): New macros.
- \* w32-ce.c (\_gpgme\_wince\_access): New.  
(RegQueryValueExA): Change DATA to a void\*.  
(\_gpgme\_wince\_bsearch): New. Taken from glibc 2.6.

Guard include of sys/stat.h and sys/types.h.

2010-11-02 Werner Koch <wk@g10code.com>

- \* data-fd.c (read, write, lseek) [W32CE && !\_\_MINGW32CE\_\_]: New.

Taken from Pedro Alves Public Domain code.

- \* w32-ce.h (SHGetSpecialFolderPath): Remove our defines and prototypes. We use the system provided prototypes now.
- \* w32-ce.c: Include shlobj.h
- (\_WIN32\_IE): Define to 0x0400
- (CreateFileA): New.
- \* w32-util.c: Explicitly include windows headers before util.h.
- (\_gpgme\_w32ce\_get\_debug\_envvar): Do not use wchar\_t strings for read\_w32\_registry\_string.
- (mkstemp): Use CreateFile instead of open.
  
- \* w32-io.c (handle\_to\_fd, fd\_tohandle): Add. We need them for W32.
- \* w32-util.c (\_WIN32\_IE): Define to 0x0400.
  
- \* util.h [W32]: Include windows.h.
- \* w32-sema.c: Do not include windows.h directly.
- \* ath.c (ssize\_t, pid\_t)[\_MSC\_VER]: Add new types.
- \* gpgme.c (gpgme\_result\_ref, gpgme\_result\_unref): Do not use a void pointer in pointer arithmetic.
- \* w32-util.c: Include util.h prior to ath.h. Don't include windows.h directly.
- (F\_OK): Define if not defined.
- \* w32-ce.c: Include string.h.
- (RegQueryValueExA): Use WINAPI modifier to match the declaration.
- \* vfs-create.c: Include string.h because under W32CE with MSC we get a warning related to our strerror replacement.
- \* encrypt-sign.c: Include stdlib.h, string.h and errno.h.
- \* priv-io.h [W32CE]: Include w32-ce.h
- \* w32-ce.h: Include winsock2.h and ws2tcpip.h.
- (\_MSV\_VER): Remove useless macro.
- (pid\_t): Add typedef.

Guard all includes of unistd.h and sys/time.h.

2010-10-28 Marcus Brinkmann <marcus@g10code.com>

- \* opassuan.c (gpgme\_op\_assuan\_transact\_ext): Fix uninitialized value use. Reported by Marc Mutz.

2010-10-07 Werner Koch <wk@g10code.com>

- \* gpgme-tool.c (ARGP\_ERR\_UNKNOWN): Use EDEADLK if available.
- \* w32-util.c (\_gpgme\_w32ce\_get\_debug\_envvar) [W32CE]: New.
- \* debug.c (debug\_init) [W32CE]: Use new function.

2010-09-16 Werner Koch <wk@g10code.com>

\* import.c: Include "util.h".

(parse\_import): Return GPG\_ERR\_MISSING\_ISSUER\_CERT.

\* util.h: Add fallback define for GPG\_ERR\_MISSING\_ISSUER\_CERT.

\* op-support.c: Include "util.h".

(\_gpgme\_parse\_inv\_recv): Handle new code 12.

2010-09-02 Marcus Brinkmann <marcus@g10code.de>

\* error.c (gpgme\_err\_code\_to\_errno): Fix cut and paste bug (thanks to Marc Mutz).

2010-09-01 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c: Revert change from 2009-06-18, as it created a race condition.

2010-08-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.def: Add gpgme\_err\_code\_from\_syserror and gpgme\_err\_set\_errno.

\* libgpgme.vers: Likewise.

\* gpgme.h.in (gpgme\_error\_from\_errno): Fix return type to gpgme\_error\_t.

(gpgme\_err\_code\_from\_syserror, gpgme\_err\_set\_errno): New prototype.

(gpgme\_error\_from\_syserror): New inline function (why are gpgme\_err\_make\_from\_errno and gpgme\_error\_from\_errno not inline functions?).

\* error.c (gpgme\_error\_from\_errno): Fix return type to gpgme\_error\_t.

(gpgme\_err\_set\_errno, gpgme\_err\_code\_from\_syserror): New functions.

2010-08-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (result\_encrypt\_to\_xml, result\_sign\_to\_xml)

(result\_verify\_to\_xml, result\_import\_to\_xml)

(result\_genkey\_to\_xml): Check vigorously for null pointers.

\* w32-io.c (GPGCEDEV\_IOCTL\_ASSIGN\_RVID): New macro.

(\_gpgme\_io\_spawn): Use ASSIGN\_RVID.

2010-06-11 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (\_gpgme\_io\_spawn): Remove debug printf.

2010-06-10 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (gpgme\_server): Use special hack for Windows CE to get at stdin and stdout.



\* engine-gpgsm.c (gpgsm\_new): Translate returned achild\_fds back to child\_fds.

\* debug.h (TRACE\_SUC6): New macro.

\* w32-io.c (MAX\_SLAFD): New macro.

(fd\_table): New static variable.

(new\_fd, release\_fd): New functions.

(fd\_to\_handle, handle\_to\_fd, handle\_to\_socket): Remove macros.

(MAX\_READERS, MAX\_WRITERS): Increase to 64.

(notify\_table): Increase to MAX\_SLAFD.

(struct reader\_context\_s, struct writer\_context\_s): Add member file\_sock.

(reader, writer): Use file\_hd vs file\_sock to decide if socket operations to use. Remove auto-detect mode.

(create\_reader, create\_writer): Set file\_sock. Unblock pending thread only if this is a pipe fd.

(\_gpgme\_io\_pipe): Allocate fds from table and return slot indices instead of windows handles. This allows to properly handle RVIDs.

(\_gpgme\_io\_close): Handle dup'ed file descriptors.

(build\_commandline) [HAVE\_W32\_SYSTEM]: Use RVID from fd table now.

(\_gpgme\_io\_spawn): Use fd table now.

(\_gpgme\_io\_fd2str): Use RVID from fd table now.

(\_gpgme\_io\_dup): Implement using fd table.

(\_gpgme\_io\_socket): Allocate fds from table.

(\_gpgme\_io\_connect): Use fd from table.

\* w32-glib-io.c (find\_channel): Check that the slot is used.

2010-06-09 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c [HAVE\_W32CE\_SYSTEM]: Include assuan.h and winioctl.h.

(GPGCEDEV\_IOCTL\_UNBLOCK) [HAVE\_W32CE\_SYSTEM]: Define.

(set\_synchronize) [HAVE\_W32CE\_SYSTEM]: Stub it out.

(is\_socket): Allow to return -1 for auto-detect (old behaviour).

(is\_socket) [HAVE\_W32CE\_SYSTEM]: Return -1.

(reader): Handle auto-detect case. Handle ctx->stop\_me before checking for EOF.

(destroy\_reader) [HAVE\_W32CE\_SYSTEM]: Unblock a pending reader.

(writer): Handle auto-detect case. Handle ctx->stop\_me with ERROR\_BUSY.

(destroy\_writer) [HAVE\_W32CE\_SYSTEM]: Unblock a pending writer.

(\_gpgme\_io\_pipe) [HAVE\_W32CE\_SYSTEM]: Implement in terms of a half-pipe.

(build\_commandline) [HAVE\_W32CE\_SYSTEM]: New function.

(\_gpgme\_io\_spawn) [HAVE\_W32CE\_SYSTEM]: Implement it differently for this platform.

(\_gpgme\_io\_fd2str) [HAVE\_W32CE\_SYSTEM]: Implement it for RVIDs.

(\_gpgme\_io\_dup) [HAVE\_W32CE\_SYSTEM]: Stub it out.

\* gpgme-tool.c (result\_add\_timestamp): Add missing NULL argument.

(result\_sign\_to\_xml): Protect against NULL fingerprint.

(struct server): New members input\_fd, input\_filename,  
input\_stream output\_fd, output\_filename, output\_stream,  
message\_filename, message\_stream.

(server\_reset\_fds): Deallocate those.

(server\_parse\_fd): New function.

(server\_data\_obj): Take optional filename argument and direction  
argument. Also take new argument to return a filestream that  
needs to be closed after destroying the data object.

Change all callers, too.

(input\_notify, output\_notify): Removed.

(cmd\_input, cmd\_output): New functions.

(gpgme\_server): Do not register input and output notifier.

(register\_commands): Use cmd\_input and cmd\_output.

(cmd\_message): Rewritten to use server\_parse\_fd.

(cmd\_delete, cmd\_keylist): Fix inverted option check.

(main) [HAVE\_W32CE\_SYSTEM]: Sleep a bit to work around bug in ssh.

\* genkey.c (gpgme\_op\_genkey): Return err with TRACE\_ERR.

2010-05-12 Marcus Brinkmann <marcus@g10code.de>

\* conversion.c (\_gpgme\_timegm) [HAVE\_W32\_SYSTEM]: New static  
function.

(\_gpgme\_parse\_timestamp) [HAVE\_W32\_SYSTEM]: Use it.

\* gpgme-tool.c (main): Protect call to setlocale with  
HAVE\_SETLOCALE.

\* Makefile.am (system\_components): Remove custom cppflags from  
RCCOMPILER (because gpg-error adds -idirafter that makes RC bail.  
[HAVE\_W32CE\_SYSTEM]: Add w32-ce.h and w32-ce.c, clear  
libexec\_PROGRAMS.

\* w32-ce.h, w32-ce.c: New files.

\* priv-io.h: Include <sys/types.h>

\* util.h: Likewise.

2010-05-11 Marcus Brinkmann <marcus@g10code.de>

\* w32-util.c: Include ath.h

(HAVE\_ALLOW\_SET\_FOREGROUND\_WINDOW) [!HAVE\_W32CE\_SYSTEM]: Define  
it.

(RTLD\_LAZY, dlopen, dlsym,

dlclose) [!HAVE\_ALLOW\_SET\_FORGROUND\_WINDOW]: Don't define anymore.

(\_gpgme\_allow\_set\_foreground\_window) [!HAVE\_ALLOW\_SET\_FOREGROUND\_WINDOW]:

Make it a stub.

(read\_w32\_registry\_string): Use FooA variants of Windows functions instead of Foo (which dispatches depending on UNICODE).

[!HAVE\_W32CE\_SYSTEM]: Don't check environment.

(w32\_shgetfolderpath): Remove.

(find\_program\_at\_standard\_place): Call SHGetSpecialFolderPath (which is available on all Windows systems and also Windows CE).

(mkstemp): Use ath\_self instead of getpid.

(\_gpgme\_mkstemp): Use GetTempPathA instead of GetTempPath.

\* gpgme.h.in: Use \_WIN32 instead of \_MSC\_VER. Include time.h for time\_t.

2010-05-07 Marcus Brinkmann <marcus@g10code.de>

\* engine-g13.c, gpgme.c, engine-gpgsm.c, engine-gpg.c, op-support.c, engine-assuan.c, gpgme-tool.c: Include <locale.h> only if available with HAVE\_LOCALE\_H and conditionalize use of LC\_CTYPE on its definition.

\* engine-gpgconf.c: Do not include <locale.h>.

\* engine-gpgsm.c (gpgsm\_new, start): Cast between int and assuan\_fd\_t.

\* assuan-support.c (my\_pipe, my\_close, my\_read, my\_write): Likewise.

\* gpgme-tool.c (server\_data\_obj, server\_reset\_fds, gpgme\_server), (my\_recvmsg, my\_sendmsg, my\_spawn): Likewise.

\* engine-assuan.c (start): Likewise.

\* engine-g13.c (start): Likewise.

2010-05-06 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c, w32-io.c, w32-qt-io.cpp, w32-sema.c, w32-util.c: Do not include <signal.h>.

\* sign.c, data-user.c, conversion.c, debug.c, verify.c, data.c, decrypt.c, delete.c, assuan-support.c, import.c, engine-gpgsm.c, data-mem.c, op-support.c, w32-io.c, w32-util.c, data-compat.c: Use gpg\_error\_from\_syserror instead gpg\_error\_from\_errno, and use gpg\_err\_set\_errno to set error number.

\* setenv.c: Include <gpg-error.h> and define \_\_set\_errno to use gpg\_err\_set\_errno.

\* gpgme-tool.c (ARGP\_ERR\_UNKNOWN): Define to EDEADLOCK (which is mapped in Windows CE) instead of E2BIG (which is not).

(gt\_import\_keys): Initialize err.

2010-04-19 Marcus Brinkmann <marcus@g10code.de>

\* assuan-support.c (my\_spawn): Cast to avoid warning.  
\* engine-g13.c (g13\_new): Make ARGV array of pointer to const char.  
(g13\_assuan\_simple\_command) [!USE\_DESCRIPTOR\_FUNCTION]: Don't define.  
\* ops.h (\_gpgme\_key\_append\_name): Same in prototype.  
\* key.c (\_gpgme\_key\_append\_name): Make SRC argument pointer to const char.  
\* posix-util.c (\_gpgme\_get\_uiserver\_socket\_path): Make HOMEDIR const.  
\* vfs-mount.c (gpgme\_op\_vfs\_transact\_start): Never define this potentially useful but currently unused function.  
\* vfs-create.c (gpgme\_op\_vfs\_transact\_start): Likewise.

2010-04-16 Werner Koch <wk@g10code.com>

\* w32-io.c (is\_socket): New.  
(reader, writer): Use it to figure out the API to use.

2010-03-15 Werner Koch <wk@g10code.com>

\* gpgme.h.in: Add autoconf template to set generated file to read-only in an emacs buffer.

2010-03-12 Werner Koch <wk@g10code.com>

\* gpgme.h.in (GPGME\_STATUS\_SUCCESS): Use the right file for the change; see below.

\* passwd.c (op\_data\_t): New.  
(passwd\_start): Setup OPD.  
(passwd\_status\_handler): Return GPG\_ERR\_NOT\_SUPPORTED if needed.  
\* context.h (OPDATA\_PASSWD): New.  
\* gpgme.h (GPGME\_STATUS\_SUCCESS): New.

2010-03-09 Werner Koch <wk@g10code.com>

\* engine-gpgsm.c (gpgsm\_keylist): Try to start the agent.

2010-02-17 Werner Koch <wk@g10code.com>

\* posix-io.c (notify\_table): Change implementation.  
(notify\_table\_item\_t, notify\_table\_size, notify\_table\_lock): New.  
(\_gpgme\_io\_close, \_gpgme\_io\_set\_close\_notify): Adjust for new implementation.

2010-02-16 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (spacep, has\_option, skip\_options): New.  
(cmd\_export): Implement option --minimal.

\* gpgme.h.in (GPGME\_EXPORT\_MODE\_MINIMAL): New.  
\* export.c (export\_start, export\_ext\_start): Implement it.  
\* engine-gpg.c (export\_common): Ditto.

2010-01-25 Werner Koch <wk@g10code.com>

\* w32-io.c (\_gpgme\_io\_connect): Fix return code check to make it work.  
  
\* version.c (do\_subsystem\_inits): Remove superfluous second  
WSAStartup.

2010-01-22 Werner Koch <wk@g10code.com>

\* w32-io.c (writer): Try to use send first.  
(reader): Try to use recv first.

2010-01-08 Werner Koch <wk@g10code.com>

\* engine-gpg.c (gpg\_passwd): New.  
(\_gpgme\_engine\_ops\_gpg): Register.  
\* passwd.c (parse\_error): New.  
(passwd\_status\_handler): Use it.

2010-01-07 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (result\_xml\_write\_cb\_t, struct result\_xml\_state):  
New types.  
(MAX\_TAGS): New macro.  
(result\_init, result\_xml\_indent, result\_xml\_tag\_start)  
(result\_xml\_tag\_data, result\_xml\_tag\_end, result\_add\_error)  
(result\_add\_pubkey\_algo, result\_add\_hash\_algo, result\_add\_keyid)  
(result\_add\_fpr, result\_add\_timestamp, result\_add\_sig\_mode)  
(result\_add\_value, result\_add\_string, result\_encrypt\_to\_xml)  
(result\_decrypt\_to\_xml, result\_sign\_to\_xml)  
(result\_verify\_to\_xml, result\_import\_to\_xml)  
(result\_genkey\_to\_xml, result\_keylist\_to\_xml)  
(result\_vfs\_mount\_to\_xml): New functions.  
(gt\_result): Rewritten.

2010-01-05 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (gt\_passwd, cmd\_passwd): New.  
(register\_commands): Register.  
  
\* gpgme.h.in (gpgme\_op\_passwd\_start, gpgme\_op\_passwd): New.

\* libpgpme.vers, gpgme.def: Add new functions.  
\* passwd.c: New.  
\* Makefile.am (main\_sources): Add passwd.c  
\* engine.c, engine.h (\_gpgme\_engine\_op\_passwd): New.  
\* engine-backend.h (struct engine\_ops): Add PASSWD.  
\* engine-gpgsm.c (gpgsm\_passwd): New.  
(\_gpgme\_engine\_ops\_gpgsm): Register.  
(gpgsm\_reset): Reset only if we have a connection.  
  
\* gpgme.h.in (GPGME\_PK\_ECDSA, GPGME\_PK\_ECDH): New.  
\* gpgme.c (gpgme\_pubkey\_algo\_name): Add them.

2009-12-22 Marcus Brinkmann <marcus@g10code.de>

\* debug.c: Test for TLS, not \_\_GNU\_\_

2009-12-15 Marcus Brinkmann <marcus@g10code.de>

\* assuan-support.c (my\_spawn): Calloc, not malloc, the fd\_items.

2009-12-10 Werner Koch <wk@g10code.com>

\* debug.c (debug\_init): Test on sgid process.

2009-12-08 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (LTRCCOMPILE): Refactor with ...  
(RCCOMPILE): ... this new macro.  
(SUFFIXES): Add .lo.  
(gpgme\_res\_ldflag): Removed.  
(gpgme\_res): Use libtool object file name here.  
(libpgpme\_la\_LDFLAGS): Remove gpgme\_res\_ldflag usage.  
(libpgpme\_la\_LIBADD): Add gpgme\_res.

\* ath.c (ath\_self) [HAVE\_W32\_SYSTEM]: Fix typo.

2009-12-02 Werner Koch <wk@g10code.com>

\* gpgconf.c (gpgme\_conf\_arg\_release): No return in a function  
returning void. Reported by Wyllys Ingersoll.

2009-12-01 Werner Koch <wk@g10code.com>

\* gpgme-tool.c (cmd\_getauditlog): Add flag --html.  
(hlp\_getauditlog): New.

\* gpgme-tool.c (GT\_GCC\_A\_SENTINEL, GT\_GCC\_A\_PRINTF): New.  
(gt\_write\_status): Use sentinel.

(argp\_error, log\_error): Use printf attribute.  
(argp\_parse): Remove extra argument to argp\_error.  
(\_gt\_progress\_cb, gt\_get\_engine\_info, gt\_get\_keylist\_mode)  
(gt\_result): Add NULL arg.

2009-11-26 Marcus Brinkmann <marcus@g10code.de>

\* opassuan.c (opassuan\_start): Allocate result structure before beginning operation.

2009-11-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (gpgme\_server): Use assuan\_fd\_t and assuan\_fdopen on fds.

2009-11-13 <wk@g10code.com>

\* sign.c (\_gpgme\_sign\_status\_handler): Handle SIG\_CREATED\_SEEN.  
\* engine-uiserver.c (uiserver\_sign): Make sending SENDER optional.

2009-11-10 Marcus Brinkmann <marcus@g10code.de>

\* op-support.c (\_gpgme\_op\_reset): Instead of last change, only set sub protocol if it is not the default.

2009-11-10 Werner Koch <wk@g10code.com>

\* op-support.c (\_gpgme\_op\_reset): Ignore GPG\_ERR\_NOT\_IMPLEMENTED while setting the sub protocol.

\* engine-uiserver.c (uiserver\_new): Pass fdpassing flag to assuan\_socket\_connect.

(set\_recipients): Replace fingerprint by user id.

\* engine-gpgsm.c (set\_recipients): Fix non-terminating loop in case of a missing key.

2009-11-10 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_new): Set default sub protocol.

\* gpgme-tool.c: Implement get sub protocol.

\* gpgme.h.in (gpgme\_get\_sub\_protocol): Add prototype.

\* gpgme.def, libgpgme.vers: Add gpgme\_get\_sub\_protocol.

\* context.h (struct gpgme\_context): New member sub\_protocol.

\* gpgme.c (gpgme\_set\_sub\_protocol): Set CTX->sub\_protocol.

(gpgme\_get\_sub\_protocol): New function.

\* op-support.c (\_gpgme\_op\_reset): Set sub protocol.

\* Makefile.am (uiserver\_components): New variable.  
(main\_sources): Add it.  
\* ops.h, key.c (\_gpgme\_key\_append\_name): Take CONVERT argument, implement it. Adjust callers.  
(gpgme\_key\_from\_uid): New function.  
\* gpgme.h.in (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_DEFAULT.  
(gpgme\_encrypt\_flags\_t): Add GPGME\_ENCRYPT\_PREPARE, GPGME\_ENCRYPT\_EXPECT\_SIGN.  
(gpgme\_set\_sub\_protocol, gpgme\_key\_from\_uid): New functions.  
\* libgpgme.vers, gpgme.def: Add new functions.  
\* gpgme.c (gpgme\_set\_protocol): Add UIServer protocol.  
(gpgme\_set\_sub\_protocol): New function.  
(gpgme\_get\_protocol\_name): Add UIServer and default protocol.  
\* assuan-support.c: Return correct error values, implement socketpair for POSIX.  
\* priv-io.h, posix-io.c, w32-io.c, w32-glib-io.c, w32-qt-io.cpp (\_gpgme\_io\_spawn): Add ATFORK and ATFORKVALUE arguments. Implement it for POSIX. Adjust all callers.  
\* engine.h, engine-backend.h (\_gpgme\_engine\_set\_protocol) (\_gpgme\_engine\_op\_decrypt\_verify): New prototypes. Adjust all users.  
\* engine.c (engine\_ops, gpgme\_get\_engine\_info): Add UIServer engine.  
(\_gpgme\_engine\_set\_protocol, \_gpgme\_engine\_op\_decrypt\_verify): New function.  
\* decrypt-verify.c (decrypt\_verify\_start): Call \_gpgme\_engine\_op\_decrypt\_verify.  
\* util.h, posix-util.c, w32-util.c (\_gpgme\_get\_uiserver\_socket\_path): New function.  
\* engine-gpgsm.c (gpgsm\_set\_fd): Fix \_gpgme\_io\_pipe invocation.  
\* gpgme-tool.c: Some support for UIServer protocol.  
\* engine-uiserver.c: New file.

2009-11-09 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Close server side FDs.

2009-11-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-tool.c (struct gpgme\_tool): New members write\_data and write\_data\_hook.  
(gt\_write\_data): New function.  
(gt\_result): Output vfs\_mount result.  
(server\_write\_data): New function.  
(gpgme\_server): Initialize write\_data members.

2009-11-05 Marcus Brinkmann <marcus@g10code.de>



- \* engine-g13.c (struct engine\_g13): Remove members RESULT\_CB and RESULT\_CB\_VALUE.
- (g13\_assuan\_simple\_command, status\_handler): Don't use those anymore.
- (g13\_transact): Remove them from argument list, too.
- \* vfs-mount.c (\_gpgme\_vfs\_mount\_status\_handler): New function.
- (\_gpgme\_op\_vfs\_mount): Pass it to transact.
  
- \* engine-assuan.c (lass\_new): Update use of assuan\_socket\_connect.
- \* engine-gpgsm.c (gpgsm\_new): Update use of assuan\_pipe\_connect.
- \* engine-g13.c (g13\_new): Likewise.
  
- \* priv-io.h (IOSPAWN\_FLAG\_NOCLOSE): New flag.
- \* w32-io.c (\_gpgme\_io\_spawn): Implement this flag.
- \* posix-io.c (\_gpgme\_io\_spawn): Likewise.
- \* w32-glib-io.c (\_gpgme\_io\_spawn): Likewise.
- \* assuan-support.c (my\_spawn): Set this flag.
  
- \* decrypt.c (gpgme\_op\_decrypt\_start): Fix use of debug macro.
- \* decrypt-verify.c (gpgme\_op\_decrypt\_verify\_start): Likewise.
- \* delete.c (gpgme\_op\_delete\_start): Likewise.
- \* edit.c (gpgme\_op\_edit\_start, gpgme\_op\_card\_edit\_start):  
Likewise.
- \* encrypt.c (gpgme\_op\_encrypt\_start): Likewise.
- \* encrypt-sign.c (gpgme\_op\_encrypt\_sign\_start): Likewise.
- \* export.c (gpgme\_op\_export\_start, gpgme\_op\_export\_ext\_start)  
(gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): Likewise.
- \* genkey.c (gpgme\_op\_genkey\_start): Likewise.
- \* getauditlog.c (gpgme\_op\_getauditlog\_start): Likewise.
- \* import.c (gpgme\_op\_import\_start, gpgme\_op\_import\_keys\_start):  
Likewise.
- \* opassuan.c (gpgme\_op\_assuan\_transact\_start): Likewise.
- \* sign.c (gpgme\_op\_sign\_start): Likewise.
- \* verify.c (gpgme\_op\_verify\_start): Likewise.
- \* vfs-create.c (gpgme\_op\_vfs\_create): Likewise.
- \* vfs-mount.c (gpgme\_op\_vfs\_mount): Likewise.

2009-11-04 Marcus Brinkmann <marcus@g10code.de>

- \* ath.h (ath\_self): New prototype. Include <stdint.h>
- \* ath.c, ath-pth.c, ath-pthread.c (ath\_self): New function.
- \* debug.h: Rewrite most macros to beautify debug output.
- (\_gpgme\_debug\_buffer): Remove tagname and tag argument.
- (\_gpgme\_debug\_frame\_begin, \_gpgme\_debug\_frame\_end): New prototypes.
- \* debug.c: Include <time.h>. Don't include assuan.h.
- (frame\_nr, FRAME\_NR): New thread-specific variable and macro.
- (debug\_init): Do not initialize assuan. Call \_gpgme\_debug after  
initialization instead using printf directly.

(`_gpgme_debug`): Do not call `debug_init` (we now ensure proper initialization by user). Add timestamp and thread/process ID.  
(`_gpgme_debug_buffer`): Do not take tagname and tag argument.  
(`_gpgme_debug_frame_begin`, `_gpgme_debug_frame_end`): New functions.  
\* `version.c` (`gpgme_check_version_internal`, `gpgme_check_version`):  
Fix debug string. Do not initialize `assuan`.  
\* `posix-io.c` (`get_max_fds`): Use 0 not NULL (nicer debug output).

2009-11-04 Werner Koch <wk@g10code.com>

\* `gpgme-tool.c` (`register_commands`): Add HELP feature.

2009-11-03 Werner Koch <wk@g10code.com>

\* `gpgme.h.in` (`GPGME_PROTOCOL_UISERVER`): New.

2009-11-03 Marcus Brinkmann <marcus@g10code.de>

\* `Makefile.am` (`main_sources`): Change `g13.c` to `vfs-mount.c`. Add `vfs-create.c`  
\* `vfs-create.c`: New file.  
\* `g13.c`: Renamed to ...  
\* `vfs-mount.c`: ... this new file.  
\* `gpgme.h.in` (`gpgme_op_vfs_create`): New prototype.  
\* `gpgme.def`, `libgpgme.vers`: Add `gpgme_op_vfs_create`.  
\* `gpgme-tool.c` (`gt_vfs_create`, `cmd_vfs_create`): New functions.  
(`register_commands`): Add `VFS_CREATE` and `CREAET`.

2009-11-02 Marcus Brinkmann <marcus@g10code.de>

\* `debug.h` (`_gpgme_debug_buffer`): Make TAG argument const const.  
\* `debug.c` (`_gpgme_debug_buffer`): Likewise.  
\* `gpgme-tool.c` (`input_notify`, `output_notify`): Adjust type to new `assuan` interface.  
\* `decrypt.c` (`gpgme_op_decrypt_result`): Remove unused variable.  
\* `opassuan.c` (`gpgme_op_assuan_transact`): Fix return value.

2009-10-30 Marcus Brinkmann <marcus@g10code.de>

\* `Makefile.am` (`noinst_PROGRAMS`): New target `gpgme-tool`.  
(`gpgme_tool_LDADD`): New variable.  
\* `gpgme-tool.c`: New file.  
\* `ops.h` (`_gpgme_sig_notation_clearm`, `_gpgme_signers_clear`): New prototypes.  
\* `gpgme.c` (`gpgme_set_protocol`): Allow `GPGME_PROTOCOL_GPGCONF` (when had that gone missing?).  
(`_gpgme_sig_notation_clear`): New function without debug output.  
(`gpgme_release`): Call it and `_gpgme_signers_clear`.

- \* signers.c (\_gpgme\_signers\_clear): New function without debug output.
- \* g13.c (gpgme\_op\_vfs\_mount): Add debug output.
- \* assuan-support.c (my\_spawn): Allow fd\_child\_list to be NULL.
- \* conversion.c (\_gpgme\_encode\_percent\_string): Fix infinite loop.
- \* debug.h: Put tag in front of debug lines, should make for nicer output.
- \* engine-assuan.c (llass\_new): Use our new system hooks for libassuan.
- \* engine-g13.c (g13\_new): Remove redundant assuan context allocation.
- \* version.c (gpgme\_check\_version\_internal): Delay debug output until after gpgme\_check\_version was called.

2009-10-28 Marcus Brinkmann <marcus@g10code.de>

- \* signers.c, encrypt-sign.c, encrypt.c, delete.c, keylist.c, edit.c, import.c, export.c: Fix last change in debug output.

2009-10-27 Marcus Brinkmann <marcus@g10code.de>

- \* edit.c (gpgme\_op\_edit\_start, gpgme\_op\_edit) (gpgme\_op\_card\_edit\_start, gpgme\_op\_card\_edit): Add debug output.
- \* encrypt-sign.c (gpgme\_op\_encrypt\_sign\_start) (gpgme\_op\_encrypt\_sign): Likewise.
- \* encrypt.c (gpgme\_op\_encrypt\_start, gpgme\_op\_encrypt) (gpgme\_op\_encrypt\_result): Likewise.
- \* export.c (gpgme\_op\_export\_start, gpgme\_op\_export) (gpgme\_op\_export\_ext\_start, gpgme\_op\_export\_ext) (gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): Likewise.
- \* genkey.c (gpgme\_op\_genkey\_start, gpgme\_op\_genkey) (gpgme\_op\_genkey\_result): Likewise.
- \* getauditlog.c (gpgme\_op\_getauditlog\_start) (gpgme\_op\_getauditlog): Likewise.
- \* import.c (gpgme\_op\_import\_result, gpgme\_op\_import\_start) (gpgme\_op\_import): Likewise.
- \* keylist.c (gpgme\_op\_keylist\_result, keylist\_colon\_handler) (gpgme\_op\_keylist\_start, gpgme\_op\_keylist\_ext\_start) (gpgme\_op\_keylist\_next, gpgme\_op\_keylist\_end, gpgme\_get\_key): Likewise.
- \* opassuan.c (gpgme\_op\_assuan\_transact\_start) (gpgme\_op\_assuan\_transact\_ext, gpgme\_op\_assuan\_result) (gpgme\_op\_assuan\_transact): Likewise.
- \* signers.c (gpgme\_signers\_add, gpgme\_signers\_clear): Likewise.
- \* trustlist.c (gpgme\_op\_trustlist\_start) (gpgme\_op\_trustlist\_next, gpgme\_op\_trustlist\_end): Likewise.
- \* verify.c (gpgme\_op\_verify\_start, gpgme\_op\_verify) (gpgme\_op\_verify\_result): Likewise.

2009-10-26 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h.in (struct gpgme\_io\_event\_done\_data)

(gpgme\_io\_event\_done\_data\_t): New types.

(struct \_gpgme\_op\_assuan\_result): Deprecate the err member.

(gpgme\_op\_assuan\_result): Deprecate (for now).

(gpgme\_op\_assuan\_transact\_ext): New prototype.

(gpgme\_op\_assuan\_transact): Deprecate.

(struct \_gpgme\_op\_g13\_result): Replace with ...

(struct \_gpgme\_op\_vfs\_mount\_result): ... this.

(gpgme\_op\_g13\_mount): Replace with ...

(gpgme\_op\_vfs\_mount): ... this.

\* gpgme.def (gpgme\_op\_assuan\_transact\_ext, gpgme\_wait\_ext)

(gpgme\_op\_vfs\_mount\_result, gpgme\_op\_vfs\_mount): New.

(gpgme\_op\_g13\_mount): Remove.

\* libgpgme.vers: Likewise.

\* engine-backend.h (struct engine\_ops): Remove RESULT\_CB and RESULT\_CB\_VALUE args in opassuan\_transact member. Add CANCEL\_OP member.

\* ops.h (\_gpgme\_cancel\_with\_err, \_gpgme\_wait\_on\_condition): Add OP\_ERR argument.

(\_gpgme\_wait\_one\_ext): New prototype.

\* context.h (ctx\_op\_data\_id\_t): Add OPDATA\_VFS\_MOUNT.

\* engine-g13.c (g13\_cancel\_op): New function.

(parse\_status): Remove declaration.

(g13\_assuan\_simple\_command): Do nothing with status lines for now.

(status\_handler): Update opaque value access.

(\_gpgme\_engine\_ops\_g13): Add new cancel\_op member.

\* gpgme.c (\_gpgme\_cancel\_with\_err): Add new parameter OP\_ERR. Handle operational errors.

(gpgme\_cancel, gpgme\_io\_read, gpgme\_io\_write): Add debug output.

\* data.c (\_gpgme\_data\_inbound\_handler)

(\_gpgme\_data\_outbound\_handler): Adjust opaque value access.

\* engine-gpg.c (command\_handler, status\_handler)

(colon\_line\_handler): Likewise.

\* engine-gpgsm.c (status\_handler): Likewise.

\* engine-gpg.c (\_gpgme\_engine\_ops\_gpg): Add cancel\_op member.

\* engine-gpgsm.c (\_gpgme\_engine\_ops\_gpgsm): Likewise.

\* g13.c: Rewritten (and will be rewritten again).

\* engine.h (\_gpgme\_engine\_op\_assuan\_transact): Remove result\_cb and result\_cb\_value parameters from prototype.

(\_gpgme\_engine\_cancel\_op): New prototype.

\* engine.c (engine\_ops) [! ENABLE\_ASSUAN]: Add missing comma.

(\_gpgme\_engine\_op\_assuan\_transact): Remove result\_cb and result\_cb\_value parameter.

(\_gpgme\_engine\_cancel\_op): New function.

\* wait.h (\_gpgme\_run\_io\_cb): Add new argument OP\_ERR.

(struct io\_cb\_data): New struct to pass opaque data and get a op\_err return value. Needed because we can't modify I/O callback handler signature because it is exposed to the user.

\* wait.c (\_gpgme\_run\_io\_cb): Add OP\_ERR parameter. Handle

operational errors.

\* wait-user.c (`_gpgme_user_io_cb_handler`): Handle operational errors.

\* wait-private.c (`_gpgme_wait_on_condition`): New argument to retrieve the operational result. Handle operational errors in session based protocols.

(`_gpgme_wait_one_ext`): New function.

(`_gpgme_wait_one`): Pass argument in invocation of `_gpgme_wait_on_condition`.

\* wait-global.c (struct `ctx_list_item`): Add member `OP_ERR`.

(`ctx_done`): New argument `OP_ERR`.

(`ctx_wait`): New argument `OP_ERR`.

(`gpgme_wait_ext`): New function based on `gpgme_wait` but handling operational errors.

(`gpgme_wait`): Implement in term of `gpgme_wait_ext`.

\* keylist.c (`gpgme_op_keylist_next`): Pass argument in invocation of `_gpgme_wait_on_condition`.

\* trustlist.c (`gpgme_op_trustlist_next`): Pass argument in invocation of `_gpgme_wait_on_condition`.

\* engine-assuan.c (struct `engine_lllass`): Replace members `RESULT_CB` and `RESULT_CB_VALUE` by `LAST_OP_ERR`.

(`_gpgme_engine_assuan_last_op_err`): Add this hack function.

(`llass_cancel_op`): New function.

(`_gpgme_engine_llass_ops`): Add `cancel_op` member.

(`llass_status_handler`): Update opaque value access.

(`llass_transact`): Remove `RESULT_CB` and `RESULT_CB_VALUE` arguments.

\* opassuan.c: Move compat hacks to the end of file.

(`opassuan_start`): Do not set `OPD->result.err`.

Do not pass `RESULT_Cb` and `CTX` to `_gpgme_engine_op_assuan_transact`.

(`gpgme_op_assuan_transact_ext`): New function.

\* debug.h (`DEBUG_GLOBAL`): New debug level.

\* conversion.c (`gnupg_errors`, `_gpgme_map_gnupg_error`): Removed.

\* data-user.c (`gpgme_data_new_from_cbs`): Add debug output.

\* data-fd.c (`gpgme_data_new_from_fd`): Likewise.

\* data-stream.c (`gpgme_data_new_from_stream`): Likewise.

\* decrypt.c (`gpgme_op_decrypt_result`, `gpgme_op_decrypt_start`) (`gpgme_op_decrypt`): Likewise.

\* delete.c (`gpgme_op_delete_start`, `gpgme_op_delete`): Likewise.

\* decrypt-verify.c (`gpgme_op_decrypt_verify_start`) (`gpgme_op_decrypt_verify`): Likewise.

\* sign.c (`gpgme_op_sign_result`): Fix debug message.

\* data-mem.c (`gpgme_data_new`): Improve debug output.

\* verify.c (`parse_trust`): Use `atoi` instead of `_gpgme_map_gnupg_error`.

\* decrypt.c (`_gpgme_decrypt_status_handler`): Likewise.

2009-10-22 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am: Remove @NETLIBS@ from LIBADDs.  
(g13\_components): New variable.  
(main\_sources): Add \$(g13\_components).  
\* g13.c, engine-g13.c: New files.  
\* engine.c (engine\_ops): Check for assuan for assuan engine, add g13 engine.  
\* util.h (\_gpgme\_get\_g13\_path, \_gpgme\_encode\_percent\_string): New prototypes.  
\* conversion.c (\_gpgme\_encode\_percent\_string): New function.  
\* gpgme.h.in (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_G13.  
(struct\_gpgme\_op\_g13\_result, gpgme\_g13\_result\_t): New types.  
(gpgme\_op\_g13\_mount): New function.  
\* gpgme.def, libgpgme.vers: Add gpgme\_op\_g13\_mount.  
\* gpgme.c (gpgme\_set\_protocol): Allow GPGME\_PROTOCOL\_G13.  
(gpgme\_get\_protocol\_name): Add GPGME\_PROTOCOL\_G13.  
\* posix-util.c (\_gpgme\_get\_g13\_path): New function.  
\* w32-util.c (\_gpgme\_get\_g13\_path): New function.  
\* engine-backend.h (\_gpgme\_engine\_ops\_g13): New declaration.

2009-10-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in (netlibs): Remove.  
(assuan\_cflags, assuan\_libs): Add.  
  
\* Makefile.am (assuan\_cppflags, assuan\_libobjs): Removed.  
(gpgsm\_components): Move engine-assuan.c to ...  
(assuan\_components): ... this new variable.  
(main\_sources): Add this new variable.  
(AM\_CPPFLAGS): Remove \$(assuan\_cppflags).  
(AM\_CFLAGS): Add @LIBASSUAN\_CFLAGS@.  
(libgpgme\_la\_DEPENDENCIES, libgpgme\_pth\_la\_DEPENDENCIES)  
(libgpgme\_glib\_la\_DEPENDENCIES, libgpgme\_qt\_la\_DEPENDENCIES)  
(libgpgme\_pthread\_la\_DEPENDENCIES): Remove \$(assuan\_libobjs).  
(libgpgme\_la\_LIBADD, libgpgme\_pth\_la\_LIBADD)  
(libgpgme\_glib\_la\_LIBADD, libgpgme\_qt\_la\_LIBADD))  
(libgpgme\_pthread\_la\_LIBADD): Replace \$(assuan\_libobjs) by @LIBASSUAN\_LIBS@.  
\* priv-io.h [HAVE\_W32\_SYSTEM]: Declare \_gpgme\_io\_recvmsg, \_gpgme\_io\_sendmsg, \_gpgme\_io\_waitpid.  
\* engine-backend.h: Define with [ENABLE\_ASSUAN] instead of [ENABLE\_GPGSM].  
\* posix-io.c (\_gpgme\_io\_waitpid): Make non-static.  
\* util.h (ENABLE\_ASSUAN): Declare \_gpgme\_assuan\_system\_hooks, \_gpgme\_assuan\_malloc\_hooks, \_gpgme\_assuan\_log\_cb.  
\* engine-gpgsm.c: Don't map assuan error codes. Use assuan\_release instead of assuan\_disconnect.  
(map\_assuan\_error): Remove function.

(gpgsm\_new): Use new assuan context interface.

\* engine-assuan.c: Use assuan\_release instead of  
assuan\_disconnect.

(llass\_new): Use new assuan context interface.

2009-10-07 <wk@g10code.com>

\* priv-io.h [W32]: Include windows.h instead of sys/socket.h.

2009-08-06 Werner Koch <wk@g10code.com>

\* op-support.c (\_gpgme\_parse\_inv\_recp): Allow for no fingerprint.

\* engine-gpgsm.c (gpgsm\_sign): Hook up the status func for the  
SIGNER command.

\* gpgme.h.in (GPGME\_STATUS\_INV\_SGMR, GPGME\_STATUS\_NO\_SGMR): New.

\* sign.c (op\_data\_t): Add fields IGNORE\_INV\_RECP and INV\_SGMR\_SEEN.

(\_gpgme\_op\_sign\_init\_result): Factor code out to ...

(sign\_init\_result): .. new. Init new fields.

(sign\_start): Use sign\_init\_result.

(\_gpgme\_sign\_status\_handler): Take care of the new INV\_SGMR.

Return an error if no signature has been created.

2009-07-07 Werner Koch <wk@g10code.com>

\* engine-gpgsm.c (struct engine\_gpgsm): Add fields  
input\_helper\_data and input\_helper\_memory.

(close\_notify\_handler): Release these new fields.

(gpgsm\_import): Implement the keyarray feature.

\* engine-gpg.c (gpg\_import): Actually return GPG\_ERR\_INV\_VALUE.

\* engine-gpgsm.c (gpgsm\_import): Return an error for unknown data  
encodings.

2009-06-22 Marcus Brinkmann <marcus@g10code.de>

\* debug.h: Everywhere, use %p instead of 0x%x to print pointer.

[HAVE\_STDINT\_H]: Include <stdint.h>.

(\_TRACE, TRACE, TRACE0, TRACE1, TRACE2, TRACE3, TRACE6): Cast tag  
to (uintptr\_t) before casting it to (void\*) to silence GCC  
warning.

\* gpgme.h.in (\_GPGME\_DEPRECATED\_OUTSIDE\_GPGME): New macro.

\* sign.c (\_GPGME\_IN\_GPGME): Define it.

\* keylist.c (\_GPGME\_IN\_GPGME): Define it.

\* debug.c (\_gpgme\_debug\_begin, \_gpgme\_debug\_add): Handle error in

vasprintf and asprintf.

\* priv-io.h: Include <sys/socket.h>. Declare \_gpgme\_io\_connect.

2009-06-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (GPGME\_CONF\_PATHNAME): Revert last change, it's back! (GPA still uses it...).

\* gpgme.def: Fix stupid typo.

\* w32-io.c (\_gpgme\_io\_pipe): Add missing declaration.

\* gpgme.h.in (GPGME\_CONF\_PATHNAME): Remove obsolete macro.

\* w32-io.c (\_gpgme\_io\_pipe): Allocate reader/writer thread right away.

(\_gpgme\_io\_read, \_gpgme\_io\_write, \_gpgme\_io\_select)

(\_gpgme\_io\_dup): Never allocate threads here.

(find\_writer, find\_reader): Check return value of thread creation function.

\* context.h (CTX\_OP\_DATA\_MAGIC): New macro.

(struct ctx\_op\_data): New member MAGIC.

\* op-support.c (\_gpgme\_op\_data\_lookup): Initialize magic.

\* gpgme.c (gpgme\_result\_unref, gpgme\_result\_ref): Check magic.

2009-06-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_result\_unref): Hot fix to release a lock.

\* gpgme.c (result\_ref\_lock): New global variable.

(gpgme\_result\_ref, gpgme\_result\_unref): use it.

2009-06-16 Werner Koch <wk@g10code.com>

\* version.c: Include stdlib.h.

\* gpgme.h.in (gpgme\_data\_encoding\_t): Add GPGME\_DATA\_ENCODING\_URL, GPGME\_DATA\_ENCODING\_URLESC, GPGME\_DATA\_ENCODING\_URL0.

\* data.c (gpgme\_data\_set\_encoding): Adjust for new values.

\* engine-gpg.c (string\_from\_data): New.

(gpg\_import): Implement --fetch-key feature.

\* gpgme.h.in (gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): New.

\* gpgme.def, libgpgme.vers: Add them.

\* export.c (gpgme\_op\_export\_keys\_start, gpgme\_op\_export\_keys): New.

(export\_keys\_start): New.



\* gpgme.h.in (gpgme\_export\_mode\_t, GPGME\_EXPORT\_MODE\_EXTERN): New.  
(gpgme\_op\_export\_start, gpgme\_op\_export, gpgme\_op\_export\_ext\_start)  
(gpgme\_op\_export\_ext): Change arg RESERVED to MODE of new  
compatible type.  
\* export.c (gpgme\_export\_ext\_start, gpgme\_op\_export)  
(gpgme\_op\_export\_ext\_start, gpgme\_op\_export\_ext): Ditto.  
(export\_start): Ditto.  
\* engine.c (\_gpgme\_engine\_op\_export): Ditto.  
\* engine-backend.h (struct engine\_ops): Ditto.  
\* engine-gpgsm.c (gpgsm\_export, gpgsm\_export\_ext): Ditto.  
\* engine-gpg.c (gpg\_export, gpg\_export\_ext): Ditto. Implement  
mode EXTERN.  
(gpg\_export, gpg\_export\_ext): Factor common code out to ..  
(export\_common): .. this.

\* gpgme.h.in (gpgme\_op\_import\_keys\_start, gpgme\_op\_import\_keys): New.  
\* gpgme.def, libgpgme.vers: Add them.  
\* import.c (gpgme\_op\_import\_keys\_start, gpgme\_op\_import\_keys): New.  
(\_gpgme\_op\_import\_keys\_start): New.  
\* engine.c (\_gpgme\_engine\_op\_import): Add arg KEYARRAY.  
\* engine-backend.h (struct engine\_ops): Ditto.  
\* engine-gpgsm.c (gpgsm\_import): Ditto. Not functional.  
\* engine-gpg.c (gpg\_import): Ditto. Implement it.

2009-06-15 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (gpgme\_result\_ref, gpgme\_result\_unref): Add  
prototypes.  
\* gpgme.def, libgpgme.vers (gpgme\_result\_ref, gpgme\_result\_unref):  
Add these.  
\* context.h (struct ctx\_op\_data): Add member "references".  
\* gpgme.c (gpgme\_result\_ref, gpgme\_result\_unref): New functions.  
(\_gpgme\_release\_result): Use gpgme\_result\_unref.  
\* op-support.c (\_gpgme\_op\_data\_lookup): Initialize references.

2009-06-12 Werner Koch <wk@g10code.com>

\* gpgme-w32spawn.c (translate\_get\_from\_file): Parse optional spawn  
flags. Add new arg R\_FLAGS. Fix segv on file w/o LF.  
(translate\_handles): Add new arg R\_FLAGS. Avoid possible segv.  
(main): Pass flags for my\_spawn.  
(my\_spawn): Add arg FLAGS and implement AllowSetForegroundWindow.  
\* priv-io.h (IOSPAWN\_FLAG\_ALLOW\_SET\_FG): New.  
\* w32-io.c (\_gpgme\_io\_spawn): Add arg FLAGS and implement it.  
\* w32-glib-io.c (\_gpgme\_io\_spawn): Ditto.  
\* w32-qt-io.cpp (\_gpgme\_io\_spawn): Ditto.  
\* posix-io.c (\_gpgme\_io\_spawn): Add dummy arg FLAGS.

\* engine-gpg.c (start): Call spawn with new flag.

\* w32-util.c (\_gpgme\_allow\_set\_foreground\_window): Rename to \_gpgme\_allow\_set\_foreground\_window. Change all callers.

\* posix-util.c (\_gpgme\_allow\_set\_foreground\_window): Ditto.

2009-06-10 Werner Koch <wk@g10code.com>

\* w32-util.c (\_gpgme\_allow\_set\_foreground\_window): Add trace support.

2009-06-09 Werner Koch <wk@g10code.com>

\* engine-gpg.c (gpg\_io\_event): Test for cmd.fd.

\* version.c (gpgme\_check\_version\_internal): Make result const.

\* gpgme.c: Include priv-io.h.

(gpgme\_io\_read, gpgme\_io\_write): New.

\* libgpgme.vers (GPGME\_1.1): Add them.

\* gpgme.def: Ditto.

\* Makefile.am (main\_sources): Remove gpgme.h.

(include\_HEADERS): Rename to nodist\_include\_HEADERS so that a VPATH build won't use the distributed one.

\* util.h (GPG\_ERR\_NOT\_OPERATIONAL): Define.

2009-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (gpgme\_check\_version\_internal): New prototype.

(gpgme\_check\_version): New macro, overriding function of the same name.

\* libgpgme.vers, gpgme.def: Add gpgme\_check\_version\_internal.o

\* context.h (\_gpgme\_selftest): New variable declaration.

\* version.c: Include "context.h".

(gpgme\_check\_version): Set \_gpgme\_selftest on success.

(gpgme\_check\_version\_internal): New function.

\* gpgme.c (\_gpgme\_selftest): Define it.

(gpgme\_new): Check the selftest result.

2009-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in (gpgme\_encrypt\_flags\_t): Add

GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO.

\* engine-gpg.c (gpg\_encrypt): Pass --no-encrypt-to to gpg if GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO flag is set.

2009-05-14 Werner Koch <wk@g10code.com>

\* gpgme.h.in (gpgme\_status\_code\_t): Explicitly initialize for better maintainability and to help debugging.

2009-05-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h.in: Add compile time check for \_FILE\_OFFSET\_BITS.

2009-04-15 Marcus Brinkmann <marcus@g10code.de>

\* posix-io.c (\_gpgme\_io\_socket, \_gpgme\_io\_connect): New functions.

\* w32-io.c (\_gpgme\_io\_connect): Fix stupid error.

2009-04-08 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (giochannel\_table): New members used, fd, socket.

(find\_channel): Drop CREATE argument.

(new\_dummy\_channel\_from\_fd, new\_channel\_from\_fd)

(new\_channel\_from\_socket): New functions.

(\_gpgm\_io\_fd2str): Implement for sockets.

(\_gpgme\_io\_write, \_gpgme\_io\_read): Translate EAGAIN errors correctly.

(\_gpgme\_io\_pipe): Fix for new channel bookkeeping.

(\_gpgme\_io\_close, \_gpgme\_io\_dup): Likewise.

(wsa2errno, \_gpgme\_io\_socket, \_gpgme\_io\_connect): New.

\* w32-io.c (MAX\_READERS, MAX\_WRITERS): Bump up to 40.

(wsa2errno, \_gpgme\_io\_socket, \_gpgme\_io\_connect): New.

\* w32-qt-io.cpp (\_gpgme\_io\_socket, \_gpgme\_io\_connect): New stubs.

\* version.c [HAVE\_W32\_SYSTEM]: Include "windows.h.

(do\_subsystem\_inits) [HAVE\_W32\_SYSTEM]: Call WSAStartup.

\* engine-assuan.c (lass\_status\_handler): Ignore EAGAIN errors.

2009-03-18 Werner Koch <wk@g10code.com>

\* gpgme.h.in (GPGME\_KEYLIST\_MODE\_EPHEMERAL): New.

\* engine-gpgsm.c (gpgsm\_keylist): Send new option.

2009-03-13 Werner Koch <wk@g10code.com>

\* gpgme-config.in: Make sure locale is set to C.

2009-02-24 Werner Koch <wk@g10code.com>

\* gpgme.h.in (struct \_gpgme\_op\_assuan\_result): New.

(gpgme\_assuan\_result\_t): New.

(gpgme\_op\_assuan\_result): Change return type.

(struct \_gpgme\_assuan\_sendfnc\_ctx)

(gpgme\_assuan\_sendfnc\_ctx\_t, gpgme\_assuan\_sendfnc\_t): Remove.

(gpgme\_assuan\_inquire\_cb\_t): Changed.  
\* opassuan.c (op\_data\_t): Make use of a result structure.  
(gpgme\_op\_assuan\_result): Change return type.  
(opassuan\_start): Use result structure.  
(result\_cb): Ditto.  
\* engine-assuan.c (struct\_gpgme\_assuan\_sendfnc\_ctx): Remove.  
(inquire\_cb\_sendfnc): Remove.  
(inquire\_cb): Change for new callback scheme. Not yet finished.  
(lass\_status\_handler): Allow sending a CANCEL from the inquire CB.

2009-02-04 Werner Koch <wk@g10code.com>

\* w32-glib-io.c (\_gpgme\_io\_spawn): Make ARGV argument const to match prototype.  
\* w32-qt-io.cpp (\_gpgme\_io\_spawn): Ditto.

2009-02-03 Werner Koch <wk@g10code.com>

\* gpgme.h.in (struct\_gpgme\_subkey): Add fields IS\_CARDKEY and CARD\_NUMBER..  
\* key.c (gpgme\_key\_unref): Release field CARD\_NUMBER.  
\* keylist.c (keylist\_colon\_handler): Factor common code out to ...  
(parse\_sec\_field15): New. Set card number.

2009-01-26 Werner Koch <wk@g10code.com>

\* opassuan.c, dirinfo.c, engine-assuan.c: New.  
\* Makefile.am: Add them.  
\* engine-backend.h: Add \_gpgme\_engine\_ops\_assuan.  
(struct engine\_ops): Add field OPASSUAN\_TRANSACT. Update all engine initializers.  
\* Makefile.am (gpgsm\_components): Add engine-assuan.c.  
\* gpgme.h.in (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_ASSUAN.  
(gpgme\_assuan\_data\_cb\_t, gpgme\_assuan\_sendfnc\_ctx\_t)  
(gpgme\_assuan\_inquire\_cb\_t, gpgme\_assuan\_status\_cb\_t): New.  
(gpgme\_op\_assuan\_transact\_start, gpgme\_op\_assuan\_transact): New.  
\* gpgme.c (gpgme\_get\_protocol\_name): Ditto.  
(gpgme\_set\_protocol): Support it.  
\* engine.c (gpgme\_get\_engine\_info): Ditto.  
(engine\_ops): Register it.  
(\_gpgme\_engine\_op\_assuan\_transact): New.  
\* libgpgme.vers (gpgme\_op\_assuan\_transact\_start)  
(gpgme\_op\_assuan\_transact): New.  
\* gpgme.def (gpgme\_op\_assuan\_transact\_start)  
(gpgme\_op\_assuan\_transact): New.  
\* engine-backend.h (struct engine\_ops): Add GET\_HOME\_DIR and initialize to NULL for all engines.  
\* engine.c (engine\_get\_home\_dir): New.

(gpgme\_get\_engine\_info): Use it.  
(\_gpgme\_set\_engine\_info): Use it.  
\* engine.h (engine\_assuan\_result\_cb\_t): New.  
\* context.h (ctx\_op\_data\_id\_t): Add OPDATA\_ASSUAN.  
  
\* util.h (GPG\_ERR\_UNFINISHED): Define if not yet defined.  
  
\* version.c (gpgme\_check\_version): Protect trace arg against NULL.

2009-01-19 Werner Koch <wk@g10code.com>

\* runpgg.c: Rename to engine-gpg.c  
\* Makefile.am (main\_sources): Ditto.

2008-12-03 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (status-table.h): Use \$(builddir) to find gpgme.h.

2008-11-18 Werner Koch <wk@g10code.com>

\* version.c (do\_subsystem\_inits): Always initialize I/O subsystem. Fixes regression from 2007-08-02.  
  
\* decrypt.c (\_gpgme\_decrypt\_status\_handler): Use \_gpgme\_map\_gnupg\_error to parse the error code for decrypt.algorithm.

2008-10-30 Marcus Brinkmann <marcus@g10code.de>

\* wait-private.c (\_gpgme\_wait\_on\_condition): Remove unused variable IDX.  
\* wait-global.c: Include ops.h to silence gcc warning.  
(\_gpgme\_wait\_global\_event\_cb): Pass error value directly.  
\* wait-user.c: Include ops.h to silence gcc warning.  
  
\* posix-io.c (\_gpgme\_io\_spawn): Make ARGV argument const to silence gcc warning. Cast argument to execv to silence warning.  
\* w32-io.c (\_gpgme\_io\_spawn): Likewise.  
\* priv-io.h (\_gpgme\_io\_spawn): Likewise for prototype.

2008-10-24 Werner Koch <wk@g10code.com>

\* runpgg.c (gpg\_keylist\_preprocess): Escape backslashes too.

2008-10-23 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (gpg\_keylist\_preprocess): Convert percent escaped string to C coded string.

2008-10-20 Werner Koch <wk@g10code.com>

- \* Makefile.am (EXTRA\_DIST): Add gpgme.h.in.
- \* gpgme.h: Rename to gpgme.h.in.
- \* gpgme.h.in (GPGME\_VERSION): Use autoconf substitution.
- \* posix-io.c: Include sys/uio.h. Fixes bug #818.

2008-10-18 Marcus Brinkmann <marcus@g10code.com>

- \* w32-util.c (find\_program\_in\_registry): Don't define. (`_gpgme_get_gpg_path`, `_gpgme_get_gpgsm_path`) (`_gpgme_get_gpgconf_path`): Do not check for fooProgram in the registry anymore. It is now no longer possible to overwrite the default location in that way.

2008-10-17 Werner Koch <wk@g10code.com>

- \* w32-glib-io.c (`_gpgme_io_fd2str`): Use "%d" and not "%ld" to work around a bug in mingw32.

2008-09-23 Marcus Brinkmann <marcus@g10code.com>

- \* gpgme.c (`gpgme_sig_notation_clear`): Clear CTX->sig\_notations. Submitted by "Daniel Mueller" <daniel@danm.de>

2008-09-16 Marcus Brinkmann <marcus@g10code.com>

- \* `rungpg.c` (`gpg_new`): Don't use `errno` with `ttynam_r`.

2008-08-11 Marcus Brinkmann <marcus@g10code.com>

- \* `rungpg.c` (`gpg_cancel`): Remove `cmd fd` before `status fd`.
- \* `gpgme.c` (`_gpgme_cancel_with_err`): New function. (`gpgme_cancel`): Reimplement in terms of `_gpgme_cancel_with_err`.
- \* `wait-private.c` (`_gpgme_wait_on_condition`): Use `_gpgme_cancel_with_err`.
- \* `wait-user.c` (`_gpgme_user_io_cb_handler`): Likewise.
- \* `wait-global.c` (`_gpgme_wait_global_event_cb`, `gpgme_wait`): Likewise.

2008-08-08 Marcus Brinkmann <marcus@g10code.com>

- \* `rungpg.c` (`command_handler`): Remove I/O callback on error, too.

2008-06-29 Marcus Brinkmann <marcus@g10code.com>

- \* `gpgme.c` (`gpgme_cancel_async`): Remove unused variable.

2008-06-27 Marcus Brinkmann <marcus@g10code.de>

- \* libpgpme.vers: Add gpgme\_cancel\_async.
- \* gpgme.def: Likewise.
  
- \* context.h: Include "sema.h".
- (struct gpgme\_context): New members lock and canceled.
- \* gpgme.c (gpgme\_new): Initialize lock.
- (gpgme\_release): Destroy lock.
- (gpgme\_cancel\_async): New function.
- \* op-support.c (\_gpgme\_op\_reset): Reset the canceled flag.
- \* wait-global.c (gpgme\_wait): Check cancel flag before processing any I/O callbacks.
- \* wait-private.c (\_gpgme\_wait\_on\_condition): Likewise.
- \* wait-user.c (\_gpgme\_user\_io\_cb\_handler): Likewise.

2008-06-26 Werner Koch <wk@g10code.com>

- \* w32-util.c (\_gpgme\_mkstemp): Replace sprint by stpcpy.
- (mkstemp): Need to use GetSystemTimeAsFileTime for better compatibility.

2008-06-25 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme-w32spawn.c: New file.
- \* Makefile.am (libexec\_PROGRAMS) [HAVE\_W32\_SYSTEM]: New variable with gpgme-w32spawn.
- \* engine-gpgsm.c (gpgsm\_new): Use server translated handles.
- (gpgsm\_set\_locale): Return early if locale value is NULL.
- \* util.h (\_gpgme\_mkstemp)
- (\_gpgme\_get\_w32spawn\_path) [HAVE\_W32\_SYSTEM]: New function prototypes.
- \* w32-util.c: Include <stdint.h>, <sys/stat.h> and <unistd.h>.
- (letters, mkstemp, \_gpgme\_mkstemp, \_gpgme\_get\_w32spawn\_path): New functions.
- \* runpgp.c (gpg\_decrypt, gpg\_encrypt, gpg\_encrypt\_sign)
- (gpg\_genkey, gpg\_import, gpg\_verify, gpg\_sign): Pass data over special filename FD rather than stdin.
- (struct arg\_and\_data\_s): Add member ARG\_LOCP.
- (struct fd\_data\_map\_s): Add member ARG\_LOC.
- (struct engine\_gpg): Add member ARG\_LOC to status and colon.
- (\_add\_arg, add\_arg\_with\_locp): New function.
- (add\_arg\_ext): Reimplement in terms of \_add\_arg.
- (gpg\_new): Remember argument location for status FD.
- (build\_argv): Set argument location if requested. Also set argument location of fd\_data\_map for data items.
- (start): Adjust caller of \_gpgme\_io\_spawn.

\* priv-io.h (struct spawn\_fd\_item\_s): Add members peer\_name and arg\_loc.  
(\_gpgme\_io\_spawn): Remove parent fd list argument.  
\* posix-io.c (get\_max\_fds): New function.  
(\_gpgme\_io\_dup): Add tracing.  
(\_gpgme\_io\_spawn): Remove parent fd list. Change meaning of child fd list to contain all child fds that should be inherited. Close all other file descriptors after fork.  
\* w32-io.c, w32-glib-io.c, w32-qt-io.c(\_gpgme\_io\_spawn): Remove parent fd list. Change meaning of child fd list to contain all child fds that should be inherited. Do not inherit any file descriptors, but DuplicateHandle them. Spawn process through wrapper process. Provide wrapper process with a temporary file containing handle translation data. Return translated handle names.  
\* w32-io.c (reader): Add more tracing output.  
(\_gpgme\_io\_read): Likewise.  
\* engine-gpgconf.c (gpgconf\_read): Adjust caller of \_gpgme\_io\_spawn.  
\* version.c (\_gpgme\_get\_program\_version): Likewise.

2008-06-20 Werner Koch <wk@g10code.com>

\* engine-gpgconf.c (gpgconf\_read): Change ARGV initialization for compatibility with old compilers. Fix amount of memmove. Fix CR removal.

2008-06-19 Werner Koch <wk@g10code.com>

\* gpgme.h (GPGME\_CONF\_PATHNAME): Replace by GPGME\_CONF\_FILENAME, change all callers and provide compatibility macro.  
(gpgme\_conf\_type\_t): Add complex types 34..37.  
\* engine-gpgconf.c (gpgconf\_parse\_option, arg\_to\_data)  
(\_gpgme\_conf\_arg\_new, \_gpgme\_conf\_arg\_release): Add new types.

2008-06-19 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgconf.c (gpgconf\_parse\_option): Fix comma detection.

2008-05-09 Werner Koch <wk@g10code.com>

\* engine-gpgconf.c (gpgconf\_read): Do not pass empty lines to the callback.

2008-05-07 Werner Koch <wk@g10code.com>

\* engine-gpgconf.c (gpgconf\_write): Change argv[0] to a self-explaining string. Needs a proper fix, though.



\* `runpg.c` (`gpg_keylist`, `gpg_keylist_ext`): Factor common code out to ..  
(`gpg_build_keylist_options`): .. new. Allow combination of extern and intern mode.  
(`gpg_new`): `DFT_TTYNAME` is an array, thus check the first character.

2008-05-06 Werner Koch <wk@g10code.com>

\* `version.c` (`extract_version_string`): New.  
(`_gpgme_get_program_version`): Use it to allow for suffixes in the version line.

2008-04-28 Werner Koch <wk@g10code.com>

\* `engine-gpgconf.c` (`gpgconf_read`): Fixed segv. Avoid memmove for each line.

2008-04-22 Marcus Brinkmann <marcus@g10code.de>

\* `w32-qt-io.cpp`, `kdpipelineio.cpp`: New versions from Frank Osterfeld, implement blocking select.

2008-03-11 Marcus Brinkmann <marcus@g10code.de>

\* `data.c` (`gpgme_data_read`, `gpgme_data_write`): Retry on `EINTR`.

2008-03-06 Marcus Brinkmann <marcus@g10code.de>

\* `key.c` (`_gpgme_key_add_sig`): Terminate UID in case SRC is NULL. Reported by Marc Mutz.

2008-03-05 Marcus Brinkmann <marcus@g10code.de>

\* `decrypt.c` (`release_op_data`): Release `OPD->result.recipients`.  
\* `encrypt.c` (`release_op_data`): Release `invalid_recipient`.

2008-02-15 Marcus Brinkmann <marcus@g10code.de>

\* `engine-gpgconf.c` (`gpgconf_read`): Fix end-of-line handline.

2008-02-14 Werner Koch <wk@g10code.com>

\* `w32-io.c` (`_gpgme_io_spawn`): Add arg `R_PID` to return the pid.  
\* `posix-io.c` (`_gpgme_io_spawn`): Ditto.  
\* `w32-glib-io.c` (`_gpgme_io_spawn`): Ditto.  
\* `w32-qt-io.cpp` (`_gpgme_io_spawn`): Ditto.  
\* `priv-io.h` (`_gpgme_io_spawn`): Adjust prototyp and change all callers.

\* `runpg.c` (start): Call `_gpgme_allow_set_foreground_window`.

\* `w32-util.c` (`_gpgme_allow_set_foreground_window`): New.

\* `posix-util.c` (`_gpgme_allow_set_foreground_window`): New.

\* `engine-gpgsm.c` (`default_inq_cb`): New.

(`gpgsm_new`) [W32]: Enable pinentry notifications.

(`status_handler`): Handle inquiries.

2008-01-30 Marcus Brinkmann <marcus@g10code.de>

\* `kdpipelinedevice.cpp`: New version by Frank Osterfeld, fixes race condition.

2008-01-28 Marcus Brinkmann <marcus@g10code.de>

\* `engine-gpgsm.c` (`map_input_enc`): Rename to ...

(`map_data_enc`): ... this. Also change all callers.

(`gpgsm_encrypt`, `gpgsm_export`, `gpgsm_export_ext`, `gpgsm_genkey`)

(`gpgsm_sign`): Set encoding for output.

2008-01-28 Werner Koch <wk@g10code.com>

\* `keylist.c` (`gpgme_get_key`): Skip duplicated keys. Fixes bug 876.

2008-01-14 Marcus Brinkmann <marcus@g10code.de>

\* `engine-gpgconf.c` (`gpgconf_config_load_cb`): Fix `program_name` field.

2008-01-10 Marcus Brinkmann <marcus@g10code.de>

\* `kdpipelinedevice.cpp`: New version from Frank Osterfeld.

\* `engine-gpgconf.c` (`gpgconf_config_load_cb2`): Handle the flag `NO_ARG_DESC`.

2008-01-04 Marcus Brinkmann <marcus@g10code.de>

\* `Makefile.am` (`gpgconf_components`): New variable.

(`main_sources`): Add `gpgconf.c`.

\* `gpgme.h` (`gpgme_protocol_t`): New protocol `GPGME_PROTOCOL_GPGCONF`.

(`gpgme_conf_level_t`, `gpgme_conf_type_t`, `gpgme_conf_arg_t`)

(`gpgme_conf_opt_t`, `gpgme_conf_comp_t`, `gpgme_conf_arg_new`)

(`gpgme_conf_arg_release`, `gpgme_conf_opt_change`)

(`gpgme_conf_release`, `gpgme_op_conf_load`, `gpgme_op_conf_save`): New types.

\* `gpgconf.c`, `engine-gpgconf.c`: New files.

\* `engine.h`: (`_gpgme_engine_op_conf_load`,

(\_gpgme\_engine\_op\_conf\_save): New prototypes.  
\* op-support.c (\_gpgme\_op\_reset): Ignore not implemented locale function.  
\* posix-util.c (\_gpgme\_get\_gpgconf\_path): New function.  
\* w32-util.c (\_gpgme\_get\_gpgconf\_path): New function.  
\* engine-gpgsm.c:  
(\_gpgme\_engine\_ops\_gpgsm): Add stubs for conf\_load and conf\_save.  
\* runpgg.c:  
(\_gpgme\_engine\_ops\_gpg): Add stubs for conf\_load and conf\_save.  
\* gpgme.def: Add new gpgconf related interfaces.  
\* libgpgme.vers: Likewise.  
\* util.h (\_gpgme\_get\_gpgconf\_path): New prototype.  
\* gpgme.h (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_GPGCONF.  
\* engine-backend.h (\_gpgme\_engine\_ops\_gpgconf): New prototype.  
(struct engine\_ops): Add members for conf\_load and conf\_save.  
\* engine.c (engine\_ops): Add \_gpgme\_engine\_ops\_gpgconf.  
(\_gpgme\_engine\_op\_conf\_load,  
(\_gpgme\_engine\_op\_conf\_save): New functions.  
(gpgme\_get\_engine\_info): Allow protocol GPGME\_PROTOCOL\_GPGCONF.

2007-11-28 Marcus Brinkmann <marcus@g10code.de>

\* w32-util.c (\_gpgme\_get\_gpg\_path, \_gpgme\_get\_gpgsm\_path): Search for installation directory. Remove old fallback default.  
(find\_program\_in\_inst\_dir): New function.

2007-11-26 Werner Koch <wk@g10code.com>

\* engine-gpgsm.c (struct engine\_gpgsm): Add field INLINE\_DATA and always reset it before calling start.  
(gpgsm\_new): Clear it.  
(status\_handler): Implement it.  
(gpgsm\_getauditlog) [USE\_DESCRIPTOR\_PASSING]: Use INLINE\_DATA.

2007-11-23 Werner Koch <wk@g10code.com>

\* op-support.c (\_gpgme\_op\_reset): Implement a no-reset flag.  
\* getauditlog.c (getauditlog\_start): Use that flag.

2007-11-20 Werner Koch <wk@g10code.com>

\* op-support.c (\_gpgme\_parse\_inv\_recp): Add new reason code 11.

2007-11-22 Werner Koch <wk@g10code.com>

\* gpgme.h (gpgme\_op\_getauditlog\_start, gpgme\_op\_getauditlog): New.  
\* libgpgme.vers: Ditto.  
\* gpgme.def: Ditto.

\* getauditlog.c: New.  
\* engine-backend.h (struct engine\_ops): Add member GETAUDITLOG.  
\* engine-gpgsm.c (gpgsm\_getauditlog): New.  
(\_gpgme\_engine\_ops\_gpgsm): Insert new function.  
(gpgsm\_new): Try to enable audit log support.  
\* runpgg.c (\_gpgme\_engine\_ops\_gpg): Insert dummy entry.

2007-11-12 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp: New version from Frank Osterfeld.

2007-10-11 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp: New version from Frank Osterfeld.

2007-10-09 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp: New version from Frank Osterfeld and Marc Mutz.

2007-10-05 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp, w32-qt-io.cpp: New versions from Frank Osterfeld.

2007-10-04 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.h, kdpipelinedevice.cpp, kdpipelinedevice.moc, w32-qt-io.cpp: New versions from Frank Osterfeld.

2007-10-02 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.cpp, kdpipelinedevice.moc: New versions.  
\* w32-qt-io.cpp (\_gpgme\_io\_fd2str): Print actual\_fd if available.  
(\_gpgme\_io\_dup): Only acquire a reference, do not actually dup.  
Submitted by Frank Osterfeld.

\* priv-io.h, engine-gpgsm.c: Add comments.  
\* w32-qt-io.cpp (\_gpgme\_io\_select): Remove code handling frozen FDs.  
\* w32-glib-io.c (\_gpgme\_io\_close): Always dereference the channel, even if not primary.  
(\_gpgme\_io\_dup): Acquire a reference. Replace unused implementation by assertion.

2007-09-28 Werner Koch <wk@g10code.com>

\* engine-gpgsm.c (iocb\_data\_t): Add SERVER\_FD\_STR.  
(gpgsm\_new): Set it.

(gpgsm\_set\_fd): Use it.

\* w32-glib-io.c (find\_channel): Add a new primary flag.  
(\_gpgme\_io\_close): Close channel only if primary.  
(\_gpgme\_io\_dup): Put newfd into the table as shallow copy.

\* priv-io.h (struct io\_select\_fd\_s): Remove member FROZEN.  
\* w32-io.c (\_gpgme\_io\_select): Ditto.  
\* w32-glib-io.c (\_gpgme\_io\_select): Ditto.

\* posix-io.c (\_gpgme\_io\_select): Ditto.  
\* runpgg.c (read\_status): Ditto.  
\* wait.c (fd\_table\_put): Ditto.

\* runpgg.c (gpg\_io\_event): Add tracing.  
(start): Use gpg\_io\_event for sending the start event.  
\* engine-gpgsm.c (gpgsm\_io\_event): Add tracing.  
(start): Use gpgsm\_io\_event for sending the start event.  
\* wait.c (\_gpgme\_add\_io\_cb, \_gpgme\_run\_io\_cb): Add tracing.

2007-09-28 Marcus Brinkmann <marcus@g10code.de>

\* kdpipelinedevice.moc, w32-qt-io.cpp, kdpipelinedevice.cpp: New versions from Frank Osterfeld.

2007-09-27 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (\_gpgme\_io\_spawn),  
w32-qt-io.cpp (\_gpgme\_io\_spawn), w32-io.c (\_gpgme\_io\_spawn): Close the process handle, return 0.

\* gpgme.h (gpgme\_protocol\_t): Add GPGME\_PROTOCOL\_UNKNOWN.  
\* gpgme.c (gpgme\_get\_protocol\_name): Implement support for GPGME\_PROTOCOL\_UNKNOWN.

\* kdpipelinedevice.h: Fix last change.

\* w32-glib-io.c (\_gpgme\_io\_pipe), w32-qt-io.c (\_gpgme\_io\_pipe),  
w32-io.c (\_gpgme\_io\_pipe), posix-io.c (\_gpgme\_io\_pipe): Fix debug output.

2007-09-25 Marcus Brinkmann <marcus@g10code.de>

\* conversion.c, keylist.c: Include <sys/types.h>.

\* kdpipelinedevice.h: Use namespace \_gpgme\_.

\* kdpipelinedevice.cpp: Use namespace \_gpgme\_.

[Q\_OS\_WIN32 && NOMINMAX]: Do not define NOMINMAX again.

\* w32-qt-io.cpp: Change namespace of KDPipeIODevice to  
\_gpgme\_::KDPipeIODevice.

2007-09-17 Werner Koch <wk@g10code.com>

\* runpgg.c (gpg\_new): Make robust against undefined ttyname or  
ttytype.

2007-09-14 Werner Koch <wk@g10code.com>

\* data-mem.c (gpgme\_data\_release\_and\_get\_mem): Fix tracing bug.

2007-09-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_release): Call gpgme\_sig\_notation\_clear.

2007-09-13 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (gpg\_new): Handle return value of \_gpgme\_getenv (fixes  
small memory leak).

2007-09-07 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_qt\_la\_SOURCES): Move  
moc\_kdpipeiodevice.cpp to EXTRA\_DIST, as this is only included by  
another file (it's more like a header file than a cpp file, but  
automake doesn't know that).

\* w32-qt-io.cpp (\_gpgme\_io\_spawn): Fix several cast errors and typos.

\* w32-io.c (\_gpgme\_io\_write): Use TRACE\_SYSRES instead of TRACE\_SYS.

(libgpgme\_qt\_la\_LIBADD): Add QT4\_CORE\_LIBS, not QT4\_CORE\_LIB.

\* kdpipeiodevice.h, kdpipeiodevice.cpp, moc\_kdpipeiodevice.cpp,  
kdpipeiodevice.moc, w32-qt-io.c: New files.

\* Makefile.am (lplib\_gpgme\_extra): Rename to lplib\_gpgme\_glib.

(lplib\_gpgme\_qt): New variable.

(lib\_LTLIBRARIES): Add \$(lplib\_gpgme\_qt).

(libgpgme\_qt\_la\_SOURCES): New variable.

(AM\_CPPFLAGS): Add @QT4\_CORE\_INCLUDES@

(AM\_CFLAGS): Add @QT4\_CORE\_CFLAGS@.

(libgpgme\_qt\_la\_LDFLAGS, libgpgme\_qt\_la\_DEPENDENCIES)

(libgpgme\_qt\_la\_LIBADD): New variables.

\* sema.h (struct critsect\_s): Rename "private" to "priv" to make  
C++ users happy. Change users.

\* posix-sema.c (\_gpgme\_sema\_cs\_enter, \_gpgme\_sema\_cs\_leave)

(\_gpgme\_sema\_cs\_destroy): Likewise.

\* w32-sema.c (critsect\_init, \_gpgme\_sema\_cs\_enter)

(\_gpgme\_sema\_cs\_leave, \_gpgme\_sema\_cs\_destroy): Likewise.  
\* w32-glib-io.c (gpgme\_get\_giochannel): Change return type to void\*.  
(gpgme\_get\_fdptr): New function.  
\* w32-io.c (gpgme\_get\_fdptr): New function  
\* gpgme.def: Add gpgme\_get\_fdptr.

2007-08-22 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (\_gpgme\_io\_write): Return early if COUNT is zero.  
(writer): Remove superfluous check.

2007-08-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Move include of gpg-error.h out of extern "C".

2007-08-07 Werner Koch <wk@g10code.com>

\* gpgme.h (struct \_gpgme\_signature): Add member CHAIN\_MODEL.  
\* verify.c (parse\_trust): Set Chain\_MODEL.

2007-08-02 Werner Koch <wk@g10code.com>

\* w32-glib-io.c (\_gpgme\_io\_spawn): Use DETACHED\_PROCESS flag.  
\* w32-io.c (\_gpgme\_io\_spawn): Ditto.  
(\_gpgme\_io\_write): Map ERROR\_NO\_DATA to EPIPE.  
\* debug.c (\_gpgme\_debug): Enable assuan logging.  
(\_gpgme\_debug\_subsystem\_init): New.  
\* version.c (do\_subsystem\_inits): Disable assuan logging and initialize the debug system.  
(gpgme\_check\_version): Do not trace before the subsystems are initialized.

2007-07-17 Marcus Brinkmann <marcus@g10code.de>

\* debug.c: Include <errno.h> and "debug.h".  
(\_gpgme\_debug): Save and restore ERRNO.  
(TOHEX): New macro.  
(\_gpgme\_debug\_buffer): New function.  
\* conversion.c, data-compat.c, data-mem.c, data.c, engine-gpgsm.c, gpgme.c, keylist.c, posix-io.c, runpgp.c, sign.c, version.c, w32-io.c, wait.c: Replace DEBUG macros by TRACE\_\* variants. In most of these files, add many more tracepoints.

2007-07-16 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (status\_handler): Do not send BYE here.

\* w32-io.c (struct reader\_context\_s, struct writer\_context\_s): New members REFCOUNT.  
(create\_reader, create\_writer): Initialize C->refcount to 1.  
(destroy\_reader, destroy\_writer): Only destroy if C->refcount drops to 0.  
(find\_reader, find\_writer, kill\_reader, kill\_writer): Beautify.  
\* priv-io.h (\_gpgme\_io\_dup): New prototype.  
\* posix-io.c (\_gpgme\_io\_dup): New function.  
\* w32-io.c (\_gpgme\_io\_dup): Likewise.  
\* w32-glib-io.c (\_gpgme\_io\_dup): Likewise.  
\* engine-gpgsm.c (start): Reverting to version 2007-07-10.

2007-07-13 Marcus Brinkmann <marcus@g10code.de>

\* data-user.c (user\_read, user\_write, user\_seek): Set errno and return -1 instead returning the error code directly.  
\* data-compat.c (old\_user\_seek): Likewise.  
\* gpgme.c (gpgme\_sig\_notation\_add): Return error properly.  
  
\* Revert the "close\_notify\_handler" returns int stuff. Always close in the \_gpgme\_io\_close implementations.  
\* engine-gpgsm.c (status\_handler): Try to terminate the connection in case of error.  
\* w32-io.c (\_gpgme\_io\_read): Return C->error\_code in ERRNO.  
(\_gpgme\_io\_write): Likewise.  
  
\* priv-io.h (\_gpgme\_io\_set\_close\_notify): Change type of HANDLER to \_gpgme\_close\_notify\_handler.  
(\_gpgme\_close\_notify\_handler): New type.  
(\_gpgme\_io\_dup): Remove prototype.  
\* posix-io.c (notify\_table, \_gpgme\_io\_set\_close\_notify): Change type of HANDLER to \_gpgme\_close\_notify\_handler\_t.  
(\_gpgme\_io\_close): Do not close the FD if handler returns 0.  
(\_gpgme\_io\_dup): Remove function.  
\* w32-io.c (notify\_table, \_gpgme\_io\_set\_close\_notify, \_gpgme\_io\_close): Change type of HANDLER to \_gpgme\_close\_notify\_handler\_t.  
(\_gpgme\_io\_close): Do not close the FD if handler returns 0.  
(\_gpgme\_io\_dup): Remove function.  
\* w32-glib-io.c (\_gpgme\_io\_dup): Remove function.  
(\_gpgme\_io\_set\_close\_notify, notify\_table): Change type of HANDLER to \_gpgme\_close\_notify\_handler\_t.  
(\_gpgme\_io\_close): Do not close the FD if handler returns 0.  
\* runpg.c (close\_notify\_handler): Change return type to int, return 1.  
\* engine-gpgsm.c (close\_notify\_handler): Change return type to int, return 0 for status FD and 1 for all other FDs.  
(start): Do not duplicate the status FD.



2007-07-12 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am: Replace implicit rule by suffix rule. Add SUFFIXES for that.

2007-07-12 Werner Koch <wk@g10code.com>

\* version.c (do\_subsystem\_inits) [W32]: Make sure that the socket system has been started.

2007-07-10 Marcus Brinkmann <marcus@g10code.de>

\* priv-io.h (\_gpgme\_io\_dup): New prototype.  
\* posix-io.c (\_gpgme\_io\_dup): New function.  
\* w32-io.c (\_gpgme\_io\_dup): Likewise.  
\* w32-glib-io.c (\_gpgme\_io\_dup): Likewise.  
\* engine-gpgsm.c (start): Use \_gpgme\_dup() instead of dup().

2007-07-08 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c [HAVE\_W32\_SYSTEM]: Enable the bunch of the file.  
\* funopen.c (funopen): Rename to \_gpgme\_funopen.

2007-04-30 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Fix error handling for ttyname\_r.  
\* runpgg.c (gpg\_new): Likewise.  
Submitted by Stephen Tether.

2007-02-26 Werner Koch <wk@g10code.com>

\* verify.c (op\_data\_t): New element PLAINTEXT\_SEEN.  
(\_gpgme\_verify\_status\_handler): Return an error if more than one plaintext has been seen.  
(parse\_error): New arg SET\_STATUS. Also detect it based on an ERROR status (gpg > 1.4.6).

2007-01-26 Werner Koch <wk@g10code.com>

\* w32-io.c (build\_commandline): Fixed stupid quoting bug.  
\* w32-glib-io.c (build\_commandline): Ditto.  
  
\* runpgg.c (gpg\_set\_locale): Avoid dangling pointer after free.  
  
\* gpgme-config.in: New options --get-gpg and --get-gpgsm.

2007-01-18 Marcus Brinkmann <marcus@g10code.de>

\* data.h (\_gpgme\_data\_get\_fd): Add prototype.  
(gpgme\_data\_get\_fd\_cb): New type.  
(struct\_gpgme\_data\_cbs): New member get\_fd.  
\* data.c (\_gpgme\_data\_get\_fd): New function.  
\* data-fd.c (fd\_get\_fd): New function.  
(fd\_cbs): Add fd\_get\_fd.  
\* data-stream.c (stream\_get\_fd): New function.  
(stream\_cbs): Add stream\_get\_fd.  
\* data-mem.c (mem\_cbs): Add NULL for get\_fd callback.  
\* data-user.c (user\_cbs): Likewise.  
\* engine-gpgsm.c (gpgsm\_set\_fd) [USE\_DESCRIPTOR\_PASSING]: Try to short-cut by passing the data descriptor directly.

2007-01-17 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (build\_commandline): Quote all command line arguments.  
\* w32-glib-io.c (build\_commandline): Likewise.

2007-01-10 Werner Koch <wk@g10code.com>

\* ttyname\_r.c (ttyname\_r) [W32]: Return a dummy name.

2007-01-08 Werner Koch <wk@g10code.com>

\* version.c (do\_subsystem\_inits): Do assuan init only if building with Assuan.  
\* setenv.c: Include assuan-def.h only if building with Assuan support.

\* op-support.c (\_gpgme\_op\_reset): Set LC\_MESSAGES only if defined.  
\* engine-gpgsm.c (gpgsm\_set\_locale): Ditto.  
\* runpgg.c (gpg\_set\_locale): Ditto.

2006-12-17 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_set\_protocol): Shut down the engine when switching protocols.  
(gpgme\_ctx\_set\_engine\_info): Likewise for engine info.  
\* engine.h (\_gpgme\_engine\_reset): New function prototype.  
\* engine.c (\_gpgme\_engine\_reset): New function.  
\* engine-backend.h (struct\_engine\_ops): New member RESET.  
\* runpgg.c (\_gpgme\_engine\_ops\_gpg): Add NULL for reset function.  
\* engine-gpgsm.c (\_gpgme\_engine\_ops\_gpgsm) [USE\_DESCRIPTOR\_PASSING]: Add gpgsm\_reset for reset.  
(\_gpgme\_engine\_ops\_gpgsm) [!USE\_DESCRIPTOR\_PASSING]: Add NULL for reset function.

(gpgsm\_reset) [USE\_DESCRIPTOR\_PASSING]: New function.  
\* op-support.c (\_gpgme\_op\_reset): Try to use the engine's reset function if available.  
\* engine-gpgsm.c (gpgsm\_new): Move code to dup status\_fd to ... (start): ... here.  
\* posix-io.c (\_gpgme\_io\_recvmsg, \_gpgme\_io\_sendmsg): New functions.  
  
\* engine.h (\_gpgme\_engine\_new): Remove arguments lc\_ctype and lc\_messages from prototype.  
(\_gpgme\_engine\_set\_locale): New prototype.  
\* engine.c (\_gpgme\_engine\_set\_locale): New function.  
\* op-support.c (\_gpgme\_op\_reset): Call \_gpgme\_engine\_set\_locale.  
\* engine-backend.h (struct engine\_ops): Add new member SET\_LOCALE. Remove arguments lc\_messages and lc\_ctype from member NEW.  
\* engine-gpgsm.c (struct engine\_gpgsm): New members lc\_ctype\_set and lc\_messages\_set.  
(gpgsm\_new): Remove lc\_messages and lc\_ctype arguments.  
(gpgsm\_set\_locale): New function.  
(\_gpgme\_engine\_ops\_gpgsm): Add gpgsm\_set\_locale.  
\* runpgg.c (struct engine\_gpg): Add new members lc\_messages and lc\_ctype.  
(gpg\_release): Release lc\_messages and lc\_ctype if set.  
(gpg\_new): Remove lc\_messages and lc\_ctype arguments.  
(gpg\_set\_locale): New function.  
(\_gpgme\_engine\_ops\_gpg): Add gpg\_set\_locale.  
(add\_arg): Implement in terms of:  
(add\_arg\_ext): New function.  
(start): Set lc-messages and lc-ctype arguments here.

2006-12-03 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (struct engine\_gpgsm): Move members input\_fd\_server, output\_fd\_server, message\_fd\_server to ... (iocb\_data): ... here (as server\_fd).  
(close\_notify\_handler): Reset tags as well.  
(gpgsm\_new): Implement support for descriptor passing.  
(fd\_type\_t): New type.  
(gpgsm\_clear\_fd): New function. Use it instead of \_gpgsm\_io\_close for unused communication channels.  
(gpgsm\_set\_fd): Rewritten to support descriptor passing. All relevant callers adjusted as well (previously of \_gpgme\_io\_close).

2006-12-02 Marcus Brinkmann <marcus@g10code.de>

\* version.c: Include "assuan.h".  
(do\_subsystem\_inits): Call assuan\_set\_assuan\_err\_source.

2006-12-01 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_real\_la\_SOURCES): Rename to main\_sources.  
(libgpgme\_la\_SOURCES, libgpgme\_pthread\_la\_SOURCES,  
libgpgme\_glib\_la\_SOURCES, libgpgme\_pth\_la\_SOURCES): Add  
\$(main\_sources).  
(libgpgme\_la\_DEPENDENCIES, libgpgme\_la\_LIBADD,  
libgpgme\_pthread\_la\_DEPENDENCIES, libgpgme\_pthread\_la\_LIBADD,  
libgpgme\_pth\_la\_DEPENDENCIES, libgpgme\_pth\_la\_LIBADD,  
libgpgme\_glib\_la\_DEPENDENCIES, libgpgme\_glib\_la\_LIBADD): Remove  
libgpgme-real.la.  
(noinst\_LTLIBRARIES): Removed.  
(libgpgme\_glib\_la\_CFLAGS, libgpgme\_pth\_la\_CFLAGS): Removed.  
(AM\_CFLAGS): New variable.

2006-11-30 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Replace AssuanError with gpg\_error\_t and  
ASSUAN\_CONTEXT with assuan\_context\_t.

2006-11-29 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Check return value of  
assuan\_pipe\_connect.

\* runpgg.c: Include <unistd.h>.  
(gpg\_new): Support --display, --ttyname, --ttytype, --lc-ctype and  
--lc-messages. Fixes issue 734.

2006-10-24 Marcus Brinkmann <marcus@g10code.de>

\* trustlist.c (gpgme\_op\_trustlist\_next): Return error if OPD is  
NULL.

2006-10-23 Marcus Brinkmann <marcus@g10code.de>

\* wait-global.c (gpgme\_wait): Unlock CTX\_LIST\_LOCK while calling  
\_gpgme\_engine\_io\_event().

\* keylist.c (gpgme\_op\_keylist\_next): Return error if OPD is NULL.

2006-09-25 Marcus Brinkmann <marcus@g10code.de>

\* data-mem.c (gpgme\_data\_release\_and\_get\_mem): Release the data  
object properly.

2006-09-22 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (keylist\_colon\_handler): Move debug output after initialising KEY.

2006-07-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in (Options): Add NETLIBS.

\* Makefile.am (libgpgme\_la\_LIBADD, libgpgme\_pthread\_la\_LIBADD, libgpgme\_pth\_la\_LIBADD, libgpgme\_glib\_la\_LIBADD): Add NETLIBS.

\* runpg.c (read\_status): Fix comparison disguising as an assignment.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_set\_locale): Remove conditional on HAVE\_W32\_SYSTEM, and just check for LC\_MESSAGES.

2006-07-16 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (read\_status): Strip potential carriage return.

\* genkey.c (get\_key\_parameter): Skip potential carriage return.

\* version.c (\_gpgme\_get\_program\_version): Strip potential carriage return.

\* data.c (gpgme\_data\_set\_file\_name): Allow to clear the file name by passing NULL.

2006-06-22 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (gpgme\_get\_key): Also clone the engine info.

2006-03-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in (cflags\_pth): Revert accidental removal of pthread support with last change.

2006-02-28 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (O\_BINARY) [!O\_BINARY]: New macro. (\_gpgme\_io\_pipe): Open pipes in binary mode.

2006-02-22 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (gpgme\_engine\_check\_version): Reimplemented to allow checking the version correctly even after changing the engine information. Bug reported by Stphane Corthisy.

\* `runpgg.c` (`read_colon_line`): Invoke colon preprocess handler if it is set.  
(`colon_preprocessor_t`): New type.  
(`struct engine_gpg`): New member `colon.preprocess_fnc`.  
(`gpg_keylist_preprocess`): New function.  
\* `keylist.c` (`keylist_colon_handler`): Allow short key IDs.

2006-02-15 Marcus Brinkmann <marcus@g10code.de>

\* `w32-io.c` (`create_writer`): Make `C->have_data` a manually reset event.  
(`writer`): Move code from end of if block to beginning, so it is also run the first time.  
(`_gpgme_io_write`): Move assert check after error check. Reset the `is_empty` event, and also do it eagerly.  
(`_gpgme_io_select`): Unconditionally wait for the `is_empty` event.

2006-01-26 Werner Koch <wk@g10code.com>

\* `w32-util.c` (`_gpgme_get_conf_int`): New.  
\* `posix-util.c` (`_gpgme_get_conf_int`): New.  
\* `w32-io.c` (`get_desired_thread_priority`): New.  
(`create_reader`, `create_writer`): Use it here.

2006-01-04 Werner Koch <wk@g10code.com>

\* `debug.h` (`_gpgme_debug_srcname`): New. Use it with the debug macros.  
\* `w32-glib-io.c` (`_gpgme_io_set_nonblocking`): Add debug statements. Disable error return for failed nonblocking call.

2006-01-03 Marcus Brinkmann <marcus@g10code.de>

\* `w32-glib-io.c` (`_gpgme_io_close`): Only close fd if there is no channel for it.

2005-12-31 Marcus Brinkmann <marcus@g10code.de>

\* `w32-glib-io.c` (`find_channel`): Set channel to unbuffered.  
(`_gpgme_io_select`): Fix debug output.

2005-12-23 Werner Koch <wk@g10code.com>

\* `gpgme.h` (`struct _gpgme_signature`): Append field `PKA_ADDRESS`.  
\* `verify.c` (`release_op_data`, `_gpgme_verify_status_handler`): Set this field.

2005-12-20 Werner Koch <wk@g10code.com>

\* gpgme.h (gpgme\_status\_code\_t): Added GPGME\_STATUS\_PKA\_TRUST\_BAD and GPGME\_STATUS\_PKA\_TRUST\_GOOD.  
(struct \_gpgme\_signature): New field pka\_trust.  
\* verify.c (\_gpgme\_verify\_status\_handler): Set pka\_trust.

2005-12-06 Werner Koch <wk@g10code.com>

\* keylist.c (keylist\_colon\_handler): Store fingerprints of the subkeys. Reset the secret flag of subkeys for stub secret keys.  
(NR\_FIELDS): Bumped up to 16

2005-11-27 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (\_gpgme\_set\_engine\_info): Use new\_file\_name in engine\_get\_version invocation. Reported by Stphane Corthsy.

2005-11-24 Marcus Brinkmann <marcus@g10code.de>

\* w32-glib-io.c (\_gpgme\_io\_fd2str): Remove debug printf.

2005-11-18 Werner Koch <wk@g10code.com>

\* w32-glib-io.c: Include glib.h before windows to avoid a symbol shadowing warning.  
(find\_channel): Better use g\_io\_channel\_win32\_new\_fd instead of the autodetection function g\_io\_channel\_unix\_new.  
(\_gpgme\_io\_select): Rewritten. It is now a fully working select implementation.

2005-11-18 Marcus Brinkmann <marcus@g10code.de>

\* priv-io.h (\_gpgme\_io\_fd2str): New prototype.  
\* posix-io.c (\_gpgme\_io\_fd2str): New function.  
\* w32-io.c (\_gpgme\_io\_fd2str): New function.  
\* runpg.c: Use this new function.  
\* w32-glib-io.c (\_gpgme\_io\_fd2str): Rewrote the file handle code again. Two's company, three's the musketeers.

\* w32-glib-io.c: Rewrote the file handle code. We don't create system fds for every handle (doesn't work for inherited handles), but we create pseudo fds in a private namespace that designate a handle and potentially a giochannel.

2005-11-18 Werner Koch <wk@g10code.com>

\* versioninfo.rc.in: Set file version to LT-version + Svn-revision.

2005-11-17 Marcus Brinkmann <marcus@g10code.de>

- \* w32-glib-io.c: New file.
- \* gpgme.def (gpgme\_get\_giochannel): Add symbol.
- \* Makefile.am (system\_components) [HAVE\_DOSISH\_SYSTEM]: Remove w32-io.c.
- (ltlib\_gpgme\_extra): New variable.
- (lib\_LTLIBRARIES): Add \$(ltlib\_gpgme\_extra).
- (system\_components\_not\_extra): New variable.
- (libgpgme\_la\_SOURCES, libgpgme\_pthread\_la\_SOURCES, libgpgme\_pth\_la\_SOURCES): Add \$(system\_components\_not\_extra).
- (libgpgme\_glib\_la\_LDFLAGS, libgpgme\_glib\_la\_DEPENDENCIES, libgpgme\_glib\_la\_LIBADD, libgpgme\_glib\_la\_CFLAGS) [BUILD\_W32\_GLIB]: New variables.
- \* gpgme-config.in (glib): New option.
- \* gpgme.m4 (AM\_PATH\_GPGME\_GLIB): New macro.

2005-11-17 Marcus Brinkmann <marcus@g10code.de>

- \* priv-io.h (\_gpgme\_io\_waitpid, \_gpgme\_io\_kill): Removed.
- \* w32-io.c (\_gpgme\_io\_waitpid, \_gpgme\_io\_kill): Removed.
- \* posix-io.c (\_gpgme\_io\_kill): Removed.
- (\_gpgme\_io\_waitpid): Declare static.

2005-10-24 Marcus Brinkmann <marcus@g10code.de>

- \* w32-io.c (\_gpgme\_io\_spawn): Don't minimize window, hide it.

2005-10-21 Werner Koch <wk@g10code.com>

- \* Makefile.am: Fixed cut+paste problem

2005-10-20 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am: Build versioninfo.lo, not versioninfo.o. Also, fix the whole mess.

2005-10-16 Marcus Brinkmann <marcus@g10code.de>

- \* runpg.c (gpg\_edit): Don't add a key argument if in card edit mode.

2005-10-06 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (gpgme.dll gpgme.dll.a): Use \$(srcdir) for gpgme.def.
- \* gpgme.h (gpgme\_free): New prototype.



- \* data-mem.c (gpgme\_free): New function.
- \* libgpgme.vers (GPGME\_1.1): Add gpgme\_free.
- \* gpgme.def: Add gpgme\_free.

2005-10-02 Marcus Brinkmann <marcus@g10code.de>

- \* util.h (\_gpgme\_decode\_percent\_string): Add new argument BINARY to prototype.
- \* verify.c (parse\_notation): Likewise for invocation.
- \* conversion.c (\_gpgme\_decode\_percent\_string): Likewise to declaration. If set, do not replace '\0' characters with a printable string.
- \* gpgme.h (struct \_gpgme\_key\_sig): New field notations.
- \* ops.h (\_gpgme\_parse\_notation): New prototype.
- \* sig-notation.c (\_gpgme\_parse\_notation): New function.
- \* key.c (gpgme\_key\_unref): Free all signature notations.
- \* keylist.c (op\_data\_t): New member tmp\_keysig.  
(finish\_key): Clear OPD->tmp\_keysig.
- \* gpgme.c (gpgme\_set\_keylist\_mode): Remove check.
- \* runpgp.c (gpg\_keylist): Support listing signature notations.  
(gpg\_keylist\_ext): Likewise.

2005-10-01 Marcus Brinkmann <marcus@g10code.de>

- \* engine.h (\_gpgme\_set\_engine\_info): Add prototype.
- \* engine-backend.h (struct engine\_ops): Change return type of get\_file\_name() to const char \* to silence gcc warning.
- \* engine.c (engine\_get\_file\_name): Change return type to const char \* to silence gcc warning.  
(gpgme\_get\_engine\_info): Use transitional variable to go from const char \* to char \* to silence gcc warning.  
(\_gpgme\_set\_engine\_info): Likewise.
- \* engine-gpgsm.c (struct engine\_gpgsm): Change type of LINE to char \* to silence gcc warning.  
(gpgsm\_new): Make ARGV a pointer to const char.  
(status\_handler): Change type of SRC, END, DST, ALINE and NEWLINE to char \* to silence gcc warning.
- \* gpgme.def: Add gpgme\_data\_set\_file\_name,  
gpgme\_data\_get\_file\_name, gpgme\_sig\_notation\_clear,  
gpgme\_sig\_notation\_add and gpgme\_sig\_notation\_get.
- \* libgpgme.vers: Add gpgme\_sig\_notation\_clear,  
gpgme\_sig\_notation\_add and gpgme\_sig\_notation\_get.
- \* Makefile.am (libgpgme\_real\_la\_SOURCES): Add sig-notation.c.
- \* context.h (struct gpgme\_context): New field sig\_notations.
- \* gpgme.h (struct \_gpgme\_sig\_notation): New member value\_len and critical.  
(GPGME\_SIG\_NOTATION\_CRITICAL): New symbol.

(gpgme\_sig\_notation\_flags\_t): New type.  
(gpgme\_sig\_notation\_add, gpgme\_sig\_notation\_clear,  
gpgme\_sig\_notation\_get): New prototypes.  
\* ops.h (\_gpgme\_sig\_notation\_create, \_gpgme\_sig\_notation\_free):  
New prototypes.  
\* sig-notation.c (\_gpgme\_sig\_notation\_free): New file.  
\* verify.c (parse\_notation): Use support functions.  
(release\_op\_data): Likewise.  
\* runpgp.c (append\_args\_from\_sig\_notations): New function.  
(gpg\_encrypt\_sign, gpg\_sign): Call it.

2005-09-30 Marcus Brinkmann <marcus@g10code.de>

\* data.h (struct gpgme\_data): New member file\_name.  
\* data.c (gpgme\_data\_set\_filename): New function.  
(\_gpgme\_data\_release): Free DH->filename if necessary.  
(gpgme\_data\_get\_filename): New function.  
\* runpgp.c (gpg\_encrypt): Set filename option.  
(gpg\_encrypt\_sign): Likewise.  
(gpg\_sign): Likewise.  
\* libgpgme.vers (GPGME\_1.1): Add gpgme\_data\_set\_file\_name and  
gpgme\_data\_get\_file\_name.  
  
\* decrypt.c, verify.c, gpgme.h: Replace plaintext\_filename with  
file\_name.

2005-09-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_key): Add field is\_qualified.  
(struct \_gpgme\_subkey): Likewise.  
\* keylist.c (set\_subkey\_capability, set\_mainkey\_capability): Set  
field is\_qualified.

2005-09-23 Werner Koch <wk@g10code.com>

\* w32-io.c (\_gpgme\_io\_pipe): Removed use of environment variable  
again.  
(create\_reader, create\_writer): Set thread priority higher.

2005-09-19 Werner Koch <wk@g10code.com>

\* w32-io.c (\_gpgme\_io\_pipe): New environment variable to change  
the size of the pipe buffer.

2005-09-13 Werner Koch <wk@g10code.com>

\* ath.c: Changes to make it work under W32.

2005-09-12 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (libpggme\_la\_SOURCES): Set to ath.h and ath.c.
- (ath\_pth\_src, ath\_pthread\_src): Removed.
- (w32\_o\_files): Replace ath-compat.o with ath.o.
- (libpggme\_pth\_la\_CFLAGS): New variable.
- \* ath-compat.c, ath-pthread-compat.c, ath-pth-compat.c: Removed.
- \* ath.h (ath\_pthread\_available, ath\_pth\_available): Removed.
- (ath\_init) [!\_ATH\_EXT\_SYM\_PREFIX]: Do not define macro.
- (struct ath\_ops, ath\_init) [\_ATH\_COMPAT]: Removed.
- (\_ATH\_COMPAT): Macro removed.
- \* posix-sema.c (\_gpgme\_sema\_subsystem\_init): Do not call \_gpgme\_ath\_init.

2005-09-12 Marcus Brinkmann <marcus@g10code.de>

- \* keylist.c (release\_op\_data): Do not free opd->tmp\_uid.

2005-09-07 Werner Koch <wk@g10code.com>

- \* w32-io.c (build\_commandline): Quote argv[0].

2005-08-26 Marcus Brinkmann <marcus@g10code.de>

- \* runpgg.c (command\_handler): Use \_gpgme\_io\_write instead of write.
- \* edit.c (command\_handler): Do not depend on PROCESSED being available.
- \* engine.h (engine\_command\_handler\_t): Add new argument processed.
- \* ops.h (\_gpgme\_passphrase\_command\_handler\_internal): Rename prototype to ...
- (\_gpgme\_passphrase\_command\_handler): ... this one.
- \* passphrase.c (\_gpgme\_passphrase\_command\_handler\_internal):
- Rename to ...
- (\_gpgme\_passphrase\_command\_handler): ... this one.
- \* edit.c (command\_handler): Add new argument processed. Remove local variable with the same name. Always return processed as true.
- \* runpgg.c (command\_handler): Send a newline character if the handler did not.

2005-08-26 Werner Koch <wk@g10code.com>

- \* w32-util.c (read\_w32\_registry\_string): Updated from code used by GnuPG. This allows for expanding strings and features the implicit fallback key.
- (w32\_shgetfolderpath, find\_program\_at\_standard\_place): New.

(`_gpgme_get_gpg_path`, `_gpgme_get_gpgsm_path`): With no registry entry, locate the programs at the standard place.

(`dlopen`, `dlsym`, `dlclose`): New, so that we can keep on using what we are accustomed to.

\* `debug.c` (`debug_init`): Use `PATHSEP_C` so that under W32 a semicolon is used which allows us to create files with drive letters.

\* `w32-io.c` (`_gpgme_io_read`, `_gpgme_io_write`): Print content in debug mode too.

2005-07-27 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme.h` (`gpgme_status_code_t`): Add `GPGME_STATUS_PLAINTEXT`.

(`struct _gpgme_op_decrypt_result`): New member `plaintext_filename`.

(`struct _gpgme_op_verify_result`): Likewise.

\* `ops.h` (`_gpgme_parse_plaintext`): Add prototype.

\* `op-support.c` (`_gpgme_parse_plaintext`): New function.

\* `decrypt.c` (`release_op_data`): Release `OPD->result.plaintext_filename`.

(`_gpgme_decrypt_status_handler`): Handle `GPGME_STATUS_PLAINTEXT`.

\* `verify.c` (`release_op_data`): Release

`OPD->result.plaintext_filename`.

(`_gpgme_verify_status_handler`): Handle `GPGME_STATUS_PLAINTEXT`.

2005-08-08 Werner Koch <wk@g10code.com>

\* `util.h` (`stpcpy`): Renamed to ..

(`_gpgme_stpcpy`): .. this and made inline. This avoids duplicate definitions when linking statically.

\* `stpcpy.c`: Removed.

2005-08-19 Werner Koch <wk@g10code.com>

\* `gpgme.def`: New.

\* `versioninfo.rc.in`: New.

\* `Makefile.am`: Adds support for building a W32 DLL.

\* `ttyname_r.c` (`ttyname_r`) [W32]: Return error.

\* `ath-compat.c` [W32]: `select` and `co` are not yet supported; return error.

\* `data-stream.c` (`stream_seek`): Use `ftell` if `ftello` is not available.

2005-07-26 Marcus Brinkmann <marcus@g10code.de>

\* `keylist.c` (`gpgme_get_key`): Allow key IDs.

2005-06-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.m4: Only call GPGME\_CONFIG if found.

2005-06-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_signature): New members pubkey\_algo and hash\_algo.

\* verify.c (parse\_valid\_sig): Parse pubkey and hash algo numbers.

(parse\_new\_sig): Parse pubkey, hash algo and timestamp for ERRSIG.

(\_gpgme\_decrypt\_status\_handler): Fix last change.

\* gpgme.h (struct \_gpgme\_recipient): New structure.

(gpgme\_recipient\_t): New type.

(struct \_gpgme\_op\_decrypt\_result): Add member recipients.

\* decrypt.c (op\_data\_t): New member last\_recipient\_p.

(\_gpgme\_op\_decrypt\_init\_result): Initialize last\_recipient\_p.

(parse\_enc\_to): New function.

(\_gpgme\_decrypt\_status\_handler): Handle status ENC\_TO and NO\_SECKEY.

\* wait-global.c (gpgme\_wait): Break out of the fd processing loop after an error.

Reported by Igor Belyi <gpgme@katehok.ac93.org>.

2005-06-02 Marcus Brinkmann <marcus@g10code.de>

\* wait.h (\_gpgme\_run\_io\_cb): New prototype.

\* wait.c (\_gpgme\_run\_io\_cb): New function.

\* wait-global.c (gpgme\_wait): Call it.

\* wait-user.c (\_gpgme\_user\_io\_cb\_handler): Likewise.

\* wait-private.c (\_gpgme\_wait\_on\_condition): Likewise.

2005-06-02 Werner Koch <wk@g10code.com>

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Take care of GPGME\_STATUS\_NEED\_PASSPHRASE\_PIN.

(\_gpgme\_passphrase\_command\_handler\_internal): Also act on the key "passphrase.pin.ask".

\* gpgme.h: Added status codes GPGME\_STATUS\_SIG\_SUBPACKET, GPGME\_STATUS\_NEED\_PASSPHRASE\_PIN, GPGME\_STATUS\_SC\_OP\_FAILURE, GPGME\_STATUS\_SC\_OP\_SUCCESS, GPGME\_STATUS\_CARDCTRL, GPGME\_STATUS\_BACKUP\_KEY\_CREATED.

2005-05-28 Marcus Brinkmann <marcus@g10code.de>

\* data-user.c: Include <errno.h>.

2005-05-17 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_new): Set the CTX->include\_certs default to the default.

2005-05-11 Marcus Brinkmann <marcus@g10code.de>

\* w32-io.c (\_gpgme\_io\_select): Fix loop increment.

2005-05-05 Marcus Brinkmann <marcus@g10code.de>

\* data-user.c (user\_release): Only call user hook if provided.  
(user\_seek): Return EBADF if no user hook is provided.  
(user\_read): Likewise.  
(user\_write): Likewise.

2005-04-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (GPGME\_INCLUDE\_CERTS\_DEFAULT): New macro.  
\* engine-gpgsm.c (gpgsm\_sign): Send the include-certs option after the reset, just for cleanliness, and do not send it at all if the default is requested.  
\* gpgme.c (gpgme\_set\_include\_certs): Allow to use GPGME\_INCLUDE\_CERTS\_DEFAULT.

2005-04-21 Werner Koch <wk@g10code.com>

\* verify.c (calc\_sig\_summary): Set the key revoked bit.

2005-04-14 Marcus Brinkmann <marcus@g10code.de>

\* wait-global.c (gpgme\_wait): Use LI->ctx when checking a context in the list, not the user-provided CTX.  
Reported by Igor Belyi <gpgme@katehok.ac93.org>.

\* wait-global.c (gpgme\_wait): If no context is found, and we should not hang, set \*status to 0 and return NULL.  
Reported by Igor Belyi <gpgme@katehok.ac93.org>.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* data.h (EOPNOTSUPP) [\_WIN32]: Remove definition.  
\* data.c (EOPNOTSUPP) [HAVE\_W32\_SYSTEM]: Remove definition.  
(gpgme\_data\_read, gpgme\_data\_write, gpgme\_data\_seek): Return ENOSYS instead EOPNOTSUPP.  
\* data-compat.c (EOPNOTSUPP) [HAVE\_W32\_SYSTEM]: Remove definition.

(gpgme\_error\_to\_errno): Map GPG\_ERR\_NOT\_SUPPORTED to ENOSYS.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

- \* io.h: Rename to ...
- \* priv-io.h: ... this.
- \* Makefile.am (libgpgme\_real\_la\_SOURCES): Change io.h to priv-io.h.
- \* data.c, engine-gpgsm.c, posix-io.c, runpgg.c, version.c, w32-io.c, wait-private.c, wait-global.c, wait-user.c, wait.c: Change all includes of "io.h" to "priv-io.h"

2005-03-09 Werner Koch <wk@g10code.com>

- \* w32-util.c (\_gpgme\_get\_gpg\_path, \_gpgme\_get\_gpgsm\_path): Do not cast away type checks.
- \* io.h [W32]: Do not include stdio.h. If it is needed do it at the right place.
- \* data.h [W32]: Removed kludge for EOPNOTSUP.
- \* data.c, data-compat.c [W32]: Explicitly test for it here.

Replaced use of \_WIN32 by HAVE\_W32\_SYSTEM except for public header files.

2005-03-07 Timo Schulz <twoaday@g10code.de>

- \* gpgme.h: [\_WIN32] Removed ssize\_t typedef.
- \* ath.h: [\_WIN32] Added some (dummy) types.
- \* io.h: [\_WIN32] include stdio.h.
- \* data.h: [\_WIN32] Define EOPNOTSUPP.
- \* w32-io.c [\_WIN32] (\_gpgme\_io\_subsystem\_init): New.
- \* gpgme.c [\_WIN32] (gpgme\_set\_locale): Disabled.

2004-12-12 Marcus Brinkmann <marcus@g10code.de>

- \* engine.c (\_gpgme\_set\_engine\_info): Fix assertion.

2004-12-11 Marcus Brinkmann <marcus@g10code.de>

- \* util.h [HAVE\_CONFIG\_H && HAVE\_TTYNAME\_R] (ttyname\_r): Define prototype.
- \* ttyname\_r.c: New file.

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

- \* putc\_unlocked.c, funopen.c: I just claim copyright on these

files and change their license to LGPL, because they are totally trivial wrapper functions.

\* isascii.c: Change copyright notice to the one from ctype/ctype.h in the GNU C Library (CVS Head 2004-10-10), where isascii is defined as a macro doing exactly the same as the function in this file.

\* memchr.c: Update from the GNU C Library (CVS Head 2001-07-06).

\* stpcpy.c: Update from the GNU C Library (CVS Head 2004-10-10).

\* ath.c, ath-compat.c, ath.h, ath-pth.c, ath-pth-compat.c, ath-pthread.c, ath-pthread-compat.c, context.h, conversion.c, data.c, data-compat.c, data-fd.c, data.h, data-mem.c, data-stream.c, data-user.c, debug.c, debug.h, decrypt.c, decrypt-verify.c, delete.c, edit.c, encrypt.c, encrypt-sign.c, engine-backend.h, engine.c, engine-gpgsm.c, engine.h, error.c, export.c, genkey.c, get-env.c, gpgme.c, gpgme.h, import.c, io.h, key.c, keylist.c, mkstatus, Makefile.am, ops.h, op-support.c, passphrase.c, posix-io.c, posix-sema.c, posix-util.c, progress.c, runpgg.c, sema.h, sign.c, signers.c, trust-item.c, trustlist.c, util.h, verify.c, version.c, w32-io.c, w32-sema.c, w32-util.c, wait.c, wait-global.c, wait.h, wait-private.c, wait-user.c: Change license to LGPL.

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* libgpgme.vers (GPGME\_1.1): New version.

\* engine-backend.h (struct engine\_ops): Add argument FILE\_NAME to member get\_version(). Add arguments FILE\_NAME and HOME\_DIR to member new(). Change return type of get\_file\_name and get\_version to char \*.

\* engine-gpgsm.c (gpgsm\_get\_version): Change return type to char pointer. Do not cache result.

(gpgsm\_new): Add file\_name and home\_dir argument, and use them instead of the defaults, if set.

\* runpgg.c (struct engine\_gpg): New member file\_name.

(gpg\_get\_version): Change return type to char pointer, and do not cache result.

(gpg\_release): Free gpg->file\_name.

(gpg\_new): Take new arguments file\_name and home\_dir. Set the --homedir argument if HOME\_DIR is not NULL. Set gpg->file\_name.

(start): Use gpg->file\_name instead \_gpgme\_get\_gpg\_path, if set.

\* engine.h (\_gpgme\_engine\_info\_copy, \_gpgme\_engine\_info\_release): New prototypes.

(\_gpgme\_engine\_new): Change first argument to gpgme\_engine\_info\_t info.

\* engine.c: Include <assert.h>.

(gpgme\_get\_engine\_info): Set \*INFO within the lock. Move ENGINE\_INFO and ENGINE\_INFO\_LOCK to ....

(engine\_info, engine\_info\_lock): ... here. New static variables.



(engine\_get\_version): Add file\_name argument to get\_version invocation. Change return type to char pointer.

(gpgme\_engine\_check\_version): Rewritten to free() the return value of engine\_get\_version after using it.

(\_gpgme\_engine\_info\_release): New function.

(gpgme\_get\_engine\_info): Rewritten.

(\_gpgme\_engine\_info\_copy): New function.

(\_gpgme\_set\_engine\_info): New function.

(gpgme\_set\_engine\_info): New function.

(\_gpgme\_engine\_new): Change first argument to gpgme\_engine\_info\_t info, and use that.

\* gpgme.h (struct \_gpgme\_engine\_info): Change type of file\_name and version to char \* (remove the const). New member home\_dir.

(gpgme\_set\_engine\_info, gpgme\_ctx\_get\_engine\_info, gpgme\_ctx\_set\_engine\_info): New prototypes.

\* context.h (struct gpgme\_context): New member engine\_info.

\* gpgme.c (gpgme\_new): Allocate CTX->engine\_info.

(gpgme\_release): Deallocate CTX->engine\_info.

(gpgme\_ctx\_get\_engine\_info, gpgme\_ctx\_set\_engine\_info): New functions.

\* op-support.c (\_gpgme\_op\_reset): Look for correct engine info and pass it to \_gpgme\_engine\_new.

\* version.c (gpgme\_check\_version): Adjust to \_gpgme\_compare\_versions returning an int.

(\_gpgme\_compare\_versions): Return an int value, not a const char pointer.

\* ops.h (\_gpgme\_compare\_versions): Same for prototype.

2004-10-03 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (parse\_trust): If no reason is provided, set SIG->validity\_reason to 0.

(calc\_sig\_summary): Set GPGME\_SIGSUM\_CRL\_TOO\_OLD if appropriate.

2004-10-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (map\_assuan\_error): Return 0 if ERR is 0.

(start): Call map\_assuan\_error on return value of assuan\_write\_line.

2004-10-05 Marcus Brinkmann <marcus@g10code.de>

\* op-support.c (\_gpgme\_op\_data\_lookup): Use char pointer for pointer arithmetic.

2004-09-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.m4: Implement the --api-version check.

\* `rungpg.c` (`read_status`): Move the polling of the output data pipe to just before removing the command fd, from just before adding it. This avoids buffering problems.

\* `data.c` (`_gpgme_data_inbound_handler`): Use `_gpgme_io_read`, not `read`, to improve debug output.

2004-09-29 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme.h` (`GPGME_IMPORT_NEW`, `GPGME_IMPORT_UID`, `GPGME_IMPORT_SIG`, `GPGME_IMPORT_SUBKEY`, `GPGME_IMPORT_SECRET`, `(GPGME_KEYLIST_MODE_LOCAL`, `GPGME_KEYLIST_MODERN_EXTERN`, `GPGME_KEYLIST_MODE_SIGS`, `GPGME_KEYLIST_MODE_VALIDATE)`): Change from enum to macros.

(`gpgme_keylist_mode_t`): Define as unsigned int.

(`gpgme_key_t`): Change type of `keylist_mode` to `gpgme_keylist_mode_t`.

2004-09-23 Marcus Brinkmann <marcus@g10code.de>

\* `data.c` (`_gpgme_data_outbound_handler`): Close the file descriptor if we get an EPIPE.

\* `data-stream.c` (`stream_seek`): Call `ftello` and return the current offset.

\* `data.h` (`struct gpgme_data`): Change type of `data.mem.offset` to `off_t`.

\* `data.c` (`gpgme_data_seek`): Check `dh->cbs->seek` callback, not read callback. If `SEEK_CUR`, adjust the offset by the pending buffer size. Clear pending buffer on success.

2004-09-14 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme.m4`: Add copyright notice.

2004-08-18 Marcus Brinkmann <marcus@g10code.de>

\* `passphrase.c` (`_gpgme_passphrase_status_handler`): Always run the status handler.

2004-08-17 Marcus Brinkmann <marcus@g10code.de>

\* `rungpg.c` (`build_argv`): Use `--no-sk-comment`, not `--no-comment`.

2004-06-23 Marcus Brinkmann <marcus@g10code.de>

\* key.c (\_gpgme\_key\_append\_name): Make sure tail points to the byte following the uid.  
(\_gpgme\_key\_add\_sig): Likewise. Don't use calloc, but malloc and memset.

2004-06-02 Marcus Brinkmann <marcus@g10code.de>

\* libgpgme.vers: Remove C-style comment, which is not supported by older binutils.

2004-05-21 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in (Options): Support --api-version.

\* libgpgme.vers: List all gpgme symbols under version GPGME\_1.0.

\* decrypt.c (\_gpgme\_decrypt\_status\_handler): Fix last change.

\* verify.c (parse\_error): Likewise.

\* verify.c (parse\_error): Do not skip location of where token.

\* gpgme.h (gpgme\_status\_code\_t): Add GPGME\_STATUS\_REVKEYSIG.

\* verify.c (\_gpgme\_verify\_status\_handler): Add handling of GPGME\_STATUS\_REVKEYSIG.

(parse\_trust): Likewise.

2004-05-21 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_decrypt\_result): New fields wrong\_key\_usage and \_unused.

\* decrypt.c (\_gpgme\_decrypt\_status\_handler): Don't skip over character after a matched string, as in a protocol error this could skip over the trailing binary zero.

Handle decrypt.keyusage error notifications.

\* gpgme.h (struct \_gpgme\_key): New member keylist\_mode.

\* keylist.c (keylist\_colon\_handler): Set the keylist\_mode of KEY.

2004-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_signature): Change member WRONG\_KEY\_USAGE to unsigned int. Same for member \_unused.

\* keylist.c (set\_mainkey\_trust\_info): Rewritten.

(set\_subkey\_capability): Handle 'd' (disabled).

(set\_mainkey\_capability): Rewritten.

2004-04-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.m4: Quote first argument to AC\_DEFUN.

2004-04-21 Werner Koch <wk@gnupg.org>

\* key.c (gpgme\_key\_unref): Allow passing NULL like free does.  
The rule of least surprise.

2004-04-15 Werner Koch <wk@gnupg.org>

\* verify.c (prepare\_new\_sig, \_gpgme\_verify\_status\_handler): Remove  
unused result.signatures items.

\* keylist.c (gpgme\_get\_key): Return an error if FPR is NULL.

2004-04-08 Werner Koch <wk@gnupg.org>

\* verify.c (\_gpgme\_verify\_status\_handler): Ignore the error status  
if we can't process it.

\* decrypt-verify.c (decrypt\_verify\_status\_handler): Backed out  
yesterday's hack. It is not any longer required.

2004-04-07 Werner Koch <wk@gnupg.org>

\* decrypt-verify.c (decrypt\_verify\_status\_handler): Hack to cope  
with meaningless error codes from the verify status function.

2004-04-05 Werner Koch <wk@gnupg.org>

\* gpgme.h: Add GPGME\_STATUS\_NEWSIG.

\* verify.c (parse\_error): Compare only the last part of the where  
token.

(prepare\_new\_sig): New.

(parse\_new\_sig): Use prepare\_new\_sig when required.

(\_gpgme\_verify\_status\_handler): Handle STATUS\_NEWSIG.

\* engine-gpgsm.c (gpgsm\_keylist\_ext): Send with-validation  
option. Fixed pattern construction.

(status\_handler): Add debugging output.

2004-03-23 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Protect \_only\_ tty related code with  
isatty(). Submitted by Bernhard Herzog.

2004-03-11 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_new): Protect all tty related code with isatty().

\* runpg.c (gpg\_cancel): Set GPG->fd\_data\_map to NULL after releasing it.

\* engine-gpgsm.c (gpgsm\_cancel): Only call assuan\_disconnect if GPGSM->assuan\_ctx is not NULL. Set it to NULL afterwards.

2004-03-07 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in: Do not emit include and lib directory for prefix "/usr" or "".

2004-03-03 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (gpgsm\_export\_ext): Properly insert a space between patterns.

2004-02-18 Werner Koch <wk@gnupg.org>

\* gpgme-config.in: Ignore setting of --prefix.

2004-02-25 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (gpg\_cancel): New function.

(gpg\_release): Call it here.

(\_gpgme\_engine\_ops\_gpg): Add it here.

\* engine-gpgsm.c (gpgsm\_cancel): Fix last change.

2004-02-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_cancel): New function.

\* engine-backend.h (struct engine\_ops): New member cancel.

\* engine.h (\_gpgme\_engine\_cancel): New prototype.

\* engine.c (\_gpgme\_engine\_cancel): New function.

\* engine-gpgsm.c (\_gpgme\_engine\_ops\_gpgsm): Add new member cancel.

(gpgsm\_cancel): New function.

(gpgsm\_release): Use it.

\* runpg.c (\_gpgme\_engine\_ops\_gpg): Add new member cancel.

2004-02-17 Werner Koch <wk@gnupg.org>

\* gpgme.h: Add GPGME\_KEYLIST\_MODE\_VALIDATE.

\* engine-gpgsm.c (gpgsm\_keylist): Send this to gpgsm.

2004-02-15 Werner Koch <wk@gnupg.org>

\* memrchr.c (memrchr): Fixed implementation. Problem pointed out

by Adriaan de Groot.

2004-02-01 Marcus Brinkmann <marcus@g10code.de>

\* `runpg.c` (`build_argv`): Use `--no-comment`, not `--comment ""`.

\* `data-compat.c` (`gpgme_data_new_from_filepart`): Call `fseeko` if available.

\* `data-stream.c` (`stream_seek`): Likewise.

2004-01-16 Werner Koch <wk@gnupg.org>

\* `conversion.c` (`_gpgme_map_gnupg_error`): Handle numerical codes as used by GnuPG 1.9.x

2004-01-13 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme.h` (`struct _gpgme_key_sig`): Fix comment on REVOKED.

2004-01-12 Werner Koch <wk@gnupg.org>

\* `sign.c`: Include `util.h` for prototype of `_gpgme_parse_timestamp`.

2003-12-25 Marcus Brinkmann <marcus@g10code.de>

\* `gpgme.h` (`_GPGME_D_CLASS`): Revert this change.

(`struct _gpgme_key_sig`): For C++ compilers, rename class member to `_obsolete_class`. Add new member `sig_class`.

(`struct _gpgme_new_signature`): Same here.

\* `key.c` (`gpgme_key_sig_get_ulong_attr`): Use `CERTSIG->sig_class`, not `CERTSIG->class`.

\* `keylist.c` (`keylist_colon_handler`): Likewise for `KEYSIG`, but keep setting `KEYSIG->class`, too. Rename variable `CLASS` to `SIG_CLASS`.

\* `sign.c` (`parse_sig_created`): Set `SIG->sig_class`.

2003-12-22 Werner Koch <wk@gnupg.org>

\* `gpgme.h` (`_GPGME_D_CLASS`): Kludge for C++ compatibility without changing the C API.

2003-11-19 Werner Koch <wk@gnupg.org>

\* `conversion.c` (`_gpgme_parse_timestamp`): New.

(`atoi_1`, `atoi_2`, `atoi_4`): New.

\* `keylist.c` (`parse_timestamp`): Removed. Changed all callers to use the new function.

\* `verify.c` (`parse_valid_sig`): Ditto. Repalced the `errno` check.

\* `sign.c` (`parse_sig_created`): Ditto.

2003-10-31 Werner Koch <wk@gnupg.org>

\* keylist.c (parse\_timestamp): Detect ISO 8601 timestamps and try to convert them.

2003-10-10 Marcus Brinkmann <marcus@g10code.de>

\* genkey.c (get\_key\_parameter): Make a copy of the key parameters. Submitted by Miguel Coca <e970095@zipi.fi.upm.es>.

2003-10-06 Marcus Brinkmann <marcus@g10code.de>

\* data-compat.c: Include <sys/time.h> before <sys/stat.h> for broken systems.

\* engine-gpgsm.c (map\_assuan\_error): If ERR is -1, return sensible error.

\* io.h (\_gpgme\_io\_subsystem\_init): New prototype.

\* posix-io.c (\_gpgme\_io\_subsystem\_init): Add function.

(\_gpgme\_io\_spawn): Do not fixup signal handler here.

\* version.c (do\_subsystem\_inits): Call \_gpgme\_io\_subsystem\_init.

\* debug.c (debug\_init): Drop const qualifier from E.

\* ath.h (struct ath\_ops): Make ADDR argument of CONNECT prototype const.

(ath\_connect): Make ADDR argument const.

\* ath-pthread.c (ath\_connect): Likewise.

\* ath-pth.c (ath\_connect): Likewise.

\* ath-compat.c (ath\_connect): Likewise.

\* ath.c (ath\_connect): Likewise.

\* ath.h [HAVE\_SYS\_SELECT\_H]: Include <sys/select.h> for fd\_set.

[!HAVE\_SYS\_SELECT\_H]: Include <sys/time.h>.

\* conversion.c (\_gpgme\_hextobyte): Drop "unsigned" from type of SRC argument.

\* util.h (\_gpgme\_hextobyte): Likewise for prototype.

\* gpgme.h: Remove trailing comma in enum.

\* runpg.c: Do not include <time.h>, <sys/time.h>, <sys/types.h>, <signal.h>, <fcntl.h>, or "unistd.h".

2003-10-02 Marcus Brinkmann <marcus@g10code.de>

- \* engine-backend.h (struct engine\_ops): Add argument TYPE.
- \* engine.c (\_gpgme\_engine\_op\_edit): Likewise.
- \* engine.h: Likewise.
- \* runpgg.c (gpg\_edit): Likewise. Use it.
- \* edit.c (edit\_start): Likewise. Pass it on.
- (gpgme\_op\_edit\_start, gpgme\_op\_edit): Likewise.
- (gpgme\_op\_card\_edit\_start, gpgme\_op\_card\_edit): New functions.

2003-09-30 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h (gpg\_strerror\_r): Change prototype to match gpg\_strerror\_r change.
- \* error.c (gpg\_strerror\_r): Likewise, also update implementation.
  
- \* gpgme.c (gpgme\_hash\_algo\_name): Change name of RMD160 to RIPEMD160, name of TIGER to TIGER192, name of CRC32-RFC1510 to CRC32RFC1510, and name of CRC24-RFC2440 to CRC24RFC2440.

2003-09-14 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h: Add prototype for gpgme\_set\_locale.
  
- \* gpgme.h: Define macro \_GPGME\_INLINE depending on the compiler characteristics and use that instead \_\_inline\_\_.
  
- \* context.h (struct gpgme\_context): New members lc\_ctype and lc\_messages.
- \* gpgme.c: Include <locale.h>.
- (def\_lc\_lock, def\_lc\_ctype, def\_lc\_messages): New static variables.
- (gpgme\_set\_locale): New function.
- \* engine.c (\_gpgme\_engine\_new): Add arguments lc\_ctype and lc\_messages.
- \* engine.h (\_gpgme\_engine\_new): Likewise.
- \* engine-gpgsm.c (gpgsm\_new): Likewise.
- \* runpgg.c (gpg\_new): Likewise.
- \* engine-backend.h (struct engine\_ops): Likewise to NEW.
- \* op-support.c (\_gpgme\_op\_reset): Likewise to invocation of \_gpgme\_engine\_new.

2003-09-13 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h (gpgme\_strerror\_r): New prototype.
- \* error.c (gpgme\_strerror\_r): New function.
  
- \* get-env.c: New file.
- \* util.h (\_gpgme\_getenv): Add prototype.
- \* Makefile.am (libgpgme\_real\_la\_SOURCES): Add get-env.c.



- \* `runpgg.c` (`build_argv`): Use `_gpgme_getenv`.
- \* `debug.c` (`debug_init`): Likewise.
- \* `engine-gpgsm.c` (`gpgsm_new`): Likewise.

(`gpgsm_new`): Use `ttname_r`.

- \* `w32-io.c` (`_gpgme_io_spawn`): Disable debugging for now.

2003-09-03 Marcus Brinkmann <marcus@g10code.de>

- \* `gpgme-config.in`: Use `$libdir`, not `@libdir@`, for the echo command.
- \* `gpgme-config.in`: Rewritten.
- \* `gpgme.m4`: Rewritten.

2003-08-19 Marcus Brinkmann <marcus@g10code.de>

The `ath` files (`ath.h`, `ath.c`, `ath-pth.c`, `ath-pthread.c`, `ath-compat.c`, `ath-pth-compat.c` and `ath-pthread-compat.c`) have been updated to have better thread support, and the `Makefile.am` was changed to reflect that.

- \* `util.h` [`!HAVE_FOPENCOOKIE`]: Remove `fopencookie` declaration.
- \* `engine-gpgsm.c` (`gpgsm_assuan_simple_command`): Set `ERR` to return value of `status_fnc`.
- \* `runpgg.c` (`start`): Return `SAVED_ERRNO`, not `errno`.

2003-08-18 Marcus Brinkmann <marcus@g10code.de>

- \* `runpgg.c` (`start`): Use `saved_errno` instead `errno`.

2003-08-18 Marcus Brinkmann <marcus@g10code.de>

- \* `funopen.c`, `putc_unlocked.c`, `isascii.c`, `memrchr.c`: New files.
- \* `fopencookie.c`: File removed.

2003-08-15 Marcus Brinkmann <marcus@g10code.de>

- \* `gpgme-config.in`: Put `gpg-error` related flags after `gpgme`'s.

2003-08-14 Marcus Brinkmann <marcus@g10code.de>

- \* `gpgme.h` (`struct _gpgme_new_signature`): Rename member `CLASS` to `_OBSOLETE_CLASS`, add member `CLASS` with type unsigned int.
- \* `sign.c` (`parse_sig_created`): Also set `SIG->_unused_class` for backward compatibility.

2003-08-04 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (parse\_new\_sig): Fix status parsing case.

2003-07-31 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_subkey): Add flag CAN\_AUTHENTICATE.

Lower \_UNUSED to 23 bits.

(struct \_gpgme\_key): Likewise.

\* keylist.c (set\_mainkey\_capability): Support 'a' and 'A'.

(set\_subkey\_capability): Support 'a'.

\* keylist.c (gpgme\_get\_key): Check if there is more than one key

listed, and return GPG\_ERR\_AMBIGUOUS\_NAME in that case.

\* util.h (\_gpgme\_decode\_c\_string): Change type of LEN argument to size\_t.

(\_gpgme\_decode\_percent\_string): Likewise.

\* conversion.c (\_gpgme\_decode\_c\_string): Likewise.

(\_gpgme\_decode\_percent\_string): Likewise.

(\_gpgme\_map\_gnupg\_error): Change type of I to unsigned int.

\* signers.c (gpgme\_signers\_clear): Likewise.

(gpgme\_signers\_enum): New unsigned variable SEQNO, set to SEQ. Use SEQNO instead SEQ.

\* wait.c (fd\_table\_put): Change type of I and J to unsigned int.

\* wait-global.c (\_gpgme\_wait\_global\_event\_cb): Change type of IDX to unsigned int.

(gpgme\_wait): Change type of I and IDX to unsigned int.

\* wait-private.c (\_gpgme\_wait\_on\_condition): Change type of IDX and I to unsigned int.

\* posix-io.c (\_gpgme\_io\_close): Cast return value of macro DIM to int to suppress gcc warning.

(\_gpgme\_io\_set\_close\_notify): Likewise.

(\_gpgme\_io\_select): Change type of I to unsigned int.

\* engine.c (gpgme\_get\_engine\_info): Change type of PROTO to unsigned int.

\* wait-user.c (\_gpgme\_user\_io\_cb\_handler): Change type of IDX and I to unsigned int.

2003-07-29 Marcus Brinkmann <marcus@g10code.de>

\* decrypt-verify.c (decrypt\_verify\_status\_handler): Expand silly and wrong expression.

\* encrypt-sign.c (encrypt\_sign\_status\_handler): Likewise.

\* encrypt.c (encrypt\_sym\_status\_handler): Likewise.

\* sign.c (sign\_status\_handler): Likewise.

\* verify.c (verify\_status\_handler): Likewise.

\* decrypt.c (decrypt\_status\_handler): Likewise.

\* engine.c (gpgme\_get\_engine\_info): Initialize NULL.

2003-07-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme-config.in (gpg\_error\_libs): Quote GPG\_ERROR\_CFLAGS and GPG\_ERROR\_LIBS when setting the corresponding variables.  
Reported by Stphane Corthisy.

2003-07-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (set\_recipients): Move declaration of NEWLEN to the beginning of the block.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

\* data-mem.c (mem\_write): Copy original buffer content.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_user\_ids\_release, gpgme\_user\_ids\_append): Remove prototypes.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (AM\_CPPFLAGS): Add @GPG\_ERROR\_CFLAGS@.  
\* gpgme-config.in (gpg\_error\_libs, gpg\_error\_cflags): New variables.  
Print them.

\* op-support.c (\_gpgme\_parse\_inv\_userid): Rename to \_gpgme\_parse\_inv\_recp and change to new datatype.  
\* ops.h (\_gpgme\_parse\_inv\_key): Fix prototype.  
\* gpgme.h (struct \_gpgme\_invalid\_user\_id): Rename to \_\_gpgme\_invalid\_key. Rename field ID to KEY.  
(gpgme\_invalid\_user\_id\_t): Rename to gpgme\_invalid\_key\_t.  
(struct \_gpgme\_op\_encrypt\_result): Here, too.  
(struct \_gpgme\_op\_sign\_result): Likewise.  
\* encrypt.c (struct op\_data): Likewise.  
(release\_op\_data): Likewise.  
\* sign.c (struct op\_data): Likewise.  
(release\_op\_data): Likewise.

\* posix-io.c (\_gpgme\_io\_read): Save errno across debug calls.  
(\_gpgme\_io\_write): Likewise.  
(\_gpgme\_io\_pipe): Likewise.  
(\_gpgme\_io\_select): Likewise.

\* runpgg.c (struct engine\_gpg): Remove arg\_error.  
(add\_arg): Don't set arg\_error.  
(add\_data): Likewise.

(start): Don't check arg\_error.  
(gpg\_new): Check return value of add\_arg.  
\* verify.c (parse\_notation): Free allocated memory at error.

2003-06-05 Marcus Brinkmann <marcus@g10code.de>

Everywhere: Use libgpg-error error codes.

\* Makefile.am (EXTRA\_DIST): Remove mkerrors.  
(BUILT\_SOURCES): Remove errors.c.  
(MOSTLYCLEANFILES): Likewise.  
(libgpgme\_la\_SOURCES): Likewise. Add error.c.  
(errors.c): Remove target.  
\* mkerrors: File removed.  
\* error.c: New file.  
  
\* gpgme.h (gpgme\_error\_t): Change to type gpg\_error\_t.  
(gpgme\_err\_code\_t, gpgme\_err\_source\_t): New types.  
(gpgme\_err\_code, gpgme\_err\_source, gpgme\_error, gpgme\_err\_make):  
New static inline functions.  
(gpgme\_strsource, gpgme\_err\_code\_from\_errno,  
gpgme\_err\_code\_to\_errno, gpgme\_err\_make\_from\_errno,  
gpgme\_error\_from\_errno): New prototypes.

2003-05-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_op\_export\_start): Change second arg to const char \*.  
(gpgme\_op\_export): Likewise.  
(gpgme\_op\_export\_ext\_start): New prototype.  
(gpgme\_op\_export\_ext): Likewise.  
\* engine.h: Likewise for \_gpgme\_engine\_op\_export and  
\_gpgme\_engine\_op\_export\_ext.  
\* engine-backend.h (struct engine\_ops): Change second argument of  
prototype of export to const char \*, and add reserved int as  
third argument. Add prototype for export\_ext.  
\* engine.c (\_gpgme\_engine\_op\_export\_ext): New function.  
(\_gpgme\_engine\_op\_export): Change second argument of prototype of  
export to const char \*, and add reserved int as third argument.  
\* runpg.c (gpg\_export): Change second argument of prototype of  
export to const char \*, and add reserved int as third argument.  
(gpg\_export\_ext): New function.  
(gpg\_keylist\_ext): Break loop at error.  
(\_gpgme\_engine\_ops\_gpg): Add gpg\_export\_ext.  
\* engine-gpgsm.c (gpgsm\_export): Change second argument of  
prototype of export to const char \*, and add reserved int as  
third argument.  
(gpgsm\_export\_ext): New function.  
(\_gpgme\_engine\_ops\_gpgsm): Add gpgsm\_export\_ext.

\* export.c (export\_start): Change second argument of prototype of export to const char \*, and add reserved int as third argument.  
 (gpgme\_op\_export\_start): Likewise.  
 (export\_ext\_start): New function.  
 (gpgme\_op\_export\_ext\_start): Likewise.  
 (gpgme\_op\_export\_ext): Likewise.

\* gpgme.h (gpgme\_keylist\_mode\_t): New type for anonymous enum.  
 (gpgme\_sigsum\_t): New type for anonymous enum.

\* encrypt-sign.c (encrypt\_sign\_start): Check for errors earlier, and return an error if RECP is not set.

\* Makefile.am (libgpgme\_la\_SOURCES): Remove user-id.c.  
 \* user-id.c: Remove file.  
 \* ops.h: Remove prototype for \_gpgme\_user\_ids\_all\_valid.  
 \* gpgme.h (gpgme\_encrypt\_flags\_t): New type.  
 (gpgme\_op\_encrypt\_start): Change second parameter to type gpgme\_key\_t[], and add third parameter.  
 (gpgme\_op\_encrypt): Likewise.  
 (gpgme\_op\_encrypt\_sign\_start): Likewise.  
 (gpgme\_op\_encrypt\_sign): Likewise.  
 \* encrypt.c (encrypt\_start): Likewise.  
 (gpgme\_op\_encrypt\_start): Likewise.  
 (gpgme\_op\_encrypt): Likewise. Pass flags to engine.  
 \* encrypt-sign.c (encrypt\_sign\_start): Likewise.  
 (gpgme\_op\_encrypt\_sign\_start): Likewise.  
 (gpgme\_op\_encrypt\_sign): Likewise.  
 \* engine-backend.h (struct engine\_ops): Likewise for prototypes of encrypt and encrypt\_sign.  
 \* engine.h: Likewise for prototypes of \_gpgme\_engine\_op\_encrypt and \_gpgme\_engine\_op\_encrypt\_sign.  
 \* engine.c (\_gpgme\_engine\_op\_encrypt): Likewise.  
 (\_gpgme\_engine\_op\_encrypt\_sign): Likewise.  
 \* runpg.c (gpg\_encrypt): Likewise.  
 (gpg\_encrypt\_sign): Likewise.  
 \* runpg.c (gpg\_encrypt): Check flags for always trust option.  
 \* engine-gpgsm.c (gpgsm\_encrypt): Likewise.  
 (set\_recipients): Rewritten to use keys instead user IDs.  
 \* runpg.c (append\_args\_from\_recipients): Rewritten to use keys instead user IDs.  
 \* encrypt.c (\_gpgme\_encrypt\_status\_handler): Change errors returned to GPGME\_Invalid\_Key and GPGME\_General\_Error.

2003-05-28 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Rename GpgsmObject to engine\_gpgsm\_t.  
 (struct gpgsm\_object\_s): Rename to struct engine\_gpgsm.

\* `runpgg.c`: Rename `GpgObject` to `engine_gpg_t`.  
 (`struct gpg_object_s`): Rename to `struct engine_gpg`.

\* `context.h` (`struct gpgme_context`): Change `EngineObject` to `engine_object_t`.  
 (`enum ctx_op_data_type`): Rename to `ctx_op_data_id_t`.  
 (`ctx_op_data_t`): New type.  
 (`struct gpgme_context`): Use it.

\* `ops.h` (`_gpgme_op_data_lookup`): Use new type name.  
 \* `op-support.c` (`_gpgme_op_data_lookup`): Likewise.

\* `engine.c`: Rename `EngineObject` to `engine_t` in the file. Also  
`EngineStatusHandler` to `engine_status_handler_t`,  
`EngineCommandHandler` to `engine_command_handler_t` and  
`EngineColonLineHandler` to `engine_colon_line_handler`.

\* `runpgg.c` (`start`): Likewise.  
 \* `engine-gpgsm.c`: Likewise.

\* `engine-backend.h` (`struct engine_ops`): Likewise  
 \* `engine.h` (`struct engine_object_s`): Rename to `struct engine`.  
 (`EngineObject`): Rename to `engine_t`. Also everywhere else in the  
 file.  
 (`EngineStatusHandler`): Rename to `engine_status_handler_t`.  
 (`EngineColonLineHandler`): Rename to `engine_colon_line_handler_t`.  
 (`EngineCommandHandler`): Rename to `engine_command_handler_t`.

\* `engine-gpgsm.c` (`gpgsm_export`): Fix bug in last change.

\* `Makefile.am` (`libgpgme_la_SOURCES`): Remove `recipient.c`, add  
`user-id.c`.

\* `gpgme.h` (`gpgme_recipients_t`): Removed.  
 (`gpgme_recipients_new`, `gpgme_recipients_release`,  
`gpgme_recipients_add_name`,  
`gpgme_recipients_add_name_with_validity`, `gpgme_recipients_count`,  
`gpgme_recipients_enum_open`, `gpgme_recipients_enum_read`,  
`gpgme_recipients_enum_close`): Removed.  
 (`gpgme_op_encrypt`, `gpgme_op_encrypt_start`, `gpgme_op_encrypt_sign`,  
`gpgme_op_encrypt_sign_start`, `gpgme_op_export_start`,  
`gpgme_op_export`): Change second argument to `gpgme_user_id_t`.  
 (`gpgme_user_ids_release`): New prototype.  
 (`gpgme_user_ids_append`): Likewise.

\* `ops.h` (`_gpgme_recipients_all_valid`): Remove.  
 (`_gpgme_user_ids_all_valid`): Add.

\* `context.h` (`struct gpgme_recipients`): Removed.  
 \* `user-id.c`: New file.  
 \* `recipient.c`: Removed file.

\* `runpgg.c` (`append_args_from_recipients`): Change last arg to  
`gpgme_user_id_t`. Reimplement.  
 (`gpg_encrypt`): Change second arg to `gpgme_user_id_t`.  
 (`gpg_encrypt_sign`): Likewise.

(gpg\_export): Likewise. Rewrite user ID list code.  
\* engine.c (\_gpgme\_engine\_op\_encrypt): Change second arg to gpgme\_user\_id\_t.  
(\_gpgme\_engine\_op\_encrypt\_sign): Likewise.  
(\_gpgme\_engine\_op\_export): Likewise.  
\* engine.h (\_gpgme\_engine\_op\_encrypt, \_gpgme\_engine\_op\_encrypt\_sign, \_gpgme\_engine\_op\_export): Likewise.  
\* engine-gpgsm.c (set\_recipients): Likewise. Rewrite loop code.  
(gpgsm\_encrypt): Likewise.  
(gpgsm\_export): Likewise.  
\* engine-backend.h (struct engine\_ops): Likewise for members ENCRYPT, ENCRYPT\_SIGN and EXPORT.  
\* export.c (export\_start, gpgme\_op\_export\_start, gpgme\_op\_export): Likewise.  
\* encrypt.c (encrypt\_start): Likewise. Don't check for count of recipients.  
(gpgme\_op\_encrypt\_start): Likewise.  
(gpgme\_op\_encrypt): Likewise.  
\* encrypt-sign.c (encrypt\_sign\_start): Likewise.  
(gpgme\_op\_encrypt\_sign): Likewise.  
(gpgme\_op\_encrypt\_sign\_start): Likewise.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (struct \_gpgme\_op\_import\_result): Add skipped\_new\_keys.  
\* import.c (parse\_import\_res): Add skipped\_new\_keys parser.  
  
\* op-support.c (\_gpgme\_parse\_inv\_userid): Add missing break statements.  
\* encrypt.c (gpgme\_op\_encrypt): Use gpgme\_error\_t instead of int.

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\* encrypt.c (gpgme\_op\_encrypt\_result): Use intermediate variable HOOK to avoid compiler warning. Don't ask, you don't want to know.  
(\_gpgme\_encrypt\_status\_handler): Likewise.  
(\_gpgme\_op\_encrypt\_init\_result): Likewise.  
\* decrypt.c (gpgme\_op\_decrypt\_result): Likewise.  
(\_gpgme\_decrypt\_status\_handler): Likewise.  
(\_gpgme\_op\_decrypt\_init\_result): Likewise.  
\* verify.c (gpgme\_op\_verify\_result): Likewise.  
(\_gpgme\_verify\_status\_handler): Likewise.  
(\_gpgme\_op\_verify\_init\_result): Likewise.  
\* edit.c (edit\_status\_handler): Likewise.  
(command\_handler): Likewise.  
(edit\_start): Likewise.  
\* genkey.c (gpgme\_op\_genkey\_result): Likewise.  
(genkey\_status\_handler): Likewise.

(genkey\_start): Likewise.  
\* import.c (gpgme\_op\_import\_result): Likewise.  
(import\_status\_handler): Likewise.  
(\_gpgme\_op\_import\_start): Likewise.  
\* trustlist.c (gpgme\_op\_trustlist\_next): Likewise.  
(\_gpgme\_op\_trustlist\_event\_cb): Likewise.  
(gpgme\_op\_trustlist\_start): Likewise.  
\* keylist.c (gpgme\_op\_keylist\_result): Likewise.  
(keylist\_colon\_handler): Likewise.  
(keylist\_status\_handler): Likewise.  
(\_gpgme\_op\_keylist\_event\_cb): Likewise.  
(gpgme\_op\_keylist\_start): Likewise.  
(gpgme\_op\_keylist\_ext\_start): Likewise.  
(gpgme\_op\_keylist\_next): Likewise.  
\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Likewise.  
(\_gpgme\_passphrase\_command\_handler\_internal): Likewise.  
\* sign.c (gpgme\_op\_sign\_result): Likewise.  
(\_gpgme\_sign\_status\_handler): Likewise.  
(\_gpgme\_op\_sign\_init\_result): Likewise.  
  
\* passphrase.c (\_gpgme\_passphrase\_command\_handler\_internal): Fix access to pointer type.

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\* engine.h (EngineCommandHandler): Change last argument to int fd.  
\* gpgme.h (gpgme\_passphrase\_cb\_t): Rewritten to take parts of the description and fd.  
(gpgme\_edit\_cb\_t): Change last argument to int fd.  
\* ops.h (\_gpgme\_passphrase\_command\_handler\_internal): New prototype.  
\* passphrase.c: Include <assert.h>.  
(op\_data\_t): Rename userid\_hint to uid\_hint, remove last\_pw\_handle.  
(release\_op\_data): Check values before calling free.  
(\_gpgme\_passphrase\_status\_handler): Likewise.  
(\_gpgme\_passphrase\_command\_handler\_internal): New function.  
(\_gpgme\_passphrase\_command\_handler): Rewritten.  
\* edit.c (edit\_status\_handler): Pass -1 as fd argument.  
(command\_handler): Update prototype. New variable processed. Use it to store return value of  
\_gpgme\_passphrase\_command\_handler\_internal which is now used instead \_gpgme\_passphrase\_command\_handler. Use it also to check if we should call the user's edit function. Pass fd to user's edit function.  
\* runpg.c (struct gpg\_object\_s): Change type of cmd.cb\_data to void \*.  
(gpg\_release): Check value before calling free. Do not release cmd.cb\_data.  
(command\_cb): Function removed.



(command\_handler): New function. Thus we don't use a data object for command handler stuff anymore, but handle it directly. This allows proper error reporting (cancel of passphrase requests, for example). Also all callbacks work via direct writes to the file descriptor (so that passphrases are not kept in insecure memory).  
(gpg\_set\_command\_handler): Rewritten to use even more ugly hacks.  
(read\_status): Check cmd.keyword before calling free. Install command\_handler as the I/O callback handler with GPG as private data.

\* runpg.c (gpg\_new): Add --enable-progress-filter to gpg invocation.  
\* decrypt-verify.c (\_gpgme\_op\_decrypt\_verify\_start): Rename to decrypt\_verify\_start.  
(gpgme\_op\_decrypt\_verify\_start): Call decrypt\_verify\_start.  
(gpgme\_op\_decrypt\_verify): Likewise.  
\* verify.c (verify\_status\_handler): New function that also calls progress status handler.  
(\_gpgme\_op\_verify\_start): Set status handler to verify\_status\_handler. Rename to (verify\_start).  
(gpgme\_op\_verify\_start): Call verify\_start.  
(gpgme\_op\_verify): Likewise.  
\* encrypt.c (encrypt\_status\_handler): New function.  
(\_gpgme\_encrypt\_sym\_status\_handler): Call progress status handler. Make static. Rename to encrypt\_sym\_status\_handler.  
(encrypt\_start): Set status handler to encrypt\_sym\_status\_handler or encrypt\_status\_handler.  
\* sign.c (sign\_status\_handler): New function.  
(sign\_start): Set status handler to sign\_status\_handler.  
\* decrypt.c (decrypt\_status\_handler): New function that also calls progress status handler.  
(decrypt\_start): Set status handler to decrypt\_status\_handler.  
\* encrypt-sign.c (encrypt\_sign\_status\_handler): Likewise.  
\* decrypt-verify.c (decrypt\_verify\_status\_handler): Call \_gpgme\_progress\_status\_handler.  
  
\* conversion.c (\_gpgme\_decode\_c\_string): Add missing break statement.  
  
\* recipient.c (gpgme\_recipients\_add\_name\_with\_validity): Add one to buffer to allocate.

2003-05-19 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (parse\_new\_sig): Fix ERRSIG case.  
Submitted by Benjamin Lee <benjaminlee@users.sf.net>.

2003-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: The following types are renamed. The old name is kept as a deprecated typedef.

(GpgmeCtx): Rename to gpgme\_ctx\_t.  
(GpgmeData): Rename to gpgme\_data\_t.  
(GpgmeRecipients): Rename to gpgme\_recipients\_t.  
(GpgmeError): Rename to gpgme\_error\_t.  
(GpgmeDataEncoding): Rename to gpgme\_data\_encoding\_t.  
(GpgmePubKeyAlgo): Rename to gpgme\_pubkey\_algo\_t.  
(GpgmeHashAlgo): Rename to gpgme\_hash\_algo\_t.  
(GpgmeSigStat): Rename to gpgme\_sig\_stat\_t.  
(GpgmeSigMode): Rename to gpgme\_sig\_mode\_t.  
(GpgmeAttr): Rename to gpgme\_attr\_t.  
(GpgmeValidity): Rename to gpgme\_validity\_t.  
(GpgmeProtocol): Rename to gpgme\_protocol\_t.  
(GpgmeStatusCode): Rename to gpgme\_status\_code\_t.  
(GpgmeEngineInfo): Rename to gpgme\_engine\_info\_t.  
(GpgmeSubkey): Rename to gpgme\_subkey\_t.  
(GpgmeKeySig): Rename to gpgme\_keysig\_t.  
(GpgmeUserID): Rename to gpgme\_user\_id\_t.  
(GpgmePassphraseCb): Rename to gpgme\_passphrase\_cb\_t.  
(GpgmeProgressCb): Rename to gpgme\_progress\_cb\_t.  
(GpgmeEditCb): Rename to gpgme\_edit\_cb\_t.  
(GpgmeIOCb): Rename to gpgme\_io\_cb\_t.  
(GpgmeRegisterIOCb): Rename to gpgme\_register\_io\_cb\_t.  
(GpgmeRemoveIOCb): Rename to gpgme\_remove\_io\_cb\_t.  
(GpgmeEventIO): Rename to gpgme\_event\_io\_t.  
(GpgmeEventIOCb): Rename to gpgme\_event\_io\_cb\_t.  
(GpgmeIOCb): Rename to gpgme\_io\_cbs.  
(gpgme\_io\_cbs\_t): New type.  
(GpgmeDataReadCb): Rename to gpgme\_data\_read\_cb\_t.  
(GpgmeDataWriteCb): Rename to gpgme\_data\_write\_cb\_t.  
(GpgmeDataSeekCb): Rename to gpgme\_data\_seek\_cb\_t.  
(GpgmeDataReleaseCb): Rename to gpgme\_data\_release\_cb\_t.  
(GpgmeDataCbs): Rename to gpgme\_data\_cbs.  
(gpgme\_data\_cbs\_t): New type.  
(GpgmeInvalidUserID): Rename to gpgme\_invalid\_user\_id\_t.  
(GpgmeEncryptResult): Rename to gpgme\_encrypt\_result\_t.  
(GpgmeDecryptResult): Rename to gpgme\_decrypt\_result\_t.  
(GpgmeNewSignature): Rename to gpgme\_new\_signature\_t.  
(GpgmeSignResult): Rename to gpgme\_sign\_result\_t.  
(GpgmeSigNotation): Rename to gpgme\_sig\_notation\_t.  
(GpgmeSignature): Rename to gpgme\_signature\_t.  
(GpgmeVerifyResult): Rename to gpgme\_verify\_result\_t.  
(GpgmeImportStatus): Rename to gpgme\_import\_status\_t.  
(GpgmeImportResult): Rename to gpgme\_import\_result\_t.  
(GpgmeGenKeyResult): Rename to gpgme\_genkey\_result\_t.  
(GpgmeKeyListResult): Rename to gpgme\_keylist\_result\_t.

(GpgmeTrustItem): Rename to gpgme\_trust\_item\_t.  
\* gpgme.h (gpgme\_deprecated\_error\_t): New type, swallowing macros  
GPGME\_No\_Recipients, GPGME\_Invalid\_Recipient and  
GPGME\_No\_Passphrase.  
\* data.h (struct gpgme\_data\_s): Rename to struct gpgme\_data.  
\* context.h (struct gpgme\_context\_s): Rename to struct  
gpgme\_context.  
(struct gpgme\_recipients\_s): Rename to gpgme\_recipients.

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\* keylist.c (finish\_key): Clear OPD->tmp\_uid.

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\* verify.c (\_gpgme\_verify\_status\_handler): Return GPGME\_No\_Data  
for NODATA status without signatures.

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\* key.c (\_gpgme\_key\_append\_name): Use decoded string to parse user id.  
(\_gpgme\_key\_add\_sig): Likewise.

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\* context.h (struct gpgme\_context\_s): Remove member op\_info.

\* key.c (\_gpgme\_key\_add\_sig): Initialize SIG->uid.

\* gpgme.h (GpgmeError): Add deprecated values for  
GPGME\_Invalid\_Type and GPGME\_Invalid\_Mode.

2003-04-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_get\_op\_info): Remove prototype.  
\* ops.h (\_gpgme\_set\_op\_info,  
\_gpgme\_data\_release\_and\_return\_string, \_gpgme\_data\_get\_as\_string,  
\_gpgme\_data\_append, \_gpgme\_data\_append\_string,  
\_gpgme\_data\_append\_string\_for\_xml, \_gpgme\_data\_append\_for\_xml,  
\_gpgme\_data\_append\_percentstring\_for\_xml): Likewise.  
(\_gpgme\_progress\_status\_handler): Change first arg to void \*.  
\* progress.c (\_gpgme\_progress\_status\_handler): Likewise.  
\* conversion.c: Do not include <string.h>, <errno.h>, <ctype.h>,  
and <sys/types.h>, but <string.h>.  
(\_gpgme\_data\_append): Remove function.  
(\_gpgme\_data\_append\_string): Likewise.  
(\_gpgme\_data\_append\_for\_xml): Likewise.  
(\_gpgme\_data\_append\_string\_for\_xml): Likewise.

(\_gpgme\_data\_append\_percentstring\_for\_xml): Likewise.  
 \* data-mem.c (\_gpgme\_data\_get\_as\_string): Likewise.  
 (\_gpgme\_data\_release\_and\_return\_string): Likewise.  
 \* gpgme.c (gpgme\_get\_op\_info): Likewise.  
 (\_gpgme\_set\_op\_info): Likewise.

\* gpgme.h (struct \_gpgme\_key): New structure.  
 (GpgmeKey): Define using \_gpgme\_key.  
 (struct \_gpgme\_subkey): New structure.  
 (GpgmeSubKey): New type.  
 (struct \_gpgme\_key\_sig): New structure.  
 (GpgmeKeySig): New type.  
 (struct \_gpgme\_user\_id): New structure.  
 (GpgmeUserID): New type.  
 (struct \_gpgme\_op\_keylist\_result): New structure.  
 (GpgmeKeyListResult): New type.  
 (gpgme\_op\_keylist\_result): New function.  
 (gpgme\_key\_get\_as\_xml): Remove prototype.

\* context.h (struct gpgme\_context\_s): Remove members tmp\_key,  
 tmp\_uid, key\_cond and key\_queue.  
 (struct key\_queue\_item\_s): Remove structure.  
 (struct user\_id\_s): Remove structure.  
 (struct gpgme\_recipients\_s): Replace with simple  
 GpgmeUserID list.

\* gpgme.c (gpgme\_release): Do not release CTX->tmp\_key.  
 \* ops.h (\_gpgme\_key\_add\_subkey, \_gpgme\_key\_append\_name,  
 \_gpgme\_key\_add\_sig, \_gpgme\_trust\_item\_new): New prototypes.  
 \* runpg.c (command\_cb): Return GpgmeError instead int.  
 New variable ERR. Use it to hold return value of cmd handler.  
 (gpg\_delete): Access fingerprint of key directly.  
 (append\_args\_from\_signers): Likewise.  
 (gpg\_edit): Likewise.  
 (append\_args\_from\_recipients): Use GpgmeUserID for recipient list.

\* engine-gpgsm.c: Do not include "key.h".  
 (gpgsm\_delete): Access fingerprint of key directly.  
 (gpgsm\_sign): Likewise.  
 (set\_recipients): Use GpgmeUserID for recipients. Invert invalid  
 user ID flag.

\* key.h: File removed.  
 \* key.c: Completely reworked to use exposed GpgmeKey data types.  
 \* keylist.c: Likewise.  
 \* recipient.c: Completely reworked to use GpgmeUserID.

2003-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_get\_key): Remove force\_update argument.  
 \* key-cache.c: File removed.  
 \* Makefile.am (libgpgme\_la\_SOURCES): Remove key-cache.c.

\* ops.h (`_gpgme_key_cache_add`, `_gpgme_key_cache_get`): Remove prototypes.

\* keylist.c (`_gpgme_op_keylist_event_cb`): Don't call `_gpgme_key_cache_add`.

(`gpgme_get_key`): New function.

\* verify.c (`gpgme_get_sig_key`): Remove last argument to `gpgme_get_key` invocation.

\* gpgme.h (struct `_gpgme_trust_item`): New structure.

(`GpgmeTrustItem`): New type.

(`gpgme_trust_item_ref`, `gpgme_trust_item_unref`): New prototypes.

\* context.h (struct `trust_queue_item_s`): Remove structure.

(struct `gpgme_context_s`): Remove `trust_queue` member.

\* Makefile.am (libgpgme\_la\_SOURCES): Add `trust-item.c`.

\* trust-item.c: New file.

\* trustlist.c: Do not include `<stdio.h>` or `<time.h>`, but `"gpgme.h"`.

(struct `trust_queue_item_s`): Change to new type `op_data_t`.

(`trust_status_handler`): Change first argument to void \*.

(`trust_colon_handler`): Likewise.

(`_gpgme_op_trustlist_event_cb`): Use `op_data_t` type.

(`gpgme_op_trustlist_start`): Use `op_data_t` and rework error handling.

(`gpgme_op_trustlist_next`): Use `op_data_t`.

(`gpgme_trust_item_release`): Remove function.

(`gpgme_trust_item_get_string_attr`): Likewise.

(`gpgme_trust_item_get_int_attr`): Likewise.

\* verify.c (`calc_sig_summary`): Do not set `GPGME_SIGSUM_SYS_ERROR` for bad signatures.

2003-04-28 Marcus Brinkmann <marcus@g10code.de>

\* context.h: Remove `OPDATA_VERIFY_COLLECTING`.

(struct `gpgme_context_s`): Remove member notation.

\* gpgme.h: Make enum for `GPGME_KEYLIST_MODE_*` values.

\* gpgme.h (struct `_gpgme_sig_notation`): New structure.

(`GpgmeSigNotation`): New type.

(struct `_gpgme_signature`): New structure.

(`GpgmeSignature`): New type.

(struct `_gpgme_op_verify_result`): New structure.

(`GpgmeVerifyResult`): New type.

(`gpgme_op_verify_result`): New prototype.

(`gpgme_get_notation`): Remove prototype.

\* ops.h (`_gpgme_op_verify_init_result`): New prototype.

(`_gpgme_verify_status_handler`): Change first argument to void \*.

\* util.h (`_gpgme_decode_percent_string`, `_gpgme_map_gnupg_error`):

New prototypes.

- \* conversion.c (`_gpgme_decode_percent_string`): New function.
- (`gnupg_errors`): New static global.
- (`_gpgme_map_gnupg_error`): New function.
- \* gpgme.c (`gpgme_release`): Don't release CTX->notation.
- (`gpgme_get_notation`): Remove function.
- \* decrypt-verify.c (`_gpgme_op_decrypt_verify_start`): Call `_gpgme_op_verify_init_result`.
- \* verify.c: Do not include `<stdio.h>`, `<assert.h>` and "key.h", but do include "gpgme.h".
- (`struct verify_result`): Replace with ...
- (`op_data_t`): ... this type.
- (`release_verify_result`): Remove function.
- (`release_op_data`): New function.
- (`is_token`): Remove function.
- (`skip_token`): Remove function.
- (`copy_token`): Remove function.
- (`gpgme_op_verify_result`): New function.
- (`calc_sig_summary`): Rewritten.
- (`finish_sig`): Remove function.
- (`parse_new_sig`): New function.
- (`parse_valid_sig`): New function.
- (`parse_notation`): New function.
- (`parse_trust`): New function.
- (`parse_error`): New function.
- (`_gpgme_verify_status_handler`): Rewritten. Change first argument to void \*.
- (`_gpgme_op_verify_start`): Rework error handling. Call `_gpgme_op_verify_init_result`.
- (`gpgme_op_verify`): Do not release or clear CTX->notation.
- (`gpgme_get_sig_status`): Rewritten.
- (`gpgme_get_sig_string_attr`): Likewise.
- (`gpgme_get_sig_ulong_attr`): Likewise.
- (`gpgme_get_sig_key`): Likewise.
  
- \* gpgme.h (`struct _gpgme_op_decrypt_result`): New structure.
- (`GpgmeDecryptResult`): New type.
- (`gpgme_op_decrypt_result`): New prototype.
- \* ops.h (`_gpgme_op_decrypt_init_result`): New prototype.
- (`_gpgme_decrypt_status_handler`): Fix prototype.
- (`_gpgme_decrypt_start`): Remove prototype.
- \* decrypt-verify.c: Do not include `<stdio.h>`, `<stdlib.h>`, `<string.h>` and `<assert.h>`, "util.h" and "context.h", but "gpgme.h".
- (`decrypt_verify_status_handler`): Change first argument to void \*, and rework error handling.
- (`_gpgme_op_decrypt_verify_start`): New function.
- (`gpgme_op_decrypt_verify_start`): Rewrite using

\_gpgme\_op\_decrypt\_verify\_start.  
(gpgme\_op\_decrypt\_verify): Likewise.  
\* decrypt.c: Include <string.h>, "gpgme.h" and "util.h".  
(struct decrypt\_result): Change to typedef op\_data\_t, rewritten.  
(is\_token): Remove function.  
(release\_op\_data): New function.  
(skip\_token): Remove function.  
(gpgme\_op\_decrypt\_result): New function.  
(\_gpgme\_decrypt\_status\_handler): Change first argument to void \*.  
Rework error handling.  
(\_gpgme\_decrypt\_start): Rename to ...  
(decrypt\_start): ... this. Call \_gpgme\_op\_decrypt\_init\_result.  
(\_gpgme\_op\_decrypt\_init\_result): New function.  
(gpgme\_op\_decrypt\_start): Use decrypt\_start.  
(gpgme\_op\_decrypt): Likewise.

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\* encrypt-sign.c: Do not include <stddef.h>, <stdio.h>, <stdlib.h>, <string.h>, <assert.h> and "util.h", but "gpgme.h".  
(\_gpgme\_op\_encrypt\_sign\_start): Rename to ...  
(encrypt\_sign\_start): ... this.  
(gpgme\_op\_encrypt\_sign\_start): Use encrypt\_sign\_start, not \_gpgme\_op\_encrypt\_sign\_start.  
(gpgme\_op\_encrypt\_sign): Likewise.  
  
\* gpgme.h (GpgmeEncryptResult): New data type.  
(gpgme\_op\_encrypt\_result): New prototype.  
\* ops.h (\_gpgme\_op\_encrypt\_init\_result): New prototype.  
(\_gpgme\_op\_encrypt\_status\_handler): Fix prototype.  
\* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Call \_gpgme\_op\_encrypt\_init\_result.  
\* encrypt.c: Do not include <stdio.h>, <assert.h>, "util.h" and "wait.h". Include <errno.h> and "gpgme.h".  
(SKIP\_TOKEN\_OR\_RETURN): Remove macro.  
(struct encrypt\_result): Rename to ...  
(op\_data\_t): ... new data type. Rewrite for user result data.  
(append\_xml\_encinfo): Remove function.  
(release\_op\_data): New function.  
(gpgme\_op\_encrypt\_result): New function.  
(\_gpgme\_op\_encrypt\_status\_handler): Change first argument to void \*.  
Rewrite result parsing.  
(\_gpgme\_op\_encrypt\_sym\_status\_handler): Change first argument to void \*.  
(\_gpgme\_op\_encrypt\_init\_result): New function.  
(\_gpgme\_op\_encrypt\_start): Rename to ...  
(encrypt\_start): ... this.  
(gpgme\_op\_encrypt\_start): Use encrypt\_start, not

gpgme\_op\_encrypt\_start.

(gpgme\_op\_encrypt): Likewise.

\* gpgme.h (GpgmePubKeyAlgo, GpgmeHashAlgo, GpgmeInvalidUserID, GpgmeNewSignature, GpgmeSignResult): New data types.

(gpgme\_op\_sign\_result, gpgme\_pubkey\_algo\_name, gpgme\_hash\_algo\_name): New prototypes.

\* gpgme.c (gpgme\_pubkey\_algo\_name): New function.

(gpgme\_hash\_algo\_name): Likewise.

\* ops.h (\_gpgme\_parse\_inv\_userid, \_gpgme\_op\_sign\_init\_result): New prototype.

(\_gpgme\_op\_sign\_status\_handler): Fix prototype.

\* op-support.c: Include <errno.h> and <string.h>.

(\_gpgme\_parse\_inv\_userid): New function.

\* sign.c: Include <errno.h> and "gpgme.h", but not <stdio.h>, <assert.h> and "util.h".

(SKIP\_TOKEN\_OR\_RETURN): Remove macro.

(struct sign\_result): Change to op\_data\_t type and rework it.

(release\_sign\_result): Rename to ...

(release\_op\_data): ... this and rewrite it.

(append\_xml\_info): Remove function.

(gpgme\_op\_sign\_result): New function.

(parse\_sig\_created): New function.

(\_gpgme\_sign\_status\_handler): Change first argument to void \*.

Rewrite the function to use the new result structure and functions.

(\_gpgme\_op\_sign\_init\_result): New function.

(\_gpgme\_op\_sign\_start): Rename to ...

(sign\_start): ... this. Call \_gpgme\_op\_sign\_init\_result.

(gpgme\_op\_sign\_start): Use sign\_start instead \_gpgme\_op\_sign\_start.

(gpgme\_op\_sign): Likewise.

\* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Call \_gpgme\_op\_sign\_init\_result.

\* delete.c: Include <errno.h> and "gpgme.h", but not "util.h" or "key.h".

(enum delete\_problem): Move into function delete\_status\_handler.

(delete\_status\_handler): Change first argument to void \*. Parse delete problem with strtol instead atoi. Return better error values.

(\_gpgme\_op\_delete\_start): Rename to ...

(delete\_start): ... this. Rework error handling.

(gpgme\_op\_delete\_start): Use delete\_start instead \_gpgme\_op\_delete\_start.

(gpgme\_op\_delete): Likewise.

\* gpgme.h (GpgmeDataType): Removed.

2003-04-25 Marcus Brinkmann <marcus@g10code.de>



\* gpgme.h: Change GPGME\_IMPORT\_PRIVATE to GPGME\_IMPORT\_SECRET.

\* import.c (parse\_import\_res): Parse unchanged field.

\* gpgme.h: New enum for GPGME\_IMPORT\_NEW, GPGME\_IMPORT\_UID, GPGME\_IMPORT\_SIG, GPGME\_IMPORT\_SUBKEY, GPGME\_IMPORT\_PRIVATE.

(GpgmeError): GPGME\_Unknown\_Reason, GPGME\_Not\_Found,

GPGME\_Ambiguous\_Specification, GPGME\_Wrong\_Key\_Usage,

GPGME\_Key\_Revoked, GPGME\_Key\_Expired, GPGME\_No\_CRL\_Known,

GPGME\_CRL\_Too\_Old, GPGME\_Policy\_Mismatch, GPGME\_No\_Secret\_Key,

GPGME\_Key\_Not\_Trusted, GPGME\_Issuer\_Missing, GPGME\_Chain\_Too\_Long,

GPGME\_Unsupported\_Algorithm, GPGME\_Sig\_Expired,

GPGME\_Bad\_Signature, GPGME\_No\_Public\_Key added as new error codes.

(struct \_gpgme\_import\_status): New structure.

(GpgmeImportStatus): New type.

(struct \_gpgme\_op\_import\_result): New structure.

(GpgmeImportResult): New type.

(gpgme\_op\_import\_result): New function.

\* import.c: Include <errno.h> and "gpgme.h", but not "util.h".

(struct import\_result): Change to type op\_data\_t.

(release\_import\_result): Rename to ...

(release\_op\_data): ... this.

(append\_xml\_impinfo): Function removed.

(gpgme\_op\_import\_result): New function.

(parse\_import): New function.

(parse\_import\_res): Likewise.

(import\_status\_handler): Change first argument to void \*. Rewrite to use new functions.

(\_gpgme\_op\_import\_start): Rework error handling.

\* edit.c: Do not include <assert.h>, "util.h", but "gpgme.h".

(edit\_resut): Change to typedef for op\_data\_t.

(edit\_status\_handler): Change first argument to void \*.

Rework error handling.

(command\_handler): Rework error handling.

(\_gpgme\_op\_edit\_start): Rename to ...

(edit\_start): ... this. Rework error handling.

(gpgme\_op\_edit\_start): Rewrite using edit\_start.

(gpgme\_op\_edit): Likewise.

\* ops.h (\_gpgme\_passphrase\_start): Remove prototype.

\* passphrase.c: Do not include <assert.h>, "util.h" or "debug.h", but "gpgme.h".

(struct passphrase\_result): Change to typedef for op\_data\_t.

(release\_passphrase\_result): Rename to release\_op\_data.

(\_gpgme\_passphrase\_status\_handler): Change first argument to void \*.

Use new op\_data\_t type.

(\_gpgme\_passphrase\_command\_handler): Use new op\_data\_t type.

(\_gpgme\_passphrase\_start): Remove function.

- \* decrypt.c (\_gpgme\_decrypt\_start): Rewrite error handling. Do not call \_gpgme\_passphrase\_start, but install command handler.
- \* encrypt.c (\_gpgme\_op\_encrypt\_start): Likewise.
- \* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Likewise.
- \* sign.c (\_gpgme\_op\_sign\_start): Likewise.
  
- \* context.h (struct gpgme\_context\_s): Remove member initialized, use\_cms and help\_data\_1. Add member protocol. Make use\_armor and use\_textmode bit flags. Make keylist\_mode, include\_certs, signers\_len and signers\_size unsigned.
- \* gpgme.c (gpgme\_new): Initialize CTX->protocol.
- (gpgme\_set\_protocol): Do not check CTX. Use CTX->protocol.
- (gpgme\_get\_protocol): Likewise.
- (gpgme\_release): Do not release CTX->help\_data\_1.
- \* op-support.c (\_gpgme\_op\_reset): Use CTX->protocol.
  
- \* wait-private.c (\_gpgme\_wait\_private\_event\_cb): Remove variable CTX.
  
- \* data.c: Do not include <assert.h>, but "gpgme.h".
- (\_gpgme\_data\_inbound\_handler): Expand \_gpgme\_data\_append, because it will go. Do not assert DH.
- (\_gpgme\_data\_outbound\_handler): Do not assert DH.
  
- \* export.c: Do not include <stdlib.h>, "debug.h" and "util.h", but "gpgme.h".
- (export\_status\_handler): Change type of first argument to void \*.
- (\_gpgme\_op\_export\_start): Rename to ...
- (export\_start): ... this. Rework error handling.
- (gpgme\_op\_export\_start): Rewritten to use export\_start instead \_gpgme\_op\_export\_start.
- (gpgme\_op\_export): Likewise.
  
- \* gpgme.h (GpgmeError): Add GPGME\_Busy, GPGME\_No\_Request, GPGME\_No\_Recipients, GPGME\_Invalid\_Recipient, GPGME\_No\_Passphrase): New macros.
  
- \* key.c (gpgme\_key\_get\_string\_attr): Fix validity attribute.

2003-04-24 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h (struct \_gpgme\_op\_genkey\_result): New structure.
- (GpgmeGenKeyResult): New type.
- (gpgme\_op\_genkey): Drop last argument.
- (gpgme\_op\_genkey\_result): New function.
- \* genkey.c: Do not include "util.h", but "gpgme.h".
- (struct genkey\_result): Replace with ...
- (op\_data\_t): ... this new type.
- (release\_genkey\_result): Replace with ...

(release\_op\_data): ... this new function.  
(gpgme\_op\_genkey\_result): New function.  
(genkey\_status\_handler): Rewritten using new op\_data\_t type.  
(get\_key\_parameter): New function.  
(\_gpgme\_op\_genkey\_start): Renamed to  
(genkey\_start): ... this and rewritten.  
(gpgme\_op\_genkey\_start): Use genkey\_start instead  
\_gpgme\_op\_genkey\_start.  
(gpgme\_op\_genkey): Rewritten. Remove FPR argument.

\* context.h (struct gpgme\_context\_s): Remove member verbosity.  
\* gpgme.c (gpgme\_new): Do not set member verbosity.  
\* engine.h (\_gpgme\_engine\_set\_verbosity): Remove prototype.  
\* engine.c (\_gpgme\_engine\_set\_verbosity): Remove function.  
\* engine-backend.h (struct engine\_ops): Remove set\_verbosity.  
\* engine-gpgsm.c (\_gpgme\_engine\_ops\_gpgsm): Remove set\_verbosity member.  
\* runpgg.c (\_gpgme\_engine\_ops\_gpg): Likewise.  
(gpg\_set\_verbosity): Remove function.  
\* decrypt.c (\_gpgme\_decrypt\_start): Don't call  
\_gpgme\_engine\_set\_verbosity.  
\* delete.c (\_gpgme\_op\_delete\_start): Likewise.  
\* edit.c (\_gpgme\_op\_edit\_start): Likewise.  
\* encrypt.c (\_gpgme\_op\_encrypt\_start): Likewise.  
\* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Likewise.  
\* export.c (\_gpgme\_op\_export\_start): Likewise.  
\* genkey.c (\_gpgme\_op\_genkey\_start): Likewise.  
\* import.c (\_gpgme\_op\_import\_start): Likewise.  
\* keylist.c (gpgme\_op\_keylist\_start): Likewise.  
(gpgme\_op\_keylist\_ext\_start): Likewise.  
\* sign.c (\_gpgme\_op\_sign\_start): Likewise.  
\* verify.c (\_gpgme\_op\_verify\_start): Likewise.

\* Makefile.am (libgpgme\_la\_SOURCES): Add key-cache.c.  
\* key.c (key\_cache\_initialized, key\_cache\_size,  
key\_cache\_max\_chain\_length, ): Removed.  
(struct key\_cache\_item\_s, key\_cache\_lock, key\_cache,  
key\_cache\_unused\_items, hash\_key, \_gpgme\_key\_cache\_add,  
\_gpgme\_key\_cache\_get, gpgme\_get\_key): Moved to ...  
\* key-cache.c: ... here. New file.  
\* key.h (\_gpgme\_key\_cache\_init): Remove prototypes.  
(\_gpgme\_key\_cache\_add, \_gpgme\_key\_cache\_get): Move to ...  
\* ops.h: ... here.  
\* version.c: Do not include "key.h".  
(do\_subsystem\_inits): Do not call \_gpgme\_key\_cache\_init.

\* mkstatus: Strip trailing comma.  
\* gpgme.h (GpgmeStatus): Pretty print.

\* gpgme.h (GpgmeError): Rename GPGME\_No\_Passphrase to GPGME\_Bad\_Passphrase.

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Use GPGME\_Bad\_Passphrase instead GPGME\_No\_Passphrase.

\* gpgme.h (GpgmeError): Rename GPGME\_No\_Recipients to GPGME\_No\_UserID and GPGME\_Invalid\_Recipient to GPGME\_Invalid\_UserID.

\* encrypt.c (\_gpgme\_encrypt\_status\_handler): Use GPGME\_No\_UserID instead GPGME\_No\_Recipients and GPGME\_Invalid\_UserID instead GPGME\_Invalid\_Recipient.

(\_gpgme\_op\_encrypt\_start): Likewise.

\* gpgme.h (GpgmeError): Remove GPGME\_Busy and GPGME\_No\_Request.

\* wait-user.c (\_gpgme\_wait\_user\_event\_cb): Don't clear CTX->pending.

\* wait-private.c (\_gpgme\_wait\_private\_event\_cb): Likewise.

\* wait-global.c (gpgme\_wait): Likewise.

\* verify.c (\_gpgme\_op\_verify\_start): Likewise.

(gpgme\_get\_sig\_status): Don't check pending flag.

(gpgme\_get\_sig\_string\_attr): Likewise.

(gpgme\_get\_sig\_ulong\_attr): Likewise.

(gpgme\_get\_sig\_key): Likewise.

\* op-support.c (\_gpgme\_op\_reset): Likewise.

\* trustlist.c (gpgme\_op\_trustlist\_start): Don't clear pending flag.

(gpgme\_op\_trustlist\_next): Don't check or clear pending flag.

(gpgme\_op\_trustlist\_end): Likewise.

\* sign.c (\_gpgme\_op\_sign\_start): Likewise.

\* context.h (struct gpgme\_context\_s): Remove member PENDING.

\* decrypt.c (\_gpgme\_decrypt\_start): Likewise.

\* delete.c (\_gpgme\_op\_delete\_start): Likewise.

\* edit.c (\_gpgme\_op\_edit\_start): Likewise.

\* encrypt.c (\_gpgme\_op\_encrypt\_start): Likewise.

\* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start): Likewise.

\* export.c (\_gpgme\_op\_export\_start): Likewise.

\* genkey.c (\_gpgme\_op\_genkey\_start): Likewise.

\* import.c (\_gpgme\_op\_import\_start): Likewise.

\* key.c (gpgme\_get\_key): Likewise.

\* keylist.c (gpgme\_op\_keylist\_start): Likewise.

(gpgme\_op\_keylist\_ext\_start): Likewise.

(gpgme\_op\_keylist\_next): Likewise.

(gpgme\_op\_keylist\_end): Likewise.

\* data-compat.c (gpgme\_error\_to\_errno): Don't convert EBUSY.

2003-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (GpgmePassphraseCb): Change type to return GpgmeError, and add argument for returning the result string.

(gpgme\_cancel): Remove prototype.

\* gpgme.c (gpgme\_cancel): Remove function.  
\* context.h (struct gpgme\_context\_s): Remove member cancel.  
\* passphrase.c (\_gpgme\_passphrase\_command\_handler): Call the passphrase callback in the new way.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

\* edit.c (\_gpgme\_edit\_status\_handler): Call the progress status handler.

2003-02-05 Marcus Brinkmann <marcus@g10code.de>

\* wait-user.c (\_gpgme\_wait\_user\_remove\_io\_cb): Move check for no I/O handlers left to ...  
(\_gpgme\_user\_io\_cb\_handler): ... here.

2003-02-04 Marcus Brinkmann <marcus@g10code.de>

\* trustlist.c (trustlist\_colon\_handler): Release ITEM if name could not be allocated.  
(gpgme\_trust\_item\_release): Only release name if it is allocated.  
Reported by Marc Mutz <Marc.Mutz@uni-bielefeld.de>.

2003-02-04 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (read\_status): If the status handler returns an error, return it.  
(status\_handler): If read\_status fails, just return the error.

2003-02-01 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (start): Handle all errors, not only most of them.  
(xtoi\_1, xtoi\_2): Remove macro.  
(status\_handler): Replace use of xtoi\_2 with \_gpgme\_hextobyte.

2003-02-01 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (map\_assuan\_error): Replace ASSUAN\_Bad\_Certificate\_Path with ASSUAN\_Bad\_Certificate\_Chain.  
(gpgsm\_new): Use assuan\_pipe\_connect instead assuan\_pipe\_connect2.

\* util.h (DIMof): Remove macro.

\* ops.h (\_gpgme\_op\_event\_cb, \_gpgme\_op\_event\_cb\_user, \_gpgme\_data\_unread): Prototypes removed.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

- \* types.h: File removed.
- \* Makefile.am (libpggme\_la\_SOURCES): Remove types.h.
- \* io.h (struct spawn\_fd\_item\_s): Do not include "types.h".
- \* key.h: Likewise.
- \* context.h: Likewise.
- \* engine-gpgsm.h: Likewise.
- \* engine.h: Include "gpgme.h" instead "types.h". Add prototypes for EngineStatusHandler, EngineColonLineHandler and EngineCommandHandler.
- (\_gpgme\_engine\_set\_status\_handler): Change parameter type from GpgmeStatusHandler to EngineStatusHandler.
- (\_gpgme\_engine\_set\_command\_handler): Change parameter type from GpgmeCommandHandler to EngineCommandHandler.
- (\_gpgme\_engine\_set\_colon\_line\_handler): Change parameter type from GpgmeColonLineHandler to EngineColonLineHandler.
- \* engine-backend.h: Include "engine.h" instead "types.h".
- (struct engine\_ops): Change Gpgme\*Handler parameters in members set\_command\_handler, set\_colon\_line\_handler and set\_status\_handler to Engine\*Handler.
- \* engine.c (\_gpgme\_engine\_set\_status\_handler): Change parameter type from GpgmeStatusHandler to EngineStatusHandler.
- (\_gpgme\_engine\_set\_command\_handler): Change parameter type from GpgmeCommandHandler to EngineCommandHandler.
- (\_gpgme\_engine\_set\_colon\_line\_handler): Change parameter type from GpgmeColonLineHandler to EngineColonLineHandler.
- \* runpgg.c (struct gpg\_object\_s): Change type of member status.fnc from GpgmeStatusHandler to EngineStatusHandler. Change type of member colon.fnc from GpgmeColonLineHandler to EngineColonLineHandler. Change type of member cmd.fnc from GpgmeCommandHandler to EngineCommandHandler.
- \* engine-gpgsm.c (struct gpgsm\_object\_s): Likewise.
- \* runpgg.c (gpg\_set\_status\_handler): Change parameter type from GpgmeStatusHandler to EngineStatusHandler.
- \* engine-gpgsm.c (gpgsm\_set\_status\_handler): Likewise.
- (assuan\_simple\_command): Likewise.
- \* runpgg.c (gpg\_set\_colon\_line\_handler): Change parameter type from GpgmeColonLineHandler to EngineColonLineHandler.
- \* engine-gpgsm.c (gpgsm\_set\_colon\_line\_handler): Likewise.
- \* runpgg.c (gpg\_set\_command\_handler): Change parameter type from GpgmeCommandHandler to EngineCommandHandler.
  
- \* engine-gpgsm.c (status\_handler): Do not close status fd at end of function.
  
- \* ops.h (\_gpgme\_op\_data\_lookup): Add prototype.
- \* op-support.c: Include <stdlib.h>.
- (\_gpgme\_op\_data\_lookup): New function.

\* decrypt.c (\_gpgme\_release\_decrypt\_result): Function removed.

(struct decrypt\_result\_s): Rename to ...

(struct decrypt\_result): ... this.

(DecryptResult): New type.

(\_gpgme\_decrypt\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* sign.c (\_gpgme\_release\_sign\_result): Function removed.

(release\_sign\_result): New function.

(struct sign\_result\_s): Rename to ...

(struct sign\_result): ... this.

(SignResult): New type.

(\_gpgme\_sign\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* encrypt.c (struct encrypt\_result\_s): Rename to ...

(struct encrypt\_result): ... this.

(\_gpgme\_release\_encrypt\_result): Function removed.

(release\_encrypt\_result): New function.

(\_gpgme\_encrypt\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* verify.c (struct verify\_result\_s): Rename to ...

(struct verify\_result): ... this. Remove member next.

(VerifyResult): New type.

(\_gpgme\_release\_verify\_result): Function removed.

(release\_verify\_result): New function.

(finish\_sig): Change first argument to type VerifyResult. Diddle the type of the op\_data structure.

(add\_notation): Change first argument to type VerifyResult.

(\_gpgme\_verify\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

\* passphrase.c (struct passphrase\_result\_s): Rename to ...

(struct passphrase\_result): ... this. Remove member next.

(PassphraseResult): New type.

(\_gpgme\_release\_passphrase\_result): Function removed.

(release\_passphrase\_result): New function.

(\_gpgme\_passphrase\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

(\_gpgme\_passphrase\_command\_handler): Likewise.

\* keylist.c (struct keylist\_result\_s): Rename to ...

(struct keylist\_result): ... this. Remove member next.

(KeylistResult): New type.

(\_gpgme\_release\_keylist\_result): Function removed.

(release\_keylist\_result): New function.

(keylist\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

- \* edit.c (struct edit\_result\_s): Rename to ...
- (struct edit\_result): ... this. Remove member next.
- (EditResult): New type.
- (\_gpgme\_release\_edit\_result): Function removed.
- (release\_edit\_result): New function.
- (edit\_status\_handler): Don't use

test\_and\_allocate\_result, but use \_gpgme\_op\_data\_lookup to retrieve result data object.

- (command\_handler): Likewise.
- \* types.h (DecryptResult, SignResult, EncryptResult, PassphraseResult, ImportResult, DeleteResult, GenKeyResult, KeylistResult, EditResult): Types removed.
- \* ops.h: Don't include "types.h", but "gpgme.h" and "context.h".
- (test\_and\_allocate\_result): Remove macro.
- (\_gpgme\_release\_decrypt\_result): Remove prototype.
- (\_gpgme\_decrypt\_result): Remove prototype.
- (\_gpgme\_release\_sign\_result): Remove prototype.
- (\_gpgme\_release\_encrypt\_result): Remove prototype.
- (\_gpgme\_release\_passphrase\_result): Remove prototype.
- (\_gpgme\_release\_import\_result): Remove prototype.
- (\_gpgme\_release\_delete\_result): Remove prototype.
- (\_gpgme\_release\_genkey\_result): Remove prototype.
- (\_gpgme\_release\_keylist\_result): Remove prototype.
- (\_gpgme\_release\_edit\_result): Remove prototype.
- (\_gpgme\_release\_verify\_result): Remove prototype.
- \* gpgme.c (\_gpgme\_release\_result): Rewritten.
- \* context.h (enum ctx\_op\_data\_type): New enum.
- (struct ctx\_op\_data): New structure.
- (struct gpgme\_context\_s): Replace the member result with a member op\_data.
- (fail\_on\_pending\_request): Remove macro.
- \* op-support.c (\_gpgme\_op\_reset): Expand macro
- fail\_on\_pending\_request.
- \* util.h: Don't include "types.h" or "debug.h", but include "gpgme.h".

2003-01-19 Marcus Brinkmann <marcus@g10code.de>

- \* runpg.c (\_gpgme\_engine\_ops\_gpg): Remove gpg\_start.
- (gpg\_start): Rename to ...
- (start): ... this function. Change arguments to GpgObject.
- (gpg\_decrypt): Call start.
- (gpg\_edit): Likewise.
- (gpg\_encrypt): Likewise.
- (gpg\_encrypt\_sign): Likewise.
- (gpg\_export): Likewise.
- (gpg\_import): Likewise.



(gpg\_keylist): Likewise.

(gpg\_keylist\_ext): Likewise.

(gpg\_trustlist): Likewise.

(gpg\_verify): Likewise.

\* engine-gpgsm.c (\_gpgme\_engine\_ops\_encrypt): Remove gpgsm\_start.

(gpgsm\_start): Rename to ...

(struct gpgsm\_object\_s): Remove member command.

(gpgsm\_release): Don't free command.

(start): ... this function. Change arguments to GpgsmObject and const char \*.

(gpgsm\_decrypt): Call start.

(gpgsm\_delete): Likewise.

(gpgsm\_encrypt): Likewise.

(gpgsm\_export): Likewise.

(gpgsm\_genkey): Likewise.

(gpgsm\_import): Likewise.

(gpgsm\_keylist): Likewise.

(gpgsm\_keylist\_ext): Likewise.

(gpgsm\_verify): Likewise.

\* decrypt.c (\_gpgme\_decrypt\_start): Don't call \_gpgme\_engine\_start.

\* delete.c (\_gpgme\_op\_delete\_start): Likewise.

\* edit.c (\_gpgme\_op\_edit\_start): Likewise.

\* encrypt.c (\_gpgme\_op\_encrypt\_start):

\* encrypt-sign.c (\_gpgme\_op\_encrypt\_sign\_start):

\* export.c (\_gpgme\_op\_export\_start): Likewise.

\* genkey.c (\_gpgme\_op\_genkey\_start): Likewise.

\* import.c (\_gpgme\_op\_import\_start): Likewise.

\* keylist.c (gpgme\_op\_keylist\_ext\_start): Likewise.

(gpgme\_op\_keylist\_start): Likewise.

\* sign.c (\_gpgme\_op\_sign\_start): Likewise.

\* trustlist.c (gpgme\_op\_trustlist\_start): Likewise.

\* verify.c (\_gpgme\_op\_verify\_start): Likewise.

\* engine-backend.h (struct engine\_ops): Remove member start.

\* engine.h (\_gpgme\_engine\_start): Remove prototype.

\* engine.c (\_gpgme\_engine\_start): Remove function.

2003-01-19 Miguel Coca <mcoca@gnu.org>

\* w32-io.c (\_gpgme\_io\_select): Add missing argument in calls to DEBUG\_BEGIN.

\* w32-util.c: Include "sema.h".

(find\_program\_in\_registry): Change DEBUG1 to DEBUG2, fixes compilation error.

- \* types.h: Remove byte and ulong types.
- \* util.h (\_gpgme\_hextobyte): Change prototype to unsigned char instead byte.
- \* conversion.c (\_gpgme\_hextobyte): Change argument to unsigned char instead byte.
- (\_gpgme\_decode\_c\_string): Likewise, and beautify. Also support a few more escaped characters. Be more strict about buffer size.
- (\_gpgme\_data\_append\_percentstring\_for\_xml): Change type of SRC, BUF and DST to unsigned char instead byte.
- \* progress.c (\_gpgme\_progress\_status\_handler): Use unsigned char instead byte.
- \* debug.c (trim\_spaces): Likewise.
  
- \* util.h (mk\_error): Remove macro.
- \* conversion.c, data.c, data-compat.c, decrypt.c, delete.c, edit.c, encrypt.c, encrypt-sign.c, engine.c, engine-gpgsm.c, export.c, genkey.c, gpgme.c, import.c, key.c, keylist.c, passphrase.c, progress.c, recipient.c, runpgg.c, sign.c, signers.c, trustlist.c, verify.c, wait.c, wait-global.c, wait-private (literally everywhere): Expand the mk\_error macro.
  
- \* context.h (wait\_on\_request\_or\_fail): Remove macro.
  
- \* context.h (gpgme\_context\_s): Remove member ERROR.
- \* types.h (GpgmeStatusHandler): Change return type to GpgmeError.
- (GpgmeCommandHandler): Change return type to GpgmeError and add new argument RESULT.
- \* gpgme.h (GpgmeIOCb): Change return type to GpgmeError.
- (GpgmeEventIO): New event GPGME\_EVENT\_START.
- (GpgmeIdleFunc): Remove type.
- (gpgme\_register\_idle): Remove prototype.
- \* data.c: Include <assert.h>.
- (\_gpgme\_data\_inbound\_handler): Change return type to GpgmeError. Return any error instead ignoring it, don't close file descriptor on error.
- (\_gpgme\_data\_outbound\_handler): Likewise.
- \* decrypt.c: Do not include <stdio.h>, <string.h> and <assert.h>.
- (\_gpgme\_decrypt\_status\_handler): Change return type to GpgmeError. Return error instead setting ctx->error. Return success at end of function.
- (gpgme\_op\_decrypt): Don't work around the old kludge anymore.
- \* decrypt-verify.c (decrypt\_verify\_status\_handler): Change return type to GpgmeError. Return possible errors.
- \* delete.c: Do not include <stdio.h>, <string.h>, <time.h> and <assert.h>.

(delete\_status\_handler): Change return type to GpgmeError. Return error instead setting ctx->error. Return success at end of function.

\* edit.c: Do not include <stdio.h> and <string.h>.

(\_gpgme\_edit\_status\_handler): Change type to GpgmeError, make static and rename to ...

(edit\_status\_handler): ... this. Return error directly.

(command\_handler): Change return type to GpgmeError, add result argument. Return error directly.

\* encrypt.c (status\_handler\_finish): Remove function.

(\_gpgme\_encrypt\_status\_handler): Change return type to GpgmeError. Return error directly.

(\_gpgme\_encrypt\_sym\_status\_handler): Likewise.

\* encrypt-sign.c (encrypt\_sign\_status\_handler): Likewise.

\* engine-gpgsm.c (close\_notify\_handler): Do not signal done event anymore.

(status\_handler): Change return type to GpgmeError. Diddle things around a bit to return errors directly.

(start): Send start event.

\* export.c: Do not include <stdio.h>, <string.h> and <assert.h>.

(export\_status\_handler): Change return type to GpgmeError. Don't check ctx->error.

\* genkey.c: Do not include <stdio.h> and <assert.h>.

(genkey\_status\_handler): Change return type to GpgmeError. Don't check ctx->error. Return errors directly.

\* gpgme.c (\_gpgme\_release\_result): Do not initialize ctx->error.

(\_gpgme\_op\_event\_cb): Function removed.

(\_gpgme\_op\_event\_cb\_user): Likewise.

\* import.c: Do not include <stdio.h>, <string.h> and <assert.h>.

(import\_status\_handler): Change return type to GpgmeError. Don't check ctx->error.

\* keylist.c (keylist\_colon\_handler, keylist\_status\_handler, finish\_key): Change return type to GpgmeError, return error directly.

\* Makefile (libgpgme\_la\_SOURCES): Add wait-global.c, wait-private.c and wait-user.c

\* ops.h (test\_and\_allocate\_result): Return error instead setting ctx->error.

(\_gpgme\_data\_inbound\_handler, \_gpgme\_data\_outbound\_handler, \_gpgme\_verify\_status\_handler, \_gpgme\_decrypt\_status\_handler, \_gpgme\_sign\_status\_handler, \_gpgme\_encrypt\_status\_handler, \_gpgme\_passphrase\_status\_handler, \_gpgme\_progress\_status\_handler): Change return type to GpgmeError.

(\_gpgme\_passphrase\_command\_handler): Change return type to GpgmeError and add new argument RESULT.

\* op-support.c: Use new callback functions, and change private data to ctx everywhere.

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Change return type to GpgmeError, return error directly.

(`_gpgme_passphrase_command_handler`): Change return type to `GpgmeError`, add result argument. Return results accordingly.

\* `progress.c` (`_gpgme_progress_status_handler`): Change return type to `GpgmeError`, return errors directly.

\* `rungpg.c` (`status_handler`): Change return type to `GpgmeError`. Return error directly.

(`close_notify_handler`): Don't send done event.

(`colon_line_handler`): Change return type to `GpgmeError`, return errors directly.

\* `rungpg.c` (`start`): Send start event.

\* `sign.c` (`_gpgme_sign_status_handler`): Change return type to `GpgmeError`, return errors directly.

\* `trustlist.c` (`trustlist_status_handler`): Change return type to `GpgmeError`. Return 0.

(`trustlist_colon_handler`): Change return type `GpgmeError`. Return errors directly.

\* `verify.c` (`add_notation`): Change return type to `GpgmeError`, return errors directly.

(`_gpgme_verify_status_handler`): Likewise.

\* `wait.h` (`struct fd_table`): Remove lock member.

(`struct wait_item_s`): Moved here from `wait.c`.

(`struct tag`): New structure.

(`_gpgme_wait_event_cb`): Remove prototype.

(`_gpgme_wait_private_event_cb`, `_gpgme_wait_global_event_cb`, `_gpgme_wait_user_add_io_cb`, `_gpgme_wait_user_remove_io_cb`, `_gpgme_wait_user_event_io_cb`): New prototypes.

\* `wait.c`: Don't include `<stdio.h>`.

(`ftd_global`, `ctx_done_list`, `ctx_done_list_size`, `ctx_done_list_length`, `ctx_done_list_lock`, `idle_function`): Remove global variable.

(`gpgme_register_idle`, `do_select`, `_gpgme_wait_event_cb`): Remove function.

(`gpgme_wait`): Move to file `wait-global.c`.

(`_gpgme_add_io_cb`): Take `ctx` as private argument, initialize `ctx` member in wait item and tag.

(`_gpgme_remove_io_cb`): Take `ctx` from tag. Don't use FDT lock.

(`_gpgme_wait_one`, `_gpgme_wait_on_condition`): Move to `wait-private.c`.

(`gpgme_fd_table_init`): Don't initialize `FDT->lock`.

(`gpgme_fd_table_deinit`): Don't destroy `FDT->lock`.

(`_gpgme_fd_table_put`): Make static and rename to ...

(`fd_table_put`): ... this function. Don't use `FDT->lock`.

(`struct wait_item_s`): Move to `wait.h`.

\* `wait-global.c`: New file.

\* `wait-private.c`: New file.

\* `wait-user.c`: New file.

\* `key.c` (`gpgme_key_sig_get_string_attr`): Use `validity_to_string`

instead otrust\_to\_string to calculate validity.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

- \* types.h (EngineObject): Move typedef to ...
- \* engine.h: ... here.
- \* types.h (GpgObject): Move typedef to ...
- \* runpgg.c: ... here.
- \* types.h (GpgsmObject): Move typedef to ...
- \* engine-gpgsm.c: ... here.
  
- \* util.h (return\_if\_fail, return\_null\_if\_fail, return\_val\_if\_fail): Remove macro.
- \* gpgme.c (gpgme\_cancel): Don't use return\_if\_fail.
- \* key.c (gpgme\_key\_ref): Likewise.
- \* signers.c (gpgme\_signers\_enum): Likewise.
- (gpgme\_signers\_clear): Likewise.
  
- \* engine-backend.h (struct engine\_ops): Rename get\_path to get\_file\_name.
- \* gpgme.h (struct \_gpgme\_engine\_info): Rename member path to file\_name.
- \* version.c: Do not include <stdio.h>, <stdlib.h>, context.h and util.h. Other clean ups.
- (parse\_version\_number): Protect more seriously against overflow.
- (gpgme\_get\_engine\_info): Move to ...
- \* engine.c (gpgme\_get\_engine\_info): ... here.
- (\_gpgme\_engine\_get\_info): Function removed.
- (\_gpgme\_engine\_get\_path): Make static and rename to ...
- (engine\_get\_file\_name): .. this.
- (\_gpgme\_engine\_get\_version): Make static and rename to ...
- (engine\_get\_version): ... this.
- (\_gpgme\_engine\_get\_req\_version): Make static and rename to ...
- (engine\_get\_req\_version): ... this.
- \* engine.h (\_gpgme\_engine\_get\_path, \_gpgme\_engine\_get\_version, \_gpgme\_engine\_req\_version, \_gpgme\_engine\_get\_info.): Remove prototypes.
  
- \* gpgme.h (enum GpgmeProtocol): Remove GPGME\_PROTOCOL\_AUTO.
- \* gpgme.c (gpgme\_set\_protocol): Don't handle GPGME\_PROTOCOL\_AUTO.
- (gpgme\_get\_protocol\_name): New function.
  
- \* engine-backend.h (struct engine\_ops): New member get\_req\_version, remove member check\_version.
- \* engine.h (\_gpgme\_Engine\_get\_version): New prototype.
- \* runpgg.c (gpg\_get\_req\_version): New function.
- (gpg\_check\_version): Function removed.

(\_gpgme\_engine\_ops\_gpg): Add gpg\_get\_req\_version, remove gpg\_check\_version.  
\* engine-gpgsm.c (gpgsm\_get\_req\_version): New function.  
(gpgsm\_check\_version): Function removed.  
(\_gpgme\_engine\_ops\_gpgsm): Add gpgsm\_get\_req\_version, remove gpgsm\_check\_version.  
\* engine.c: Include ops.h.  
(\_gpgme\_engine\_get\_req\_version): New function.  
(gpgme\_engine\_check\_version): Rewritten.  
\* version.c (gpgme\_get\_engine\_info): Rewritten.  
\* gpgme.h (gpgme\_engine\_info): New structure.  
(GpgmeEngineInfo): New type.

2003-01-06 Werner Koch <wk@gnupg.org>

\* keylist.c (set\_mainkey\_capability): Handle 'd' and 'D' used since gpg 1.3 to denote disabled keys.

2003-01-06 Marcus Brinkmann <marcus@g10code.de>

\* data-mem.c: Include <string.h>.  
\* engine.c: Likewise.

2003-01-06 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_la\_DEPENDENCIES): Correct bug in last change.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_op\_verify, gpgme\_op\_decrypt\_verify): Drop R\_STAT argument.  
\* decrypt-verify.c (gpgme\_op\_decrypt\_verify): Drop R\_STAT argument.  
\* verify.c (gpgme\_op\_verify): Drop R\_STAT argument.  
(\_gpgme\_intersect\_stati): Function removed.  
\* ops.h (\_gpgme\_intersect\_stati): Remove prototype.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

\* libgpgme.vers: New file.  
\* Makefile.am (EXTRA\_DIST): Add libgpgme.vers.  
(libgpgme\_version\_script\_cmd): New variable.  
(libgpgme\_la\_LDFLAGS): Add libgpgme\_version\_script\_cmd here.  
(libgpgme\_la\_DEPENDENCIES): New variable.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* key.c (gpgme\_key\_get\_string\_attr): Don't accept GPGME\_ATTR\_IS\_SECRET.

(otrust\_to\_string): New function.  
(gpgme\_key\_get\_as\_xml): Use it.  
(validity\_to\_string): New function.  
(gpgme\_key\_get\_string\_attr): Beautify using above functions.  
(gpgme\_key\_get\_ulong\_attr): Likewise.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

\* data-mem.c (mem\_release): Fix gcc warning.  
\* data-user.c (user\_release): Likewise.

2002-12-06 Marcus Brinkmann <marcus@g10code.de>

\* data.h (gpgme\_data\_release\_cb): Change return type to void.  
(gpgme\_data\_read\_cb): Change return type to ssize\_t.  
\* data.c (gpgme\_data\_read): Likewise.  
\* data-stream.c (stream\_read): Likewise.  
\* data-fd.c (fd\_read): Likewise.  
\* data-mem.c (mem\_read): Likewise.  
(mem\_release): Change return type to void.  
\* data-user.c (user\_read): Change return type to ssize\_t.  
(user\_release): Change return type to void.  
\* data-compatible.c (old\_user\_read): Change return type to ssize\_t.  
\* gpgme.h (GpgmeDataReadCb): Likewise.  
(gpgme\_data\_read): Likewise.  
(GpgmeDataSeekCb): Change return type to off\_t.

2002-12-04 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Add prototype for gpgme\_get\_key.  
\* key.c (gpgme\_get\_key): New function.  
\* verify.c (gpgme\_get\_sig\_key): Rewrite using gpgme\_get\_key.  
  
\* gpgme.h: Add prototypes for new interfaces  
gpgme\_key\_sig\_get\_string\_attr and gpgme\_key\_get\_ulong\_attr.  
(enum GpgmeAttr): New attribute GPGME\_ATTR\_SIG\_CLASS.  
\* gpgme.c (gpgme\_set\_keylist\_mode): Allow GPGME\_KEYLIST\_MODE\_SIGS.  
\* key.h (struct certsigs): New members ALGO, NAME\_PART,  
EMAIL\_PART, COMMENT\_PART, NAME, SIG\_STAT and SIG\_CLASS.  
  
\* conversion.c (\_gpgme\_decode\_c\_string): Add new parameter LEN.  
Use that to determine if allocation is desired or not.  
\* util.h: Adjust prototype of \_gpgme\_decode\_c\_string.  
\* keylist.c (keylist\_colon\_handler): Adjust caller of  
\_gpgme\_decode\_c\_string.  
  
\* key.h (struct gpgme\_key\_s): New member last\_uid.  
\* key.c (\_gpgme\_key\_append\_name): Rewritten using

`_gpgme_decode_c_string` and the `last_uid` pointer.  
(`my_isdigit`): Macro removed.  
(`ALLOC_CHUNK`): Likewise.  
\* `keylist.c` (`set_userid_flags`): Use `last_uid` member of `KEY`.

\* `context.h` (`struct user_id_s`): New member `last_certsig`.  
\* `key.h`: Add prototype for `_gpgme_key_add_certsig`.  
\* `key.c` (`_gpgme_key_add_certsig`): New function.  
(`set_user_id_part`): Move function before `_gpgme_key_add_certsig`.  
(`parse_user_id`): Change first argument to `SRC`, add new arguments `NAME`, `EMAIL` and `COMMENT`. Change code to use these arguments instead going through `UID`. Move function before `_gpgme_add_certsig`.  
(`parse_x509_user_id`): Likewise.  
(`_gpgme_key_append_name`): Adjust arguments to `parse_x509_user_id` and `parse_user_id` invocation.  
(`one_certsig_as_xml`): New function.  
(`one_uid_as_xml`): Print signatures.  
\* `context.h` (`struct gpgme_context_s`): New member `TMP_UID`.  
\* `keylist.c` (`keylist_colon_handler`): Rewritten, implement "sig" record entries.

\* `key.c` (`get_certsig`): New function.  
(`gpgme_key_sig_get_string_attr`): Likewise.  
(`gpgme_key_sig_get_ulong_attr`): Likewise.

\* `keylist.c`: Include `<ctype.h>`.  
(`my_isdigit`): Macro removed.  
(`set_mainkey_trust_info`): Use `isdigit`, not `my_isdigit`.  
(`set_userid_flags`): Likewise.  
(`set_subkey_trust_info`): Likewise.  
(`set_ownertrust`): Likewise.  
(`finish_key`): Move function up a bit and remove prototype.

\* `rungpg.c` (`gpg_keylist_ext`): Correct precedence of signature listing mode.  
(`gpg_keylist_ext`): Implement signature listing mode.

2002-11-25 Marcus Brinkmann <marcus@g10code.de>

\* `rungpg.c` (`_gpgme_gpg_spawn`): Do not set parent fds to `-1`.  
\* `posix-io.c` (`_gpgme_io_spawn`): Call `_gpgme_io_close` instead close for parent fds.  
\* `w32-io.c` (`_gpgme_io_spawn`): Call `_gpgme_io_close` instead `CloseHandle` for parent fds.

2002-11-22 Marcus Brinkmann <marcus@g10code.de>



\* gpgme.h [\_MSC\_VER]: Define ssize\_t as long.

2002-11-22 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_new): Save the result of a first setlocale before doing another setlocale.

2002-11-21 Marcus Brinkmann <marcus@g10code.de>

\* decrypt.c: Some beautyfication.

\* verify.c (\_gpgme\_verify\_status\_handler): Treat GPGME\_STATUS\_UNEXPECTED like GPGME\_STATUS\_NODATA. Reported by Miguel Coca <e970095@zipi.fi.upm.es>.

2002-11-19 Marcus Brinkmann <marcus@g10code.de>

\* genkey.c: Only include <config.h> if [HAVE\_CONFIG\_H].  
(struct genkey\_result\_s): Add new member FPR.  
(\_gpgme\_release\_genkey\_result): Free RESULT->fpr if set.  
(genkey\_status\_handler): Extract the fingerprint from the status line.  
(gpgme\_op\_genkey): Add new argument FPR and return the fingerprint in it.  
\* gpgme.h: Adjust prototype of gpgme\_op\_genkey.

2002-11-19 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (gpg\_keylist): Add --with-fingerprint to gpg invocation twice, to get fingerprints on subkeys. Suggested by Timo Schulz <twoaday@freakmail.de>.  
(gpg\_keylist\_ext): Likewise.

2002-11-05 Marcus Brinkmann <marcus@g10code.de>

\* import.c (append\_xml\_impinfo): Use \_gpgme\_data\_append\_string\_for\_xml rather than \_gpgme\_data\_append\_string for the field content. Submitted by Miguel Coca <e970095@zipi.fi.upm.es>.

2002-10-10 Marcus Brinkmann <marcus@g10code.de>

\* runpg.h, engine-gpgsm.h: File removed.  
\* engine-backend.h: New file.  
\* Makefile.am (gpgsm\_components): New variable, set depending on automake conditional HAVE\_GPGSM.  
(libgpgme\_la\_SOURCES): Add engine-backend.h, remove runpg.h and engine-gpgsm.h. Replace engine-gpgsm.c with \${gpgsm\_components}.

(status-table.h): Depend on gpgme.h, not runpgg.h.

\* conversion.c: Include <stdlib.h>.

\* engine-gpgsm.c: Do not set ENABLE\_GPGSM here. Include "engine-backend.h" instead "engine-gpgsm.h". Reorder some functions and remove all function prototypes.

(\_gpgme\_gpgsm\_get\_version): Make static and rename to ...

(gpgsm\_get\_version): ... this.

(\_gpgme\_gpgsm\_check\_version): Make static and rename to ...

(gpgsm\_check\_version): ... this.

(\_gpgme\_gpgsm\_new): Make static. Change argument type from GpgsmObject \* to void \*\*. Call gpgsm\_release instead \_gpgme\_gpgsm\_release.

(\_gpgme\_gpgsm\_op\_decrypt): Make static and rename to ...

(gpgsm\_check\_decrypt): ... this.

(\_gpgme\_gpgsm\_op\_delete): Make static and rename to ...

(gpgsm\_check\_delete): ... this.

(\_gpgme\_gpgsm\_set\_recipients): Make static and rename to ...

(gpgsm\_check\_set\_recipients): ... this.

(\_gpgme\_gpgsm\_op\_encrypt): Make static and rename to ...

(gpgsm\_encrypt): ... this.

(\_gpgme\_gpgsm\_op\_export): Make static and rename to ...

(gpgsm\_export): ... this.

(\_gpgme\_gpgsm\_op\_genkey): Make static and rename to ...

(gpgsm\_genkey): ... this.

(\_gpgme\_gpgsm\_op\_import): Make static and rename to ...

(gpgsm\_import): ... this.

(\_gpgme\_gpgsm\_op\_keylist): Make static and rename to ...

(gpgsm\_keylist): ... this.

(\_gpgme\_gpgsm\_op\_keylist\_ext): Make static and rename to ...

(gpgsm\_keylist\_ext): ... this.

(\_gpgme\_gpgsm\_op\_sign): Make static and rename to ...

(gpgsm\_sign): ... this.

(\_gpgme\_gpgsm\_op\_trustlist): Make static and rename to ...

(gpgsm\_trustlist): ... this.

(\_gpgme\_gpgsm\_op\_verify): Make static and rename to ...

(gpgsm\_verify): ... this.

(gpgsm\_status\_handler): Rename to ...

(status\_handler): ... this.

(\_gpgme\_gpgsm\_set\_status\_handler): Make static and rename to ...

(gpgsm\_set\_status\_handler): ... this.

(\_gpgme\_gpgsm\_set\_colon\_line\_handler): Make static and rename to ...

(gpgsm\_set\_colon\_line\_handler): ... this.

(\_gpgme\_gpgsm\_add\_io\_cb): Rename to ...

(add\_io\_cb): ... this.

(\_gpgme\_gpgsm\_start): Make static and rename to ...

(gpgsm\_start): ... this.

(\_gpgme\_gpgsm\_set\_io\_cb): Make static and rename to ...

(gpgsm\_set\_io\_cb): ... this.

(\_gpgme\_gpgsm\_io\_event): Make static and rename to ...  
(gpgsm\_io\_event): ... this.  
(struct \_gpgme\_engine\_ops\_gpgsm): New variable.  
[!ENABLE\_GPGSM]: Removed.  
\* engine.c: Do not include <time.h>, <sys/types.h>, <string.h>, <assert.h>, "io.h", "runggpg.h" and "engine-gpgsm.h". Include <stdlib.h> and "engine-backend.h".  
(struct engine\_object\_s): Rewritten.  
(engine\_ops): New variable.  
\* engine.c (\_gpgme\_engine\_get\_path, \_gpgme\_engine\_get\_version, \_gpgme\_engine\_check\_version, \_gpgme\_engine\_new, \_gpgme\_engine\_release, \_gpgme\_engine\_set\_verbosity, \_gpgme\_engine\_set\_status\_handler, \_gpgme\_engine\_set\_command\_handler, \_gpgme\_engine\_set\_colon\_line\_handler, \_gpgme\_engine\_op\_decrypt, \_gpgme\_engine\_op\_delete, \_gpgme\_engine\_op\_edit, \_gpgme\_engine\_op\_encrypt, \_gpgme\_engine\_op\_encrypt\_sign, \_gpgme\_engine\_op\_export, \_gpgme\_engine\_op\_genkey, \_gpgme\_engine\_op\_import, \_gpgme\_engine\_op\_keylist, \_gpgme\_engine\_op\_keylist\_ext, \_gpgme\_engine\_op\_sign, \_gpgme\_engine\_op\_trustlist, \_gpgme\_engine\_op\_verify, \_gpgme\_engine\_start, \_gpgme\_engine\_set\_io\_cbs, \_gpgme\_engine\_io\_event): Reimplement.  
\* engine.h: Fix a few comments and a variable name in a prototype.  
\* ops.h: Do not include "runggpg.h".  
\* passphrase.c: Include config.h only if [HAVE\_CONFIG\_H]. Do not include "runggpg.h".  
\* recipient.c: Likewise.  
\* signers.c: Likewise.  
\* version.c: Likewise.  
\* runngpg.c: Likewise. Include "engine-backend.h". Reorder functions and remove prototypes.  
(\_gpgme\_gpg\_get\_version): Make static and rename to ...  
(gpg\_get\_version): ... this.  
(\_gpgme\_gpg\_check\_version): Make static and rename to ...  
(gpg\_check\_version): ... this.  
(\_gpgme\_gpg\_new): Make static. Change argument type from GpgObject \* to void \*\*. Call gpg\_release instead  
\_gpgme\_gpg\_release.  
(\_gpgme\_gpg\_op\_decrypt): Make static and rename to ...  
(gpg\_check\_decrypt): ... this.  
(\_gpgme\_gpg\_op\_delete): Make static and rename to ...  
(gpg\_check\_delete): ... this.  
(\_gpgme\_gpg\_set\_recipients): Make static and rename to ...  
(gpg\_check\_set\_recipients): ... this.  
(\_gpgme\_gpg\_op\_encrypt): Make static and rename to ...  
(gpg\_encrypt): ... this.  
(\_gpgme\_gpg\_op\_export): Make static and rename to ...

(gpg\_export): ... this.  
(\_gpgme\_gpg\_op\_genkey): Make static and rename to ...  
(gpg\_genkey): ... this.  
(\_gpgme\_gpg\_op\_import): Make static and rename to ...  
(gpg\_import): ... this.  
(\_gpgme\_gpg\_op\_keylist): Make static and rename to ...  
(gpg\_keylist): ... this.  
(\_gpgme\_gpg\_op\_keylist\_ext): Make static and rename to ...  
(gpg\_keylist\_ext): ... this.  
(\_gpgme\_gpg\_op\_sign): Make static and rename to ...  
(gpg\_sign): ... this.  
(\_gpgme\_gpg\_op\_trustlist): Make static and rename to ...  
(gpg\_trustlist): ... this.  
(\_gpgme\_gpg\_op\_verify): Make static and rename to ...  
(gpg\_verify): ... this.  
(gpg\_status\_handler): Rename to ...  
(status\_handler): ... this.  
(\_gpgme\_gpg\_set\_status\_handler): Make static and rename to ...  
(gpg\_set\_status\_handler): ... this.  
(\_gpgme\_gpg\_set\_colon\_line\_handler): Make static and rename to ...  
(gpg\_set\_colon\_line\_handler): ... this.  
(gpgme\_gpg\_add\_io\_cb): Rename to ...  
(add\_io\_cb): ... this.  
(\_gpgme\_gpg\_start): Make static and rename to ...  
(gpg\_start): ... this.  
(\_gpgme\_gpg\_set\_io\_cb): Make static and rename to ...  
(gpg\_set\_io\_cb): ... this.  
(\_gpgme\_gpg\_io\_event): Make static and rename to ...  
(gpg\_io\_event): ... this.  
(struct \_gpgme\_engine\_ops\_gpg): New variable.

2002-10-10 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_verify) [ENABLE\_GPGSM]: Add missing argument.

2002-10-09 Marcus Brinkmann <marcus@g10code.de>

\* data.h, data-user.c, data-stream.c, data-mem.c, data-fd.c, data-compat.c: New file. Really check them in this time, completes 2002-10-08 change.

\* runpgg.h (GpgStatusHandler): Rename type to GpgmeStatusHandler and move to ...

\* types.h (GpgmeStatusHandler): ... here.

\* runpgg.h (GpgColonLineHandler): Rename type to GpgmeColonLineHandler. and move to ...

\* types.h (GpgmeColonLineHandler): ... here.

\* `runpg.h` (`GpgCommandHandler`): Rename type to `GpgmeCommandHandler`.  
and move to ...

\* `types.h` (`GpgmeCommandHandler`): ... here.

\* `engine.h`: Don't include "`runpg.h`".

(`_gpgme_engine_set_status_handler`): Change type of argument from `GpgStatusHandler` to `GpgmeStatusHandler`.

(`_gpgme_engine_set_colon_line_handler`): Change type of argument from `GpgColonLineHandler` to `GpgmeColonLineHandler`.

(`_gpgme_engine_set_command_handler`): Change type of argument from `GpgCommandHandler` to `GpgmeCommandHandler`.

\* `engine-gpgsm.h`: Don't include "`runpg.h`".

(`_gpgme_gpgsm_set_status_handler`): Change type of argument from `GpgStatusHandler` to `GpgmeStatusHandler`.

(`_gpgme_gpgsm_set_colon_line_handler`): Change type of argument from `GpgColonLineHandler` to `GpgmeColonLineHandler`.

\* `engine-gpgsm.c`: Do not include "`runpg.h`".

(`struct gpgsm_object_s`): Change type of `status.fnc` to `GpgmeStatusHandler`. Change type of `colon.fnc` to `GpgmeColonLineHandler`.

(`gpgsm_assuan_simple_command`): Change type of argument from `GpgStatusHandler` to `GpgmeStatusHandler`.

(`_gpgme_gpgsm_set_status_handler`): Likewise.

(`_gpgme_gpgsm_set_colon_line_handler`): Change type of argument from `GpgColonLineHandler` to `GpgmeColonLineHandler`.

\* `runpg.h` (`_gpgme_gpg_set_status_handler`): Change type of argument from `GpgStatusHandler` to `GpgmeStatusHandler`.

(`_gpgme_gpg_set_colon_line_handler`): Change type of argument from `GpgColonLineHandler` to `GpgmeColonLineHandler`.

(`_gpgme_gpg_set_command_handler`): Change type of argument from `GpgCommandHandler` to `GpgmeCommandHandler`.

\* `runpg.c` (`struct gpg_object_s`): Change type of `status.fnc` to `GpgmeStatusHandler`. Change type of `colon.fnc` to `GpgmeColonLineHandler`. Change type of `cmd.fnc` to `GpgmeCommandLineHandler`.

(`_gpgme_gpg_set_status_handler`): Change type of argument FNC to `GpgmeStatusHandler`.

(`_gpgme_gpg_set_colon_line_handler`): Change type of argument FNC to `GpgmeColonLineHandler`.

(`_gpgme_gpg_set_command_handler`): Change type of argument FNC to `GpgmeCommandHandler`.

\* `engine.c` (`_gpgme_engine_set_status_handler`): Change type of argument FNC to `GpgmeStatusHandler`.

(`_gpgme_engine_set_colon_line_handler`): Change type of argument FNC to `GpgmeColonLineHandler`.

(`_gpgme_engine_set_command_handler`): Change type of argument FNC to `GpgmeCommandHandler`.

\* `runpg.h` (`_gpgme_gpg_enable_pipemode`): Remove prototype.

\* `runpg.c` (`struct gpg_object_s`): Remove PM.  
 (`pipemode_cb`): Prototype removed.  
 (`add_pm_data`): Function removed.  
 (`_gpgme_gpg_enable_pipemode`): Likewise.  
 (`pipemode_copy`): Likewise.  
 (`pipemode_cb`): Likewise.  
 (`add_arg`): Don't check for pipemode.  
 (`add_data`): Likewise.  
 (`_gpgme_gpg_set_status_handler`): Likewise.  
 (`_gpgme_gpg_set_colon_line_handler`): Likewise.  
 (`_gpgme_gpg_set_command_handler`): Likewise.  
 (`_gpgme_gpg_spawn`): Likewise.  
 (`_gpgme_gpg_spawn`): Don't set PM.active.  
 (`_gpgme_gpg_op_verify`): Remove pipemode case.  
 \* `verify.c` (`_gpgme_op_verify_start`): Remove pipemode case.

\* `runpg.h` (`_gpgme_gpg_add_arg`, `_gpgme_gpg_add_data`,  
`_gpgme_gpg_add_pm_data`, `_gpgme_gpg_housecleaning`,  
`_gpgme_gpg_set_simple_line_handler`): Prototype removed.  
 (`_gpgme_gpg_set_verbosity`): New prototype.

\* `runpg.c` (`_gpgme_gpg_add_data`): Make static and rename to ...  
 (`add_data`): ... this.  
 (`_gpgme_gpg_add_pm_data`): Call `add_data`, not `_gpgme_gpg_add_data`.  
 (`_gpgme_gpg_set_command_handler`): Likewise.  
 (`_gpgme_gpg_op_decrypt`, `_gpgme_gpg_op_edit`, `_gpgme_gpg_op_encrypt`,  
`_gpgme_gpg_op_encrypt_sign`, `_gpgme_gpg_op_export`,  
`_gpgme_gpg_op_genkey`, `_gpgme_gpg_op_import`, `_gpgme_gpg_op_sign`,  
`_gpgme_gpg_op_verify`): Likewise.  
 (`_gpgme_gpg_add_pm_data`): Rename to ...  
 (`add_pm_data`): ... this.  
 (`_gpgme_gpg_op_verify`): Call `add_pm_data`, not  
`_gpgme_gpg_add_pm_data`.  
 (`_gpgme_gpg_add_arg`): Make static and rename to ...  
 (`add_arg`): ... this.  
 (`_gpgme_gpg_set_command_handler`, `_gpgme_gpg_new`,  
`_gpgme_gpg_op_decrypt`, `_gpgme_gpg_op_delete`,  
`_gpgme_append_gpg_args_from_signers`, `_gpgme_gpg_op_edit`,  
`_gpgme_append_gpg_args_from_recipients`, `_gpgme_gpg_op_encrypt`,  
`_gpgme_gpg_op_encrypt_sign`, `_gpgme_gpg_op_export`,  
`_gpgme_gpg_op_genkey`, `_gpgme_gpg_op_import`, `_gpgme_gpg_op_keylist`,  
`_gpgme_gpg_op_keylist_ext`, `_gpgme_gpg_op_trustlist`,  
`_gpgme_gpg_op_sign`, `_gpgme_gpg_op_verify`): Use `add_arg`, not  
`_gpgme_gpg_add_arg`.  
 (`_gpgme_gpg_set_verbosity`): New function.  
 (`struct gpg_object_s`): Remove member `simple` from `colon`.  
 (`_gpgme_gpg_set_colon_line_handler`): Don't initialize `simple`.  
 (`_gpgme_gpg_set_simple_line_handler`): Removed function.  
 (`read_colon_line`): Don't check the GPG->colon.simple.

\* engine.c (\_gpgme\_engine\_set\_verbosity): Call  
\_gpgme\_gpg\_set\_verbosity instead \_gpgme\_gpg\_add\_arg.

2002-10-08 Marcus Brinkmann <marcus@g10code.de>

\* util.h (\_gpgme\_malloc, \_gpgme\_realloc, \_gpgme\_calloc,  
\_gpgme\_strdup, \_gpgme\_free): Remove prototypes.  
(xtrymalloc, xtrycalloc, xtryrealloc, xtrystrdup, xfree): Remove  
macros.  
\* util.c: File removed.  
\* Makefile.am (libgpgme\_la\_SOURCES): Remove util.h.  
\* conversion.c (\_gpgme\_decode\_c\_string): Use malloc instead of  
xtrymalloc, realloc instead of xtryrealloc, calloc instead of  
xtrycalloc, free instead of xfree.  
(\_gpgme\_data\_append\_percentstring\_for\_xml): Likewise.  
\* data.c (\_gpgme\_data\_new, \_gpgme\_data\_release): Likewise.  
\* data-compat.c (gpgme\_data\_new\_from\_filepart): Likewise.  
\* data-mem.c (mem\_write, mem\_release, gpgme\_data\_new\_from\_mem,  
\_gpgme\_data\_get\_as\_string): Likewise.  
\* debug.c (debug\_init): Likewise.  
\* decrypt.c (\_gpgme\_release\_decrypt\_result): Likewise.  
\* delete.c (\_gpgme\_release\_delete\_result): Likewise.  
\* edit.c (\_gpgme\_release\_edit\_result, \_gpgme\_op\_edit\_start):  
Likewise.  
\* encrypt.c (\_gpgme\_release\_encrypt\_result): Likewise.  
\* engine.c (\_gpgme\_engine\_get\_info, \_gpgme\_engine\_new,  
\_gpgme\_engine\_release): Likewise.  
\* engine-gpgsm.c (\_gpgme\_gpgsm\_new, \_gpgme\_gpgsm\_release,  
\_gpgme\_gpgsm\_op\_decrypt, \_gpgme\_gpgsm\_op\_delete,  
gpgsm\_set\_recipients, \_gpgme\_gpgsm\_op\_encrypt,  
\_gpgme\_gpgsm\_op\_export, \_gpgme\_gpgsm\_op\_genkey,  
\_gpgme\_gpgsm\_op\_import, \_gpgme\_gpgsm\_op\_keylist,  
\_gpgme\_gpgsm\_op\_keylist\_ext, \_gpgme\_gpgsm\_op\_sign,  
\_gpgme\_gpgsm\_op\_verify, gpgsm\_status\_handler): Likewise.  
\* genkey.c (\_gpgme\_release\_genkey\_result): Likewise.  
\* gpgme.c (gpgme\_new, gpgme\_release): Likewise.  
\* import.c (\_gpgme\_release\_import\_result): Likewise.  
\* key.c (\_gpgme\_key\_cache\_init, \_gpgme\_key\_cache\_add, key\_new,  
add\_subkey, gpgme\_key\_release, \_gpgme\_key\_append\_name): Likewise.  
\* keylist.c (\_gpgme\_release\_keylist\_result, keylist\_colon\_handler,  
\_gpgme\_op\_keylist\_event\_cb, gpgme\_op\_keylist\_next): Likewise.  
\* ops.h (test\_and\_allocate\_result): Likewise.  
\* passphrase.c (\_gpgme\_release\_passphrase\_result,  
\_gpgme\_passphrase\_status\_handler,  
\_gpgme\_passphrase\_command\_handler): Likewise.  
\* progress.c (\_gpgme\_progress\_status\_handler): Likewise.  
\* recipient.c (gpgme\_recipients\_new, gpgme\_recipients\_release,  
gpgme\_recipients\_add\_name\_with\_validity): Likewise.

- \* `runpgp.c` (`_gpgme_gpg_new`, `_gpgme_gpg_release`,  
`_gpgme_gpg_add_arg`, `_gpgme_gpg_add_data`,  
`_gpgme_gpg_set_colon_line_handler`, `free_argv`, `free_fd_data_map`,  
`build_argv`, `_gpgme_gpg_spawn`, `read_status`, `read_colon_line`):  
Likewise.
- \* `sign.c` (`_gpgme_release_sign_result`): Likewise.
- \* `signers.c` (`_gpgme_signers_add`): Likewise.
- \* `trustlist.c` (`trust_item_new`, `trustlist_colon_handler`,  
`_gpgme_op_trustlist_event_cb`, `gpgme_op_trustlist_next`,  
`gpgme_trustitem_release`): Likewise.
- \* `verify.c` (`_gpgme_release_verify_result`, `finish_sig`): Likewise.
- \* `version.c` (`gpgme_get_engine_info`, `_gpgme_get_program_version`):  
Likewise.
- \* `w32-io.c` (`create_reader`, `create_writer`, `destroy_reader`,  
`destroy_writer`, `build_commandline`, `_gpgme_io_spawn`): Likewise.
- \* `w32-sema.c` (`critsect_init`, `_gpgme_sema_cs_destroy`): Likewise.
- \* `w32-util.c` (`read_w32_registry_string`): Likewise.
- \* `wait.c` (`_gpgme_fd_table_deinit`, `_gpgme_fd_table_put`,  
`_gpgme_wait_event_cb`, `_gpgme_add_io_cb`, `_gpgme_remove_io_cb`)
- \* `data-compat.c`: Include `<stdlib.h>`.

2002-10-08 Marcus Brinkmann <marcus@g10code.de>

New data object component:

- \* `gpgme.h` (`GpgmeDataReadCb`, `GpgmeDataWriteCb`, `GpgmeDataSeekCb`,  
`GpgmeDataReleaseCb`): New types.
- (`struct GpgmeDataCbs`): New structure.
- (`gpgme_data_read`): Changed prototype to match that of `read()` closely.
- (`gpgme_data_write`): Similar for `write()`.
- (`gpgme_data_seek`, `gpgme_data_new_from_cbs`, `gpgme_data_new_from_fd`,  
`gpgme_data_new_from_stream`): New prototypes.
- (`gpgme_data_get_type`, `gpgme_check_engine`): Prototype removed.
  
- \* `Makefile.am` (`libgpgme_la_SOURCES`): Add `data.h`, `data-fd.c`,  
`data-stream.c`, `data-mem.c`, `data-user.c` and `data-compat.c`.
- \* `data.c`: Reimplemented from scratch.
- \* (`data-compat.c`, `data-fd.c`, `data.h`, `data-mem.c`, `data-stream.c`,  
`data-user.c`): New file.
- \* `context.h` (`struct gpgme_data_s`): Removed.
- \* `conversion.c`: Include `<errno.h>` and `<sys/types.h>`.
- (`_gpgme_data_append`): New function.
- \* `data.c` (`_gpgme_data_append_string`): Move to ...
- \* `conversion.c` (`_gpgme_data_append_string`): ... here.
- \* `data.c` (`_gpgme_data_append_for_xml`): Move to ...
- \* `conversion.c` (`_gpgme_data_append_for_xml`): ... here.
- \* `data.c` (`_gpgme_data_append_string_for_xml`): Move to ...
- \* `conversion.c` (`_gpgme_data_append_string_for_xml`): ... here.



- \* data.c (`_gpgme_data_append_percentstring_for_xml`): Move to ...
- \* conversion.c (`_gpgme_data_append_percentstring_for_xml`): ... here.
  
- \* ops.h (`_gpgme_data_get_mode`, `_gpgme_data_set_mode`): Prototype removed.
- \* types.h (`GpgmeDataMode`): Type removed.
  
- \* decrypt.c (`_gpgme_decrypt_start`): Don't check data type or mode.
- \* edit.c (`_gpgme_op_edit_start`): Likewise.
- \* encrypt.c (`_gpgme_op_encrypt_start`): Likewise.
- \* encrypt-sign.c (`_gpgme_op_encrypt_sign_start`): Likewise.
- \* encrypt-sign.c (`_gpgme_op_encrypt_sign_start`): Likewise.
- \* export.c (`_gpgme_op_export_start`): Likewise.
- \* genkey.c (`_gpgme_op_genkey_start`): Likewise.
- \* import.c (`_gpgme_op_import_start`): Likewise.
- \* sign.c (`_gpgme_op_sign_start`): Likewise.
- \* verify.c (`_gpgme_op_verify_start`): Likewise.
  
- \* encrypt.c (`gpgme_op_encrypt`): Remove hack that returns invalid no recipient if no data was returned.
- \* encrypt-sign.c (`gpgme_op_encrypt_sign`): Remove hack that returns no recipient if no data was returned.
- \* encrypt-sign.c (`gpgme_op_encrypt_sign`): Remove hack that returns no recipient if no data was returned.
  
- \* engine.c (`_gpgme_engine_op_verify`): Add new argument to differentiate detached from normal signatures.
- \* engine.h (`_gpgme_engine_op_verify`): Likewise for prototype.
- \* engine-gpgsm.c (`_gpgme_gpgsm_op_verify`): Likewise. Don't check mode of data argument.
- \* engine-gpgsm.h (`_gpgme_gpgsm_op_verify`): Likewise for prototype.
- \* gpgme.h (`gpgme_op_verify_start`): Likewise for prototype.
- (`gpgme_op_verify`): Likewise for prototype.
- \* runpgg.c (`_gpgme_gpg_op_verify`): Likewise.
- \* runpgg.h (`_gpgme_gpg_op_verify`): Likewise for prototype.
- \* verify.c (`_gpgme_op_verify_start`): Likewise.
- (`gpgme_op_verify_start`): Likewise.
- (`gpgme_op_verify`): Likewise.
  
- \* runpgg.c (`struct arg_and_data_s`): New member `INBOUND` to hold direction of data object.
- (`_gpgme_gpg_add_data`): Add new argument `INBOUND`. Use it to determine direction of data object.
- (`_gpgme_gpg_add_pm_data`, `_gpgme_gpg_set_command_handler`, `_gpgme_gpg_op_decrypt`, `_gpgme_gpg_op_edit`, `_gpgme_gpg_op_encrypt`, `_gpgme_gpg_op_encrypt_sign`, `_gpgme_gpg_op_export`, `_gpgme_gpg_op_genkey`, `_gpgme_gpg_op_import`, `_gpgme_gpg_op_sign`, `_gpgme_gpg_op_verify`): Add new argument to `_gpgme_gpg_add_data`

invocation.

(build\_argv): Use new member INBOUND to determine direction of file descriptor. Don't check the data type.

\* runpgg.h (\_gpgme\_gpg\_add\_data): Add new argument to prototype.

\* gpgme.c (gpgme\_get\_op\_info): Don't call \_gpgme\_data\_get\_as\_string if CTX->op\_info is NULL.

\* version.c (gpgme\_check\_engine): Function removed.

2002-09-30 Werner Koch <wk@gnupg.org>

\* keylist.c (keylist\_colon\_handler): Take care when printing a NULL with the DEBUG.

\* engine-gpgsm.c (struct gpgsm\_object\_s): New member ANY.  
(gpgsm\_status\_handler): Run the colon function to indicate EOF.  
(\_gpgme\_gpgsm\_set\_colon\_line\_handler): Better reset ANY here.

2002-09-28 Marcus Brinkmann <marcus@g10code.de>

\* conversion.c (\_gpgme\_hextobyte): Prevent superfluous multiplication with base. Reported by Stphane Corthsy.

\* keylist.c (gpgme\_op\_keylist\_ext\_start): Use private asynchronous operation type in invocation of \_gpgme\_op\_reset.

2002-09-20 Werner Koch <wk@gnupg.org>

\* ath.c: Include sys/time.h if sys/select.h is not available.

2002-09-13 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (keylist\_status\_handler): Do not call finish\_key() here.  
(gpgme\_op\_keylist\_ext\_start): Set CTX->tmp\_key to NULL.

2002-09-03 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (assuan\_libobjs): Remove @LTLIBOBJS@ as we link them into gpgme unconditionally.  
(libgpgme\_la\_LIBADD): Change @LIBOBJS@ into @LTLIBOBJS@.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (assuan\_libobjs): Use @LTLIBOBJS@ instead @LIBOBJS@.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* debug.c (\_gpgme\_debug\_add): Test \*LINE, not LINE.  
(\_gpgme\_debug\_end): Likewise.  
Reported by Dr. Stefan Dalibor <Dr.Stefan.Dalibor@bfa.de>.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* posix-io.c (\_gpgme\_io\_select): Don't use a non-constant struct  
initializer.  
\* version.c (\_gpgme\_get\_program\_version): Likewise.  
Reported by Dr. Stefan Dalibor <Dr.Stefan.Dalibor@bfa.de>.

2002-09-02 Marcus Brinkmann <marcus@g10code.de>

\* conversion.c (\_gpgme\_decode\_c\_string): Set DESTP before  
modifying DEST.  
  
\* conversion.c (\_gpgme\_decode\_c\_string): Fix off by one error in  
last change.  
\* runpg.c (\_gpgme\_append\_gpg\_args\_from\_signers): Move before  
\_gpgme\_op\_edit so its prototype is known early on.  
  
\* conversion.c: New file.  
\* util.h: Add prototypes for \_gpgme\_decode\_c\_string and  
\_gpgme\_hextobyte.  
\* keylist.c (keylist\_colon\_handler): Call \_gpgme\_decode\_c\_string  
on issuer name.  
\* Makefile.am (libgpgme\_la\_SOURCES): Add conversion.c  
\* key.c (\_gpgme\_key\_append\_name): Replace calls to hextobyte by  
calls to \_gpgme\_hextobyte.  
(hash\_key): Likewise.

2002-09-01 Marcus Brinkmann <marcus@g10code.de>

\* op-support.c (\_gpgme\_op\_reset): Set CTX->pending after calling  
\_gpgme\_engine\_release, as this will reset pending to zero in the  
event done callback on cancelled operations.

2002-08-30 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (\_gpgme\_gpg\_op\_edit): Add args from signers.  
Suggested by Miguel Coca <e970095@zipi.fi.upm.es>.  
  
\* runpg.c (\_gpgme\_gpg\_op\_edit): Add bogus ctx argument.  
\* runpg.h: Also to prototype.  
\* engine.c (\_gpgme\_engine\_op\_edit): Likewise.  
\* engine.h: Likewise.  
\* edit.c (\_gpgme\_op\_edit\_start): Likewise.

2002-08-29 Werner Koch <wk@gnupg.org>

- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_sign): Implement signer selection.
- \* vasprintf.c (va\_copy): Define macro if not yet defined.

2002-08-29 Marcus Brinkmann <marcus@g10code.de>

- \* passphrase.c (\_gpgme\_passphrase\_status\_handler): Reset CTX->result.passphrase->no\_passphrase if passphrase is given (good or bad). Submitted by Jean DIRAISON <jean.diraison@free.fr>.

2002-08-28 Marcus Brinkmann <marcus@g10code.de>

- \* posix-io.c (\_gpgme\_io\_spawn): Use a double-fork approach. Return 0 on success, -1 on error.
- \* version.c (\_gpgme\_get\_program\_version): Don't wait for the child.
- \* engine.c (\_gpgme\_engine\_housecleaning): Function removed. (do\_reaping): Likewise. (\_gpgme\_engine\_add\_child\_to\_reap\_list): Likewise. (struct reap\_s): Removed. (reap\_list): Likewise. (reap\_list\_lock): Likewise.
- \* engine.h (\_gpgme\_engine\_io\_event): Remove prototypes for \_gpgme\_engine\_housecleaning and \_gpgme\_engine\_add\_child\_to\_reap\_list.
- \* runpg.c (\_gpgme\_gpg\_release): Don't add child to reap list. (struct gpg\_object\_s): Remove PID member. (\_gpgme\_gpg\_new): Don't initialize GPG->pid. (\_gpgme\_gpg\_spawn): Don't set GPG->pid.
- \* wait.c (run\_idle): Removed. (gpgme\_wait): Run idle\_function directly.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

- \* encrypt-sign.c (encrypt\_sign\_status\_handler): Remove dead variables encrypt\_info and encrypt\_info\_len.
  - \* trustlist.c (gpgme\_op\_trustlist\_start): Set colon line handler.
  - \* posix-sema.c (sema\_fatal): Remove function.
- All these reported by Stphane Corthsy.

2002-08-23 Werner Koch <wk@gnupg.org>

- \* gpgme-config.in: Made --prefix work for --libs.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

- \* ath.h: Update list of symbols that get a prefix: Rename the

ath\_mutex\_\*\_available symbols to ath\_\*\_available.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

- \* stpcpy.c: New file from gnulib.
- \* Makefile.am (assuan\_libobjs): Remove jnlib.

2002-08-20 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h: Add prototype for gpgme\_op\_import\_ext.
- \* import.c (struct import\_result\_s): New member `nr\_considered'. Rename `any\_imported' to `nr\_imported'.
- (import\_status\_handler): Increment nr\_imported. Set nr\_considered if appropriate.
- (gpgme\_op\_import\_ext): New function.
- (gpgme\_op\_import): Implement in terms of gpgme\_op\_import\_ext.

2002-08-20 Werner Koch <wk@gnupg.org>

- \* gpgme.m4: Replaced with a new and faster version. This does not anymore try to build test programs. If we really need test programs, we should add an option to gpgme-config to do so.
- \* vasprintf.c (int\_vasprintf): Hack to handle NULL passed for %s.

2002-08-20 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.c (\_gpgme\_set\_op\_info): Append data on subsequent calls.
- \* encrypt-sign.c (encrypt\_sign\_status\_handler): Remove op\_info handling.

2002-08-19 Werner Koch <wk@gnupg.org>

- \* decrypt.c (is\_token, skip\_token): Duplicated from verify.c
- (gpgme\_op\_decrypt): Hack to properly return Decryption\_Failed..
- (\_gpgme\_decrypt\_status\_handler): Create an operation info.

2002-08-14 Werner Koch <wk@gnupg.org>

- \* key.h (struct certsig\_s): New. Use it in gpgme\_key\_s.
- \* key.c (gpgme\_key\_release): Release it. We need to add more code of course.
- (\_gpgme\_key\_append\_name): Use memset to initialize the struct.
- \* gpgme.h (GPGME\_KEYLIST\_MODE\_SIGS): New.
- \* runpgp.c (\_gpgme\_gpg\_op\_keylist): Include sigs in listing depending non the list mode.
- \* key.c (gpgme\_key\_get\_string\_attr): Use GPGME\_ATTR\_TYPE to return

information about the key type (PGP or X.509).

(gpgme\_key\_get\_ulong\_attr): Likewise.

\* keylist.c (keylist\_colon\_handler): Include 1 in the check for valid algorithms so that RSA is usable. Store the issuer name and serial number also for "crs" records. Parse the expire date for subkeys.

(set\_userid\_flags): Put them onto the last appended key.

2002-07-29 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (\_gpgme\_gpg\_op\_edit): Use --with-colons.

2002-07-28 Marcus Brinkmann <marcus@g10code.de>

\* data.c (gpgme\_data\_read): For GPGME\_DATA\_TYPE\_NONE, return EOF instead an error.

The following changes make it possible to flush an inbound data pipe before invoking a command handler:

\* posix-io.c (\_gpgme\_io\_select): Accept new argument NONBLOCK to \_gpgme\_io\_select. Set timeout of 0 if this is set.

\* w32-io.c (\_gpgme\_io\_select): Likewise.

\* io.h: Add new argument NONBLOCK to \_gpgme\_io\_select prototype.

\* wait.c (do\_select): Add new argument to \_gpgme\_io\_select invocation.

\* runpgg.h (\_gpgme\_gpg\_set\_command\_handler): Add new argument linked\_data to prototype.

\* engine.h (\_gpgme\_engine\_set\_command\_handler): Likewise.

\* engine.c (\_gpgme\_engine\_set\_command\_handler): Likewise.

\* passphrase.c (\_gpgme\_passphrase\_start): Pass NULL as linked\_data argument to \_gpgme\_engine\_set\_command\_handler.

\* runpgg.c (struct gpg\_object\_s): New members linked\_data and linked\_idx in CMD.

(\_gpgme\_gpg\_new): Initialize those new members.

(\_gpgme\_gpg\_set\_command\_handler): Accept new argument linked\_data.

(build\_argv): Handle linked\_data in the same hack as cb\_data.

(read\_status): If linked\_data is in use, flush the pipe before activating the command handler.

\* gpgme.h: Add prototypes for gpgme\_op\_edit\_start and gpgme\_op\_edit.

The next changes export the status codes to the user:

\* decrypt.c (\_gpgme\_decrypt\_status\_handler): Likewise, also prefix all STATUS\_ with GPGME\_.

\* delete.c (delete\_status\_handler): Likewise.

- \* decrypt-verify.c (decrypt\_verify\_status\_handler): Likewise.
- \* encrypt.c (\_gpgme\_encrypt\_status\_handler): Likewise.
- (\_gpgme\_encrypt\_sym\_status\_handler): Likewise.
- \* encrypt-sign.c (encrypt\_sign\_status\_handler): Likewise.
- \* engine-gpgsm.c (parse\_status): Likewise.
- (gpgsm\_status\_handler): Likewise.
- (gpgsm\_set\_recipients): Likewise.
- \* export.c (export\_status\_handler): Likewise.
- \* genkey.c (genkey\_status\_handler): Likewise.
- \* import.c (append\_xml\_impinfo): Likewise.
- (import\_status\_handler): Likewise.
- \* keylist.c (keylist\_status\_handler): Likewise.
- \* passphrase.c (\_gpgme\_passphrase\_status\_handler): Likewise.
- (command\_handler): Likewise.
- \* progress.c (\_gpgme\_progress\_status\_handler): Likewise.
- \* sign.c (\_gpgme\_sign\_status\_handler): Likewise.
- \* trustlist.c (trustlist\_status\_handler): Likewise.
- \* verify.c (\_gpgme\_verify\_status\_handler): Likewise.
- \* gpgme.h (GpgmeEditCb): New type.
- \* runpgg.h (GpgStatusCode): Rename and move to ...
- \* gpgme.h (GpgmeStatusCode): ... this and here.
- \* Makefile.am (status-table.h): Run mkstatus on gpgme.h, not runpgg.h.
- \* mkstatus: Prefix STATUS with GPGME\_.
- \* runpgg.h (GpgStatusHandler, GpgCommandHandler): Change type accordingly.
- \* ops.h (\_gpgme\_verify\_status\_handler, \_gpgme\_decrypt\_status\_handler, \_gpgme\_sign\_status\_handler, \_gpgme\_encrypt\_status\_handler, \_gpgme\_passphrase\_status\_handler, \_gpgme\_progress\_status\_handler): Likewise.
- \* runpgg.c (struct gpg\_object\_s): Likewise for CMD.code.

These changes add an edit operation to GPGME:

- \* context.h (struct gpgme\_context\_s): New member RESULT.edit. \*
- ops.h: Add prototype for \_gpgme\_release\_edit\_result and \_gpgme\_passphrase\_command\_handler.
- \* passphrase.c (command\_handler): Make non-static and rename to ...
- (\_gpgme\_passphrase\_command\_handler): ... this.
- (\_gpgme\_passphrase\_start): Use new name for command handler.
- \* types.h: Add EditResult type.
- \* gpgme.c (\_gpgme\_release\_result): Release EDIT result.
- \* edit.c: New file.
- \* Makefile.am (libpggme\_la\_SOURCES): Add edit.c.
- (libpggme\_la\_LDADD): Rename to libpggme\_la\_LIBADD, and include assuan\_libobjs.
- (assuan\_libobjs): New variable, set this instead libpggme\_la\_LIBADD.
- \* engine.h (\_gpgme\_engine\_op\_edit): New prototype.

- \* engine.c (\_gpgme\_engine\_op\_edit): New function.
- \* runpgg.h (\_gpgme\_gpg\_op\_edit): New prototype.
- \* runpgg.c (\_gpgme\_gpg\_op\_edit): New function.

2002-07-27 Marcus Brinkmann <marcus@g10code.de>

- \* delete.c (delete\_problem): New case ambiguous specification.
- (delete\_status\_handler): Handle new case (poorly).

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- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_delete): Implement this.

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- \* Makefile.am (libgpgme\_la\_LDADD): Add @LIBBOBJS@ for vasprintf and fopencookie.
- \* vasprintf.c: Update to more recent libiberty version.
- \* debug.h: Replace #elsif with #elif.

Submitted by Stphane Corthsy:

- \* util.h (vasprintf): Correct prototype.
- \* encrypt-sign.c: Include <stddef.h>.
- (encrypt\_sign\_status\_handler): Change type of ENCRYPT\_INFO\_LEN to size\_t.
- \* ath-pthread.c: Include <stdlib.h>, not <malloc.h>.
- \* ath-pth.c: Likewise.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

- \* wait.c (fdt\_global): Make static. Reported by Stphane Corthsy.
- \* runpgg.c (\_gpgme\_gpg\_op\_keylist\_ext): Skip empty string patterns. Reported by Stphane Corthsy.
- \* key.c (gpgme\_key\_get\_as\_xml): Add OTRUST attribute. Requested by Stphane Corthsy.
- (gpgme\_key\_get\_string\_attr): Add GPGME\_ATTR\_SIG\_SUMMARY case to silence gcc warning.
- \* runpgg.c (\_gpgme\_gpg\_new): Always set utf8 as charset.

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- \* gpgme.c (gpgme\_set\_io\_cbs): Deal with CTX being NULL.
- \* gpgme.c (\_gpgme\_op\_event\_cb\_user): New function.



- \* op-support.c (\_gpgme\_op\_reset): Support a new mode of operation for private or user event loop. Use new user event callback wrapper.
- \* trustlist.c (gpgme\_op\_trustlist\_start): Use this new mode.
- \* keylist.c (gpgme\_op\_keylist\_start): Likewise.
  
- \* runpgp.c (\_gpgme\_gpg\_io\_event): New function.
- \* runpgp.h (\_gpgme\_gpg\_io\_event): New prototype.
- \* engine-gpgsm.c (\_gpgme\_gpg\_io\_event): New function.
- \* engine-gpgsm.h (\_gpgme\_gpgsm\_io\_event): New prototype.
- \* engine.c (\_gpgme\_engine\_io\_event): New function.
- \* engine.h (\_gpgme\_engine\_io\_event): New prototype.
- \* keylist.c (finish\_key): Call \_gpgme\_engine\_io\_event, and move the real work for the default IO callback routines to ... (\_gpgme\_op\_keylist\_event\_cb): ... here. New function.
- \* trustlist.c (trustlist\_colon\_handler): Signal GPGME\_EVENT\_NEXT\_TRUSTITEM. Move queue manipulation to ... (\_gpgme\_op\_trustlist\_event\_cb): ... here. New function.
- \* gpgme.c (\_gpgme\_op\_event\_cb): Call \_gpgme\_op\_keylist\_event\_cb and \_gpgme\_op\_trustlist\_event\_cb when appropriate.
- \* ops.h (\_gpgme\_op\_keylist\_event\_cb): New prototype. (\_gpgme\_op\_trustlist\_event\_cb): Likewise.
- \* op-support.c (\_gpgme\_op\_reset): Add comment why we don't use the user provided event handler directly.
- \* gpgme.h (GpgmeRegisterIOCb): Return GpgmeError value, and TAG in a pointer argument.
- \* wait.c (\_gpgme\_add\_io\_cb): Likewise.
- \* wait.h (\_gpgme\_add\_io\_cb): Likewise for prototype.
- \* runpgp.c (\_gpgme\_gpg\_add\_io\_cb): Call IO\_CBS->add with new argument. Fix up error handling.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_add\_io\_cb): Call IO\_CBS->add with new argument, fix up error handling.

2002-07-03 Werner Koch <wk@gnupg.org>

- \* encrypt.c (status\_handler\_finish): New.
- (\_gpgme\_encrypt\_status\_handler): Moved some code out to the new function and call this function also in case we get into the status handler with an error which might happen due to a kludge in engine-gpgsm.c

2002-06-28 Marcus Brinkmann <marcus@g10code.de>

- \* keylist.c (gpgme\_op\_keylist\_ext\_start): Always use our own FD table (eg use synchronous mode).

2002-06-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Fix documentation of key attribute retrieval functions.

2002-06-28 Marcus Brinkmann <marcus@g10code.de>

\* ops.h (`_gpgme_wait_on_condition`): Remove HANG argument from prototype and change return type to `GpgmeError`.

(`_gpgme_wait_one`): New prototype.

\* wait.c (`gpgme_wait`): Replace with the meat from `_gpgme_wait_on_condition` here, and remove the support for conditions.

(`_gpgme_wait_on_condition`): Remove HANG argument from prototype and change return type to `GpgmeError`. Replace with meat from `_gpgme_wait_one` and add support for conditions.

(`_gpgme_wait_one`): Just call `_gpgme_wait_on_condition` without condition.

\* keylist.c (`gpgme_op_keylist_ext_start`): Always use our own FD table (eg use synchronous mode).

(`gpgme_op_keylist_next`): Remove HANG argument from `_gpgme_wait_on_condition`. Check its return value.

\* trustlist.c (`gpgme_op_trustlist_start`): Always use our own FD table (eg use synchronous mode).

(`gpgme_op_trustlist_next`): Remove HANG argument from `_gpgme_wait_on_condition`. Check its return value.

2002-06-26 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (`map_assuan_error`): Map `No_Data_Available` to `EOF`.

\* import.c (`append_xml_impinfo`): Kludge to print fingerprint instead of keyid for use with `gpgsm`.

(`import_status_handler`): Set a flag to know whether any import occurred.

(`gpgme_op_import`): Return -1 if no certificate was imported.

2002-06-25 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (`_gpgme_gpgsm_set_io_cbs`) [`ENABLE_GPGSM`]: Fixed function arguments.

2002-06-25 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (`_gpgme_gpgsm_op_export`): Only export the keys listed in `RECP`.

\* export.c (`gpgme_op_export`): If no data was returned, return `GPGME_No_Recipients`.

2002-06-25 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_export): Implement.

2002-06-21 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_assuan\_simple\_command): Return ERR.

(parse\_status): New function.

(gpgsm\_status\_handler): Use parse\_status.

(gpgsm\_assuan\_simple\_command): Accept new arguments STATUS\_FNC and STATUS\_FNC\_VALUE and process status messages.

(gpgsm\_set\_recipients): Pass new arguments to gpgsm\_assuan\_simple\_command.

(gpgsm\_set\_fd): Likewise.

(\_gpgme\_gpgsm\_op\_keylist): Likewise.

(\_gpgme\_gpgsm\_op\_keylist\_ext): Likewise.

(\_gpgme\_gpgsm\_op\_sign): Likewise.

2002-06-21 Marcus Brinkmann <marcus@g10code.de>

\* wait.c (\_gpgme\_remove\_io\_cb): Unlock FDT->lock.

2002-06-20 Werner Koch <wk@gnupg.org>

\* runpgp.c (build\_argv): Ignore GPG\_AGENT\_INFO if set but empty.

\* verify.c (calc\_sig\_summary): Set bad policy for wrong key usage.

(skip\_token): New.

(\_gpgme\_verify\_status\_handler): Watch out for wrong key usage.

(gpgme\_get\_sig\_string\_attr): Hack to return info on the key usage. Does now make use of the former RESERVED argument which has been renamed to WHATIDX.

(gpgme\_get\_sig\_ulong\_attr): Renamed RESERVED to WHATIDX.

2002-06-14 Marcus Brinkmann <marcus@g10code.de>

\* wait.c (do\_select): Return -1 on error, and 0 if nothing to run.

(\_gpgme\_wait\_one): Only set HANG to zero if do\_select returned an error, or there are no more file descriptors to wait on.

(\_gpgme\_wait\_on\_condition): Ignore return value from do\_select for now.

2002-06-13 Werner Koch <wk@gnupg.org>

\* verify.c (gpgme\_op\_verify): Make sure that we never access an uninitialized result structure.

2002-06-12 Werner Koch <wk@gnupg.org>

\* keylist.c (struct keylist\_result\_s): New.

(\_gpgme\_release\_keylist\_result): Release it here

(keylist\_status\_handler): Handle truncated.  
(append\_xml\_keylistinfo): New.  
\* gpgme.c (\_gpgme\_release\_result): and use it here.  
\* types.h: Declare the new type here.  
\* context.h (struct gpgme\_context\_s): Use it here.

2002-06-11 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_release): Close status\_cb.fd.  
(\_gpgme\_gpgsm\_new): Duplicate status file descriptor, so we can use our own close notification mechanism without interfering with assuan.

2002-06-11 Werner Koch <wk@gnupg.org>

\* gpgme.h: Add GPGME\_ATTR\_SIG\_SUMMARY and the GPGME\_SIGSUM constants.  
\* verify.c (calc\_sig\_summary): New.  
(gpgme\_get\_sig\_ulong\_attr): And use it here.

2002-06-10 Werner Koch <wk@gnupg.org>

\* runpgg.h: Add new status codes TRUNCATED and ERROR.  
\* verify.c (is\_token, copy\_token): New.  
(\_gpgme\_verify\_status\_handler): Use copy\_token, handle the new ERROR status and store the errorcode used withgpgsm and trust status codes.  
\* gpgme.h: New attribute ERRTOK.  
\* key.c (gpgme\_key\_get\_string\_attr): Add dummy case for it.  
(gpgme\_get\_sig\_string\_attr): Use it here to return the last error.

2002-06-10 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_start): Move the code that sets the close notification for the status fd to ...  
(\_gpgme\_gpgsm\_new): ... here.  
\* wait.h: Include "sema.h". Remove prototypes of \_gpgme\_remove\_proc\_from\_wait\_queue and \_gpgme\_register\_pipe\_handler. Add prototypes of \_gpgme\_fd\_table\_init, \_gpgme\_fd\_table\_deinit, \_gpgme\_fd\_table\_put, \_gpgme\_add\_io\_cb, \_gpgme\_remove\_io\_cb, \_gpgme\_wait\_event\_cb and \_gpgme\_wait\_one..  
\* wait.c: Remove global variables PROC\_QUEUE, PROC\_QUEUE\_LOCK, FD\_TABLE\_SIZE, FD\_TABLE, FD\_TABLE\_LOCK. New global variables FDT\_GLOBAL, CTX\_DONE\_LIST, CTX\_DONE\_LIST\_SIZE, CTX\_DONE\_LIST\_LENGTH and CTX\_DONE\_LIST\_LOCK. Remove struct proc\_s. Replace struct wait\_item\_s.  
(\_gpgme\_fd\_table\_init): New function.

(\_gpgme\_fd\_table\_deinit): Likewise.

(\_gpgme\_fd\_table\_put): Likewise.

(set\_process\_done): Remove function.

(do\_select): Take argument FDT. Use that to decide which fds to select on.

(\_gpgme\_remove\_proc\_from\_wait\_queue): Remove function.

(\_gpgme\_wait\_event\_cb): New function.

(\_gpgme\_wait\_one): Likewise.

(\_gpgme\_register\_pipe\_handler): Remove function.

(\_gpgme\_add\_io\_cb): New function.

(\_gpgme\_remove\_io\_cb): Likewise.

(\_gpgme\_freeze\_fd): Remove function.

(\_gpgme\_thaw\_fd): Remove function.

\* runpg.c (struct fd\_data\_map\_s): Add new member TAG.

(struct gpg\_object\_s): Likewise for STATUS and COLON. Add member IDX to CMD. Add new member IO\_CBS.

(close\_notify\_handler): New variables POSSIBLY\_DONE and NOT\_DONE. For each I/O callback, check if it should be unregistered. If all callbacks have been unregistered, trigger GPGME\_EVENT\_DONE. Remove member RUNNING.

(\_gpgme\_gpg\_new): Initialize new members.

(\_gpgme\_gpg\_release): Check PID not RUNNING. Don't call \_gpgme\_remove\_proc\_from\_wait\_queue. Close GPG->CMD.FD if set.

(build\_argv): Store away the index instead the file descriptor for CMD.

(\_gpgme\_gpg\_add\_io\_cb): New function.

(\_gpgme\_gpg\_spawn): Use \_gpgme\_gpg\_add\_io\_cb to register IO callbacks.

(gpg\_status\_handler): Change return type to void, remove PID argument, close filedescriptor if EOF or error occurs.

(read\_status): Use \_gpgme\_gpg\_add\_io\_cb instead \_gpgme\_thaw\_fd. Use IO\_CBS->remove instead \_gpgme\_freeze\_fd.

(gpg\_colon\_line\_handler): Change return type to void, remove PID argument, close filedescriptor if EOF or error occurs.

(command\_cb): Use IO\_CBS->remove instead \_gpgme\_freeze\_fd.

(\_gpgme\_gpg\_set\_io\_cbs): New function.

\* runpg.h (\_gpgme\_gpg\_set\_io\_cbs): Prototype for \_gpgme\_gpg\_set\_io\_cbs.

\* gpgme.h (GpgmeIOCb): New type.

(GpgmeRegisterIOCb): Likewise.

(GpgmeRemoveIOCb): Likewise.

(GpgmeEventIO): Likewise.

(GpgmeEventIOCb): Likewise.

(struct GpgmeIOCb): New structure to hold I/O callbacks.

(gpgme\_set\_op\_io\_cbs): New prototype.

(gpgme\_get\_op\_io\_cbs): Likewise.

\* ops.h: New prototype for \_gpgme\_op\_event\_cb. Remove prototypes for \_gpgme\_freeze\_fd and \_gpgme\_thaw\_fd. Remove PID argument from

`_gpgme_data_inbound_handler` and `_gpgme_data_outbound_handler` prototype. Add prototype for `_gpgme_op_reset`.  
 Add synchronous argument to `_gpgme_decrypt_start` prototype.  
 \* `io.h`: Beautification.  
 \* `gpgme.c`: Include "wait.h".  
 (`gpgme_new`): Initialize FDT.  
 (`gpgme_set_io_cbs`): New function.  
 (`gpgme_get_io_cbs`): Likewise.  
 (`_gpgme_op_event_cb`): Likewise.  
 \* `data.c` (`_gpgme_data_inbound_handler`): Change return type to void. Drop PID argument. Close FD on error and EOF.  
 (`write_mem_data`): Don't close FD here ...  
 (`write_cb_data`): ... or here ...  
 (`_gpgme_data_outbound_handler`): ... but here. Change return type to void. Drop PID argument.  
 \* `context.h`: Include "wait.h".  
 (`struct gpgme_context_s`): New members FDT and IO\_CBS.  
 \* `op-support.c`: New file.  
 \* `Makefile.am` (`libgpgme_la_SOURCES`): Add `op-support.c`.  
 \* `ops.h`: Add prototype for `_gpgme_op_reset`.  
 \* `decrypt.c` (`_gpgme_decrypt_start`): New argument SYNCHRONOUS. Use `_gpgme_op_reset`.  
 (`gpgme_op_decrypt_start`): Add synchronous argument.  
 (`gpgme_op_decrypt`): Likewise. Use `_gpgme_wait_one` instead `gpgme_wait`.  
 \* `delete.c` (`gpgme_op_delete_start`): Rename to ...  
 (`_gpgme_op_delete_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
 (`gpgme_op_delete_start`): Just a wrapper around `_gpgme_op_delete_start` now.  
 (`gpgme_op_delete`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
 \* `encrypt.c`: Include "wait.h".  
 (`gpgme_op_encrypt_start`): Rename to ...  
 (`_gpgme_op_encrypt_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
 (`gpgme_op_encrypt_start`): Just a wrapper around `_gpgme_op_encrypt_start` now.  
 (`gpgme_op_encrypt`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
 \* `encrypt_sign.c` (`gpgme_op_encrypt_sign_start`): Rename to ...  
 (`_gpgme_op_encrypt_sign_start`): ... this. New argument SYNCHRONOUS. Use `_gpgme_op_reset`. Make function static.  
 (`gpgme_op_encrypt_sign_start`): Just a wrapper around `_gpgme_op_encrypt_sign_start` now.  
 (`gpgme_op_encrypt_sign`): Add synchronous argument. Use `_gpgme_wait_one` instead `gpgme_wait`.  
 \* `export.c` (`gpgme_op_export_start`): Rename to ...

(\_gpgme\_op\_export\_start): ... this. New argument SYNCHRONOUS.  
 Use \_gpgme\_op\_reset. Make function static.  
 (gpgme\_op\_export\_start): Just a wrapper around  
 \_gpgme\_op\_export\_start now.  
 (gpgme\_op\_export): Add synchronous argument. Use \_gpgme\_wait\_one  
 instead gpgme\_wait.  
 \* genkey.c (gpgme\_op\_genkey\_start): Rename to ...  
 (\_gpgme\_op\_genkey\_start): ... this. New argument SYNCHRONOUS.  
 Use \_gpgme\_op\_reset. Make function static.  
 (gpgme\_op\_genkey\_start): Just a wrapper around  
 \_gpgme\_op\_genkey\_start now.  
 (gpgme\_op\_genkey): Add synchronous argument. Use \_gpgme\_wait\_one  
 instead gpgme\_wait.  
 \* import.c (gpgme\_op\_import\_start): Rename to ...  
 (\_gpgme\_op\_import\_start): ... this. New argument SYNCHRONOUS.  
 Use \_gpgme\_op\_reset. Make function static.  
 (gpgme\_op\_import\_start): Just a wrapper around  
 \_gpgme\_op\_import\_start now.  
 (gpgme\_op\_import): Add synchronous argument. Use \_gpgme\_wait\_one  
 instead gpgme\_wait.  
 \* keylist.c (gpgme\_op\_keylist\_start): Use \_gpgme\_op\_reset.  
 (gpgme\_op\_keylist\_ext\_start): Likewise.  
 \* sign.c (gpgme\_op\_sign\_start): Rename to ...  
 (\_gpgme\_op\_sign\_start): ... this. New argument SYNCHRONOUS. Use  
 \_gpgme\_op\_reset. Make function static.  
 (gpgme\_op\_sign\_start): Just a wrapper around \_gpgme\_op\_sign\_start  
 now.  
 (gpgme\_op\_sign): Add synchronous argument. Use \_gpgme\_wait\_one  
 instead gpgme\_wait.  
 \* trustlist.c (gpgme\_op\_trustlist\_start): Use \_gpgme\_op\_reset.  
 \* verify.c (gpgme\_op\_verify\_start): Rename to ...  
 (\_gpgme\_op\_verify\_start): ... this. New argument SYNCHRONOUS.  
 Use \_gpgme\_op\_reset. Make function static.  
 (gpgme\_op\_verify\_start): Just a wrapper around  
 \_gpgme\_op\_verify\_start now.  
 (gpgme\_op\_verify): Add synchronous argument. Use \_gpgme\_wait\_one  
 instead gpgme\_wait.  
 \* engine-gpgsm.c (iocb\_data\_t): New type.  
 (struct gpgsm\_object\_s): New member status\_cb. Replace input\_fd  
 and input\_data with input\_cb. Replace output\_fd and output\_data  
 with output\_cb. Replace message\_fd and message\_data with  
 message\_cb. New member io\_cbs.  
 (\_gpgme\_gpgsm\_new): Initialize all new members (and drop the old  
 ones).  
 (close\_notify\_handler): New variable POSSIBLY\_DONE. For each I/O  
 callback, check if it should be unregistered. If all callbacks  
 have been unregistered, trigger GPGME\_EVENT\_DONE.  
 (\_gpgme\_gpgsm\_release): Remove variable PID. Use new variable

names to close the file descriptors.

(\_gpgme\_gpgsm\_op\_decrypt): Use new variable names,

(\_gpgme\_gpgsm\_op\_encrypt): Likewise.

(\_gpgme\_gpgsm\_op\_genkey): Likewise.

(\_gpgme\_gpgsm\_op\_import): Likewise.

(\_gpgme\_gpgsm\_op\_keylist): Likewise.

(\_gpgme\_gpgsm\_op\_keylist\_ext): Likewise.

(\_gpgme\_gpgsm\_op\_sign): Likewise.

(\_gpgme\_gpgsm\_op\_verify): Likewise.

(gpgsm\_status\_handler): Drop argument PID. Change return type to void. Close status pipe before returning because of EOF or error.

(\_gpgme\_gpgsm\_add\_io\_cb): New function.

(\_gpgme\_gpgsm\_start): Use \_gpgme\_gpgsm\_add\_io\_cb to register callback function.

(\_gpgme\_gpgsm\_set\_io\_cbs): New function.

\* engine-gpgsm.h: New prototype for \_gpgme\_gpgsm\_set\_io\_cbs.

\* engine.c (\_gpgme\_engine\_set\_io\_cbs): New function.

\* engine.h: New prototype for \_gpgme\_engine\_set\_io\_cbs.

2002-06-04 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (libgpgme\_la\_SOURCES): Remove mutex.h.

2002-06-03 Marcus Brinkmann <marcus@g10code.de>

\* key.c: Include <ctype.h>.

(\_gpgme\_key\_append\_name): Skip one more char when processing escaped char. Submitted by Marc Mutz <mutz@kde.org>.

Handle hexadecimal encodings. Also reported by Marc. Thanks!

2002-06-02 Marcus Brinkmann <marcus@g10code.de>

\* ath.h: Enable the \_gpgme\_ prefix. Fix all those prefix macros.

\* posix-sema.c: Use that prefix here.

\* posix-io.c: Include "ath.h".

(\_gpgme\_io\_read): Use \_gpgme\_ath\_read instead read.

(\_gpgme\_io\_write): Use \_gpgme\_ath\_write instead write.

(\_gpgme\_io\_waitpid): Use \_gpgme\_ath\_waitpid instead waitpid.

(\_gpgme\_io\_select): Use \_gpgme\_ath\_select instead select.

2002-06-02 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (ath\_components): New variable.

(ath\_components\_pthread): Likewise.

(ath\_components\_pth): Likewise.

(system\_components): Add ath\_componentes.

\* ath.h: New file.



- \* ath.c: Likewise.
- \* ath-pthread.c: Likewise.
- \* ath-pth.c: Likewise.
- \* posix-sema.c (\_gpgme\_sema\_cs\_enter): Rework to use the ATH interface.
- \* mutex.h: Remove file.

2002-05-30 Werner Koch <wk@gnupg.org>

- \* key.c (gpgme\_key\_get\_string\_attr): Return NULL when asking for an issuer with IDX > 0. We don't support altIssuerNames for now.

2002-05-22 Werner Koch <wk@gnupg.org>

- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist\_ext): Aehmm, added missing variable definition. Oohh - Marcus was faster.

2002-05-22 Marcus Brinkmann <marcus@gnu.org>

- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist\_ext): Fix last change.

2002-05-21 Werner Koch <wk@gnupg.org>

- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist)
- (\_gpgme\_gpgsm\_op\_keylist\_ext): Pass the keylist mode to gpgsm.

2002-05-10 Werner Koch <wk@gnupg.org>

- \* key.h (gpgme\_key\_s): Add OTRUST.
- \* keylist.c (set\_ownertrust): New.
- (keylist\_colon\_handler): Get the ownertrust value
- \* key.c (gpgme\_key\_get\_string\_attr, gpgme\_key\_get\_ulong\_attr): Return that value.

2002-05-08 Marcus Brinkmann <marcus@g10code.de>

- \* w32-util.c: New static variable GET\_PATH\_LOCK.
- (\_gpgme\_get\_gpg\_path): Remove superfluous NULL initializer. Take lock while determining path.
- (\_gpgme\_get\_gpgsm\_path): Likewise.
- \* version.c (do\_subsystem\_inits): Set DONE to 1 after initialization.
- (gpgme\_get\_engine\_info): New variable ENGINE\_INFO\_LOCK. Take lock while determining engine info.
- \* runpg.c (\_gpgme\_gpg\_get\_version): New variable GPG\_VERSION\_LOCK. Take the lock while determining the program version.
- \* posix-io.c: Include "sema.h".

(\_gpgme\_io\_spawn): New variable FIXED\_SIGNALS\_LOCK. Take the lock while fixing the signals.

(\_gpgme\_io\_select): Make READFDS and WRITEFDS non-static.

\* key.c: Include "sema.h". New globals KEY\_CACHE\_LOCK and KEY\_REF\_LOCK.

(capabilities\_to\_string): Make STRINGS very const.

(\_gpgme\_key\_cache\_add): Lock the key cache.

(\_gpgme\_key\_cache\_get): Likewise.

(gpgme\_key\_ref, gpgme\_key\_release): Lock the key\_ref\_lock.

\* import.c (append\_xml\_impinfo): Make IMPORTED\_FIELDS and IMPORT\_RES\_FIELDS very const. Make FIELD and FIELD\_NAME a little const.

\* engine.c (\_gpgme\_engine\_get\_info): New variable ENGINE\_INFO\_LOCK. Take lock while determining engine info.

\* engine-gpgsm.c: Include "sema.h".

(\_gpgme\_gpgsm\_get\_version): New variable GPGSM\_VERSION\_LOCK. Take lock while getting program version.

2002-05-08 Marcus Brinkmann <marcus@g10code.de>

\* debug.h: New file.

\* Makefile.am (libgpgme\_la\_SOURCES): Add debug.h.

\* util.h: Removed all prototypes and declarations related to debugging. Include "debug.h".

\* debug.c (debug\_level): Comment variable and remove superfluous zero initializer.

(errfp): Likewise.

(\_gpgme\_debug\_enabled): Function removed.

(struct debug\_control\_s): Definition removed.

(\_gpgme\_debug\_level): Function removed.

(\_gpgme\_debug\_begin): Rewritten to use vasprintf. Accept a printf-style format specification and a variable number of arguments.

(\_gpgme\_debug\_add): Rewritten using vasprintf. Expect that format starts out with "%s" for simplicity.

(\_gpgme\_debug\_end): Rewritten using vasprintf. Do not accept a TEXT argument anymore.

\* posix-io.c (\_gpgme\_io\_select): Use new level argument for DEBUG\_BEGIN instead explicit if construct.

\* debug.c (debug\_init): Remove superfluous zero initializer, remove volatile flag of INITIALIZED. Do not use the double-checked locking algorithm, it is fundamentally flawed and will empty your fridge (on a more serious note, despite the volatile flag it doesn't give you the guarantee you would expect, for example on a DEC Alpha or an SMP machine. The volatile only

serializes accesses to the volatile variable, but not to the other variables).

2002-05-03 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (`_gpgme_gpgsm_new`): Redirect any gpgsm error output to `/dev/null`.

\* verify.c (`gpgme_get_sig_key`): Set the protocol of the listctx.

\* gpgme.c (`gpgme_get_protocol`): New.

\* data.c (`gpgme_data_write`): Changed type of BUFFER to void\*.  
(`gpgme_data_read`): Ditto.

\* verify.c (`_gpgme_verify_status_handler`): Handle TRUST\_\* status lines so that a claim can be made without looking up the key.

(`gpgme_get_sig_string_attr`): New.

(`gpgme_get_sig_ulong_attr`): New.

\* gpgme.h (`GpgmeAttr`): Added GPGME\_ATTR\_SIG\_STATUS.

\* runpg.h: Add new status codes from gpg 1.0.7 and formatted the list to align with the status.h file from gnupg.

\* gpgme.h (`GpgmeSigStat`): Add `_GOOD_EXP` and `_GOOD_EXPKEY`.

\* verify.c (`_gpgme_verify_status_handler`, `finish_sig`): Handle these new status codes. Store the expiration time

2002-04-27 Werner Koch <wk@gnupg.org>

\* gpgme.h (`GpgmeData_Encoding`): New.

\* data.c (`gpgme_data_get_encoding`, `gpgme_data_set_encoding`): New.

\* engine-gpgsm.c (`map_input_enc`): New. Use it in all local functions where the INPUT command gets send.

2002-04-27 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (`_gpgme_gpgsm_op_verify`): Close the output descriptor only when we don't need it anymore. Close the message descriptor if we don't need it.

2002-04-26 Werner Koch <wk@gnupg.org>

\* Makefile.am (`libgpgme_la_LIBADD`): Use libtool libraries.

2002-04-25 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (`_gpgme_gpg_release`): Call `gpgme_data_release` on

GPG->cmd.cb\_data, not xfree.

2002-04-25 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_new): Set the display, ttyname, ttytype, lc\_ctype and lc\_messages options in the server.

2002-04-24 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (map\_assuan\_error): Add new error codes.

2002-04-23 Werner Koch <wk@gnupg.org>

\* key.c (gpgme\_key\_get\_ulong\_attr): Swapped use of can\_encrypt and can\_certify to return the requested values.

2002-04-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_get\_progress\_cb): Allow either return parameter to be NULL.  
(gpgme\_get\_passphrase\_cb): Likewise.

2002-04-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.c (gpgme\_get\_passphrase\_cb): New function.  
(gpgme\_get\_progress\_cb): New function.  
\* gpgme.h: Add new prototypes for gpgme\_get\_passphrase\_cb and gpgme\_get\_progress\_cb.

2002-03-28 Werner Koch <wk@gnupg.org>

\* gpgme.h (GpgmeAttr): Add values for issuer and chaining.  
\* key.h (gpgme\_key\_s): Add issuer and chaining elements for X509.  
\* keylist.c (keylist\_colon\_handler): Store them.  
\* key.c (gpgme\_key\_release): Free them.  
(gpgme\_key\_get\_as\_xml,gpgme\_key\_get\_string\_attr): Print them.

2002-03-26 Werner Koch <wk@gnupg.org>

\* Makefile.am (libgpgme\_la\_SOURCES): Add mutex.h

2002-03-21 Werner Koch <wk@gnupg.org>

\* util.h [!HAVE\_FOPENCOOKIE]: Make sure off\_t and ssize\_t are defined.

2002-03-18 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (system\_components): New variable, set depending on HAVE\_DOSISH\_SYSTEM.  
(libgpgme\_la\_SOURCES): Use system\_components. Remove `syshdr.h'.  
\* syshdr.h: File removed.

\* posix-io.c: Remove !HAVE\_DOSISH\_SYSTEM safeguard. Clean up source.  
\* posix-sema.c: Likewise.  
\* posix-util.c: Likewise.

\* w32-io.c: Remove HAVE\_DOSISH\_SYSTEM safeguard.  
\* w32-sema.c: Likewise.  
\* w32-util.c: Likewise.

\* posix-io.c: Include `unistd.h', do not include `syshdr.h'.  
\* posix-sema.c: Likewise.  
\* w32-io.c: Include `io.h', do not include `syshdr.h'.  
\* w32-sema.c: Likewise.  
\* w32-util.c: Likewise.  
\* data.c: Do not include `syshdr.h'.  
\* wait.c: Likewise.  
\* wait.h: Code cleanup.

\* mutex.h: New file.  
\* posix-sema.c: Implement.

2002-03-08 Werner Koch <wk@gnupg.org>

\* util.h [!HAVE\_FOPENCOOKIE]: Fixed type. Thanks to Frank Heckenbach.

2002-03-07 Werner Koch <wk@gnupg.org>

\* gpgme.h (gpgme\_op\_keylist\_ext\_start): Add prototype.

2002-03-06 Marcus Brinkmann <marcus@g10code.de>

\* encrypt.c (\_gpgme\_encrypt\_sym\_status\_handler): New function.  
(gpgme\_op\_encrypt\_start): New variable SYMMETRIC, set it if RECP is null, and if it is set, use \_gpgme\_encrypt\_sym\_status\_handler as status handler and run \_gpgme\_passphrase\_start.  
\* runpg.c (\_gpgme\_gpg\_op\_encrypt): If RECP is zero, do symmetric encryption.  
\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_encrypt): If RECP is zero, return error value.

\* runpg.c (\_gpgme\_gpg\_op\_verify): Add "--" argument.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Also set the error No\_Passphrase if only a bad passphrase was provided.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (\_gpgme\_gpg\_op\_verify): If TEXT is of mode GPGME\_DATA\_MODE\_IN, construct a command line that stores the plaintext in TEXT.

\* verify.c (gpgme\_op\_verify\_start): Accept TEXT being uninitialized, and in this case interpret SIG as a normal or cleartext signature and TEXT as a return data object.

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_verify): Likewise.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist\_ext) [ENABLE\_GPGSM]: Add stub function.

2002-02-28 Werner Koch <wk@gnupg.org>

\* key.h (subkey\_s): New member expires\_at.

\* keylist.c (keylist\_colon\_handler): Set it here

\* key.c (gpgme\_key\_get\_as\_xml,gpgme\_key\_get\_ulong\_attr): Return it.

2002-02-27 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.h (\_gpgme\_gpg\_op\_keylist\_ext): New prototype.

\* runpgg.c (\_gpgme\_gpg\_op\_keylist\_ext): New function.

\* engine-gpgsm.h (\_gpgme\_gpgsm\_op\_keylist\_ext): New prototype.

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist\_ext): New function.

\* engine.h (\_gpgme\_engine\_op\_keylist\_ext): New prototype.

\* engine.c (\_gpgme\_engine\_op\_keylist\_ext): New function.

\* keylist.c (gpgme\_op\_keylist\_ext\_start): New function.

2002-02-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h: Add new error code GPGME\_Invalid\_Recipient.

\* encrypt.c (struct encrypt\_result\_s): New member invalid\_recipients, rename no\_recipients to no\_valid\_recipients.

(\_gpgme\_encrypt\_status\_handler): Include error for invalid recipients.

\* engine-gpgsm.c (gpgsm\_set\_recipients): Change type of first argument to GpgsmObject. Use that to report back the status about the recipients.

2002-02-26 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (\_gpgme\_verify\_status\_handler): Fix the last change.

2002-02-25 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (\_gpgme\_verify\_status\_handler): Parse the args line to see if the problem is due to a missing key, and report that back to the user.

2002-02-25 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (\_gpgme\_engine\_op\_encrypt\_sign): New function.  
\* engine.h (\_gpgme\_engine\_op\_encrypt\_sign): New prototype.  
\* runpgg.c (\_gpgme\_append\_gpg\_args\_from\_signers): New function.  
(\_gpgme\_gpg\_op\_sign): Use that new function.  
(\_gpgme\_gpg\_op\_encrypt\_sign): New function.  
\* runpgg.h (\_gpgme\_gpg\_op\_encrypt\_sign): New prototype.  
\* gpgme.h (gpgme\_op\_encrypt\_sign\_start): New prototype.  
(gpgme\_op\_encrypt\_sign): Likewise.  
\* Makefile.am (libgpgme\_la\_SOURCES): Add encrypt-sign.c.  
\* ops.h (\_gpgme\_encrypt\_status\_handler): Add prototype.  
(\_gpgme\_sign\_status\_handler): Add prototype.  
\* sign.c (sign\_status\_handler): Rename to ...  
(\_gpgme\_sign\_status\_handler): ... this and make non-static.  
\* encrypt.c (encrypt\_status\_handler): Rename to ...  
(\_gpgme\_encrypt\_status\_handler): ... this and make non-static.  
\* encrypt.c (gpgme\_op\_encrypt\_start): Use new status handler name.  
\* sign.c (gpgme\_op\_sign\_start): Likewise.

2002-02-25 Marcus Brinkmann <marcus@g10code.de>

\* context.h (struct gpgme\_context\_s): New member include\_certs.  
\* gpgme.h (gpgme\_set\_include\_certs): Add prototype.  
(gpgme\_get\_include\_certs): Likewise.  
\* gpgme.c (gpgme\_set\_include\_certs): New function.  
(gpgme\_get\_include\_certs): Likewise.  
(gpgme\_new): Set include\_certs to 1 (the default).  
\* engine.c (\_gpgme\_engine\_op\_sign): Accept new argument include\_certs, and pass it to \_gpgme\_gpgsm\_op\_sign.  
\* engine.h (\_gpgme\_engine\_op\_sign): Likewise for prototype.  
\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_sign): Accept new argument include\_certs and handle it.  
\* engine-gpgsm.h (\_gpgme\_gpgsm\_start): Add new argument include\_certs.  
\* sign.c (gpgme\_op\_sign\_start): Add new argument to \_gpgme\_engine\_op\_sign call.

2002-02-14 Werner Koch <wk@gnupg.org>

\* keylist.c (gpgme\_op\_keylist\_start): Do not use a verbose listing.

2002-02-13 Werner Koch <wk@gnupg.org>

- \* vasprintf.c, fopencookie.c: Add replacement functions.
- \* util.h: Add prototypes for them.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

- \* engine-gpgsm.c (gpgsm\_assuan\_simple\_command): Return 0 if we reach the end of the function.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

- \* genkey.c (gpgme\_op\_genkey\_start): Fix logic in validity check. (gpgme\_op\_genkey\_start): Skip newlines after opening tag.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_start): Remove cruft.

2002-02-08 Marcus Brinkmann <marcus@g10code.de>

- \* genkey.c (gpgme\_op\_genkey\_start): Allow PUBKEY and SECKEY to be set, and pass them down to the crypto engine.
- \* engine-gpgsm.h (\_gpgme\_gpgsm\_start): New arguments PUBKEY and SECKEY.
- \* engine.h: Likewise.
- \* runpgg.h (\_gpgme\_gpg\_spawn): Likewise.
- \* engine.c (\_gpgme\_engine\_op\_genkey): Likewise. Use those arguments.
- \* runpgg.c (\_gpgme\_gpg\_op\_genkey): Likewise. Complain if those arguments are set.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_genkey): Likewise. Implement function.
- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist): Beautify comment.

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

- \* runpgg.c (\_gpgme\_gpg\_op\_keylist): Remove handling of keylist mode (for now).

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

- \* wait.c (gpgme\_wait): Add new argument STATUS, in which the status of the returned context is returned. (\_gpgme\_wait\_on\_condition): Rework the function a bit, to make it aware of cancelled processes, and to allow to use gpgme\_wait with CTX being NULL (as documented in the source). (struct proc\_s): New member REPORTED.
- \* gpgme.h: Fix prototype.
- \* verify.c (gpgme\_op\_verify): Fix use of gpgme\_wait.



- \* sign.c (gpgme\_op\_sign): Likewise.
- \* import.c (gpgme\_op\_import): Likewise.
- \* genkey.c (gpgme\_op\_genkey): Likewise.
- \* export.c (gpgme\_op\_export): Likewise.
- \* encrypt.c (gpgme\_op\_encrypt): Likewise.
- \* delete.c (gpgme\_op\_delete): Likewise.
- \* decrypt-verify.c (gpgme\_op\_decrypt\_verify): Likewise.

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.c (gpgme\_set\_keylist\_mode): Possibly return an error value.
- (gpgme\_get\_keylist\_mode): New function.
- (gpgme\_new): Set the default for keylist\_mode member of CTX.
- \* gpgme.h (gpgme\_set\_keylist\_mode): Fix prototype.
- (gpgme\_get\_keylist\_mode): New prototype.
- (GPGME\_KEYLIST\_MODE\_LOCAL): New macro.
- (GPGME\_KEYLIST\_MODE\_EXTERN): Likewise..

2002-02-02 Marcus Brinkmann <marcus@g10code.de>

This patch has gotten a bit large... mmh. The main thing that happens here is that error values are now not determined in the operation function after gpgme\_wait completed, but in the status handler when EOF is received. It should always be the case that either an error is flagged or EOF is received, so that after a gpgme\_wait you should never have the situation that no error is flagged and EOF is not received. One problem is that the engine status handlers don't have access to the context, a horrible kludge works around this for now. All errors that happen during a pending operation should be caught and reported in ctx->error, including out-of-core and cancellation. This rounds up neatly a couple of loose ends, and makes it possible to pass up any errors in the communication with the backend as well. As a bonus, there will be a function to access gpgme->wait, so that the operations can truly be implemented with their \_start function.

- \* engine-gpgsm.c (gpgsm\_status\_handler): Horrible kludge to report error back to the context.
- \* runpgg.c (gpg\_status\_handler): Same horrible kludge applied here.
- \* engine-gpgsm.c (gpgsm\_assuan\_simple\_command): Add error checking.
- \* wait.c (\_gpgme\_wait\_on\_condition): If canceled, set CTX->error to a value indication that.
- \* verify.c (add\_notation): Set error, not out\_of\_core.

(finish\_sig): Likewise.  
(gpgme\_op\_verify\_start): Don't clear out\_of\_core.  
(\_gpgme\_verify\_status\_handler): At EOF, clean up the notation data.  
(gpgme\_op\_verify): And don't do it here.

\* trustlist.c (trustlist\_status\_handler): Check error, not out\_of\_core.  
(gpgme\_op\_trustlist\_start): Don't clear out\_of\_core.  
(gpgme\_op\_trustlist\_next): Check error, not out\_of\_core.  
(gpgme\_op\_trustlist\_end): Likewise.

\* ops.h (test\_and\_allocate\_result): New macro.  
(\_gpgme\_passphrase\_result): Remove prototype.

\* delete.c (gpgme\_op\_delete): Return error from context.  
(delete\_status\_handler): Use macro test\_and\_allocate\_result.  
Perform error checking at EOF.  
(gpgme\_op\_delete\_start): Release result.

\* passphrase.c (\_gpgme\_passphrase\_status\_handler): Use macro test\_and\_allocate\_result, and perform error checking here.  
(\_gpgme\_passphrase\_result): Function removed.

\* sign.c (gpgme\_op\_sign\_start): Do not set out\_of\_core to zero.  
(gpgme\_op\_sign): Just return the error value from the context.  
(sign\_status\_handler): Only progress if no error is set yet. If we process an EOF, set the resulting error value (if any).

\* decrypt.c (\_gpgme\_decrypt\_result): Function removed.  
(create\_result\_struct): Function removed.  
(\_gpgme\_decrypt\_status\_handler): Use macro test\_and\_allocate\_result, calculate error on EOF, do not progress with errors.  
(\_gpgme\_decrypt\_start): Do not set out\_of\_core to zero.  
(gpgme\_op\_decrypt): Just return the error value from the context.

\* encrypt.c (encrypt\_status\_handler): Perform the error checking here.  
(gpgme\_op\_encrypt\_start): Do not clear out\_of\_core.

\* export.c (export\_status\_handler): Return if error is set in context.  
(gpgme\_op\_export\_start): Release result.  
(gpgme\_op\_export): Return error from context.

\* decrypt-verify.c (gpgme\_op\_decrypt\_verify): Return the error in the context.

\* genkey.c (genkey\_status\_handler): Use macro test\_and\_allocate\_result. Perform error checking at EOF.  
(gpgme\_op\_genkey): Just return the error from context.

\* import.c (gpgme\_op\_import): Return the error from context.  
(import\_status\_handler): Use macro test\_and\_allocate\_result.

\* keylist.c (gpgme\_op\_keylist\_start): Do not clear out\_of\_core.  
(gpgme\_op\_keylist\_next): Return error of context.  
(keylist\_colon\_handler): Set error instead out\_of\_code.  
(finish\_key): Likewise.

\* context.h: Remove member out\_of\_core, add member error.

\* gpgme.c (`_gpgme_release_result`): Clear error flag.

\* engine.h (`_gpgme_engine_get_error`): New prototype.

\* engine.c (`_gpgme_engine_get_error`): New function.

\* engine-gpgsm.c (`_gpgme_gpgsm_get_error`): New function.

\* engine-gpgsm.c (`map_assuan_error`): New function.

(`gpgsm_assuan_simple_command`): Change return type to `GpgmeError`, use the new function to map error values.

(`gpgsm_set_fd`): Change return type to `GpgmeError`.

(`_gpgme_gpgsm_op_decrypt`): Change type of `ERR` to `GpgmeError`.

(`gpgsm_set_recipients`): Likewise. Change type of return value equivalently. Adjust error values.

(`_gpgme_gpgsm_op_import`): Likewise.

(`_gpgme_gpgsm_op_sign`): Likewise.

(`struct gpgsm_object_s`): New member error.

(`gpgsm_status_handler`): Set error if error occurs. Determine error number from `ERR` line received. If `assuan_read_line` fails, terminate the connection.

2002-02-01 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (`MOSTLYCLEANFILES`): New variable.

2002-02-01 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (`gpgsm_status_handler`): At error, terminate the connection to the server.

2002-01-31 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.h: Add `STATUS_KEY_CREATED`.

\* progress.c: New file.

\* Makefile.am (`libgpgme_la_SOURCES`): Add `progress.c`.

\* genkey.c (`genkey_status_handler`): Use `_gpgme_progress_status_handler`. Add check for status.

(`struct genkey_result_s`): New structure.

(`_gpgme_release_genkey_result`): New function.

(`gpgme_op_genkey`): Check for error.

\* gpgme.c (`_gpgme_release_result`): Call `_gpgme_release_genkey_result`.

\* ops.h (`_gpgme_release_genkey_result`): Add prototype.

\* types.h (`GenKeyResult`): New type.

\* context.h (`gpgme_context_s`): Add `GenKeyResult` to member `result`.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.c (\_gpgme\_release\_result): Call \_gpgme\_release\_delete\_result.
- \* ops.h (\_gpgme\_release\_delete\_result): Add prototype.
- \* types.h (DeleteResult): New type.
- \* context.h (gpgme\_context\_s): Add DeleteResult to member result.

- \* delete.c (enum delete\_problem): New type.
- (struct delete\_result\_s): New structure.
- (\_gpgme\_release\_delete\_result): New function.
- (delete\_status\_handler): Implement more status codes.
- (gpgme\_op\_delete): Return error on failure.

- \* import.c (MAX\_IMPORTED\_FIELDS): Bump up to 14.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

- \* import.c (struct import\_result\_s): New structure.
- (\_gpgme\_release\_import\_result): New function.
- (append\_xml\_impinfo): Likewise.
- (import\_status\_handler): Implement.
- \* gpgme.c (\_gpgme\_release\_result): Add call to \_gpgme\_release\_import\_result.
- \* ops.h (\_gpgme\_release\_import\_result): Add prototype.
- \* types.h (ImportResult): New type.
- \* context.h (gpgme\_context\_s): Add ImportResult to member result.

- \* encrypt.c (gpgme\_op\_encrypt): Code clean up.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h: Add lots of comment and fix the formatting. Add gpgme\_trustlist\_end prototype.

2002-01-29 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.h: Add new type GpgmeIdleFunc. Change type of gpgme\_register\_idle to return and accept this type.
- \* wait.c (gpgme\_register\_idle): Fix type.
- Save and return old value of idle\_function.

2002-01-29 Werner Koch <wk@gnupg.org>

- \* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist): Implement secret only mode.
- \* keylist.c (keylist\_colon\_handler): Add support for the new "crs" record type.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_release): Call assuan\_disconnect, not assuan\_pipe\_disconnect.

\* Makefile.am (libgpgme\_la\_LIBADD): Change to link assuan and jnlib (needed by assuan) statically into libgpgme. Linking a static library into a shared library this way is not portable.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (GpgmePassphraseCb): Change type of R\_HD from void\* to void\*\*.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* data.c (gpgme\_data\_new\_from\_filepart): Change type of LENGTH from off\_t to size\_t.  
\* gpgme.h: Likewise.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* wait.c (\_gpgme\_wait\_on\_condition): If the process finished, reset the pending flag. Also if the operation was cancelled.

(struct proc\_s): Rename READY to DONE.

(wait\_item\_s): Likewise.

(set\_process\_ready): Rename to ...

(set\_process\_done): ... this.

(\_gpgme\_remove\_proc\_from\_wait\_queue): Call set\_process\_done instead set\_process\_ready.

(\_gpgme\_wait\_on\_condition): Likewise.

(do\_select): Rename READY to DONE.

\* verify.c (gpgme\_op\_verify): Do not set pending to zero here.

\* sign.c (gpgme\_op\_sign): Likewise.

\* import.c (gpgme\_op\_import): Likewise.

\* genkey.c (gpgme\_op\_genkey): Likewise.

\* export.c (gpgme\_op\_export): Likewise.

\* encrypt.c (gpgme\_op\_encrypt): Likewise.

\* delete.c (gpgme\_op\_delete): Likewise.

\* decrypt-verify.c (gpgme\_op\_decrypt\_verify): Likewise.

\* decrypt.c (gpgme\_op\_decrypt): Likewise.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* export.c: Cleanup.

2002-01-15 Marcus Brinkmann <marcus@g10code.de>

- \* trustlist.c: Various source clean ups.
- (my\_isdigit): Removed.
- (gpgme\_op\_trustlist\_end): New function.

2002-01-13 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.c: Various source clean ups, like renaming C to CTX where appropriate.
- (gpgme\_new): Clear R\_CTX before starting the work.
- (my\_isdigit): Removed.
- (my\_isxdigit): Likewise.
  
- \* data.c: Various source clean ups.
- (gpgme\_data\_new\_from\_mem): Check BUFFER after clearing R\_DH.
- (gpgme\_data\_new\_with\_read\_cb): Similar for READ\_CB.
- (gpgme\_data\_new\_from\_file): Loop over fread while EINTR.
- (gpgme\_data\_new\_from\_filepart): Rediddled a bit. Allow LENGTH to be zero. Loop over fread while EINTR.
  
- (my\_isdigit): Removed.
- (my\_isxdigit): Likewise.

2001-12-21 Marcus Brinkmann <marcus@g10code.de>

- \* engine-gpgsm.c (\_gpgme\_gpgsm\_new): Replace General\_Error with Pipe\_Error where appropriate.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

- \* engine.c: Include `string.h'. Reported by Stphane Corthisy.
  
- \* version.c (get\_engine\_info): Remove prototype.

2001-12-19 Marcus Brinkmann <marcus@g10code.de>

- \* engine-gpgsm.c (\_gpgme\_gpgsm\_new): New variable CHILD\_FDS. Fill it with the servers fds, and pass it to assuan\_pipe\_connect.

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

- \* keylist.c (gpgme\_op\_keylist\_end): New function.
- \* gpgme.h (gpgme\_op\_keylist\_end): New prototype.
  
- \* engine.h (gpgme\_engine\_check\_version): Move prototype to ...
- \* gpgme.h (gpgme\_engine\_check\_version): ... here.

\* genkey.c (gpgme\_op\_genkey\_start): Remove unused variable.

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* version.c (gpgme\_get\_engine\_info): Reimplemented.  
(gpgme\_check\_engine): Reimplemented.  
(\_gpgme\_compare\_versions): Return NULL if MY\_VERSION is NULL.

\* engine.c: Include `io.h'.  
(gpgme\_engine\_get\_info): New function.  
\* engine.h (gpgme\_engine\_check\_version, \_gpgme\_engine\_get\_info):  
Add prototype.

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* runpgp.c (struct reap\_s, reap\_list, reap\_list\_lock): Moved to ...  
\* engine.c (struct reap\_s, reap\_list, reap\_list\_lock): ... here.  
Include `time.h', `sys/types.h', `assert.h', and `sema.h'.  
  
\* runpgp.c (\_gpgme\_engine\_add\_child\_to\_reap\_list): New function.  
(do\_reaping, \_gpgme\_gpg\_housecleaning): Moved to ...  
\* engine.c (do\_reaping, \_gpgme\_engine\_housecleaning): ... here.  
\* runpgp.c (\_gpgme\_gpg\_release): Replace code that is now in its  
own function by call to \_gpgme\_engine\_add\_child\_to\_reap\_list().

\* wait.c: Include `engine.h'.  
(run\_idle): Call \_gpgme\_engine\_housecleaning(), not  
\_gpgme\_gpg\_housecleaning().

2001-12-18 Marcus Brinkmann <marcus@g10code.de>

\* key.c (\_gpgme\_key\_append\_name): Append, not prepend, the uid.  
Initialize the next field of the uid structure.  
(gpgme\_key\_get\_as\_xml): Do not list last uid first.

2001-12-17 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_set\_colon\_line\_handler): New  
function [!ENABLE\_GPGSM].

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_verify): Put TEXT into  
message\_data, not SIG.  
(\_gpgme\_gpgsm\_op\_sign): Use `--detached', not `--detach'.

\* sign.c (sign\_status\_handler): Call  
\_gpgme\_passphrase\_status\_handler early.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Revert last change.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_status\_handler): Freeze the output file handler when ending this operation, otherwise the wait function will sit on it.

2001-12-14 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (struct gpgsm\_object\_s): New member colon.attic.  
(\_gpgme\_gpgsm\_new): Initialize some more members.  
(\_gpgme\_gpgsm\_release): Free the colon line handler's attic line.  
(gpgsm\_status\_handler): Rework the inline-data processing.

2001-12-13 Marcus Brinkmann <marcus@g10code.de>

\* runpgg.c (\_gpgme\_gpg\_spawn): Do not add the fds to the child list that are not dup'ed, for those the close-on-exec flag is set now.  
\* version.c (\_gpgme\_get\_program\_version): Remove first entry in CFD, as the close-on-exec flag is now set for this fd.

2001-12-13 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_encrypt): Do not add `armor' option to `ENCRYPT'.  
\* engine-gpgsm.c (gpgsm\_set\_recipients): Free LINE when returning successfully.

2001-12-13 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (close\_notify\_handler): New function.  
(\_gpgme\_gpgsm\_new): Manage the file descriptors a bit differently. Do not set close-on-exec flags.  
(\_gpgme\_gpgsm\_op\_decrypt): Do not set message\_fd to -1, this is done by the close handler.  
(\_gpgme\_gpgsm\_op\_encrypt): Likewise.  
(\_gpgme\_gpgsm\_op\_import): Likewise (also for output\_fd).  
(\_gpgme\_gpgsm\_op\_keylist): Likewise (also for input\_fd and output\_fd).  
(\_gpgme\_gpgsm\_op\_sign): Likewise.  
(\_gpgme\_gpgsm\_op\_verify): Likewise, but for output\_fd.

\* posix-io.c (\_gpgme\_io\_pipe): Set the close-on-exec flag for the non-inherited file descriptor index of the pipe.



2001-12-13 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_set\_colon\_line\_handler): New.  
(gpgsm\_status\_handler): Pass datalines to a colon handler  
\* engine.c (\_gpgme\_engine\_set\_colon\_line\_handler): Set the colon  
handler for gpgsm.

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_keylist): Allow NULL for  
pattern.  
(gpgsm\_assuan\_simple\_command): Removed underscore from  
assuan\_write\_line.  
(\_gpgme\_gpgsm\_start): Ditto.  
(gpgsm\_assuan\_simple\_command): Replaced internal Assuan read  
function by the new assuan\_read\_line. Removed the use of the  
internal header.  
(gpgsm\_status\_handler): Ditto. Use the new assuan\_pending\_line.  
(\_gpgme\_gpgsm\_start): Use the documented way to get an fd from  
assuan.

\* keylist.c (keylist\_colon\_handler): Handle "crt" records  
\* key.h (gpgme\_key\_s): Add an x509 flag.  
\* key.c (parse\_x509\_user\_id): New.  
(\_gpgme\_key\_append\_name): Handle x.509 names.

2001-12-05 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_status\_handler): Make it work with current  
version of assuan.

2001-12-05 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_set\_fd): Accept one more argument OPT.  
(\_gpgme\_gpgsm\_op\_encrypt): Pass armor argument to gpgsm\_set\_fd for  
output descriptor.  
(\_gpgme\_gpgsm\_op\_sign): Likewise.

2001-12-05 Marcus Brinkmann <marcus@g10code.de>

\* keylist.c (gpgme\_op\_keylist\_next): Set pending to 0 if EOF  
occurs.

2001-11-26 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_sign): Fix stupid typo.

2001-11-24 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (gpgsm\_status\_handler): Don't break if bsearch fails.  
Deal with assuan read line returning more than one line (for now).

2001-11-23 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_sign): Implement it according to  
the current protocol definition.

2001-11-23 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_new): Set CLOEXEC flag for parent  
ends of the pipe.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Include stdlib.h and string.h. Also include,  
for now, runpg.h and status-table.h.  
(gpgsm\_status\_handler): Implement more of the status handler.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* engine.c (\_gpgme\_engine\_op\_decrypt): Implement CMS case.  
(\_gpgme\_engine\_op\_delete): Likewise.  
(\_gpgme\_engine\_op\_encrypt): Likewise.  
(\_gpgme\_engine\_op\_export): Likewise.  
(\_gpgme\_engine\_op\_genkey): Likewise.  
(\_gpgme\_engine\_op\_keylist): Likewise.  
(\_gpgme\_engine\_op\_sign): Likewise.  
(\_gpgme\_engine\_op\_trustlist): Likewise.

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_encrypt): New function.  
(gpgsm\_assuan\_simple\_command): Likewise.  
(gpgsm\_set\_recipients): Likewise.  
(gpgsm\_set\_fd): Reimplement using gpgsm\_assuan\_simple\_command.  
(\_gpgme\_gpgsm\_op\_delete): New function.  
(\_gpgme\_gpgsm\_op\_export): Likewise.  
(\_gpgme\_gpgsm\_op\_genkey): Likewise.  
(\_gpgme\_gpgsm\_op\_sign): Likewise.  
(\_gpgme\_gpgsm\_op\_keylist): Likewise.  
(\_gpgme\_gpgsm\_op\_trustlist): Likewise.  
(\_gpgme\_gpgsm\_release): Release command.  
(\_gpgme\_gpgsm\_op\_decrypt): Allocate command.  
(\_gpgme\_gpgsm\_op\_import): Likewise.  
(gpgsm\_status\_handler): Also treat `ERR' strings as EOF.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.h (gpgme\_set\_protocol): New prototype.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c (\_gpgme\_gpgsm\_op\_decrypt): New function.  
(\_gpgme\_gpgsm\_op\_import): Likewise.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* engine-gpgsm.c: Shuffle around header inclusion a bit, to still  
keep them separate.  
(\_gpgme\_set\_status\_handler) [!ENABLE\_GPGSM]: New function.

2001-11-22 Werner Koch <wk@gnupg.org>

\* engine-gpgsm.c: Include more headers so that NULL and mk\_error  
is defined even with an undefined GPGSM\_PATH.

2001-11-22 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (gpg\_inbound\_handler, write\_mem\_data, write\_cb\_data,  
gpg\_outbound\_handler): Moved to ...

\* data.c (\_gpgme\_data\_inbound\_handler, write\_mem\_data,  
write\_cb\_data, \_gpgme\_data\_outbound\_handler): ... here. Make the  
\_gpgme\_\* ones non-static.

\* data.c: Include io.h.

\* ops.h (\_gpgme\_data\_inbound\_handler): New prototype.  
(\_gpgme\_data\_outbound\_handler): Likewise.  
(\_gpgme\_gpg\_spawn): Use these new functions.

\* engine-gpgsm.h (\_gpgme\_gpgsm\_op\_decrypt, \_gpgme\_gpgsm\_op\_delete,  
\_gpgme\_gpgsm\_op\_encrypt, \_gpgme\_gpgsm\_op\_export,  
\_gpgme\_gpgsm\_op\_genkey, \_gpgme\_gpgsm\_op\_import,  
\_gpgme\_gpgsm\_op\_keylist, \_gpgme\_gpgsm\_op\_sign,  
\_gpgme\_gpgsm\_op\_trustlist, \_gpgme\_gpgsm\_op\_verify,  
\_gpgme\_gpgsm\_start, \_gpgme\_gpgsm\_set\_status\_handler): New prototype.  
Include <runpg.h> for status handler function.

\* engine-gpgsm.c (struct gpgsm\_object\_s): New members input\_fd,  
input\_data, output\_fd, output\_data, message\_fd, message\_data, command  
and status.

(\_gpgme\_gpgsm\_new): Open input, output and message pipes before  
connecting to the client. Close server's ends afterwards.

(\_gpgme\_gpgsm\_release): Close open file descriptors. Remove  
server process from wait queue.

(\_gpgme\_gpgsm\_op\_verify, \_gpgme\_gpgsm\_start,  
\_gpgme\_gpgsm\_set\_status\_handler, gpgms\_status\_handler): New function.

\* engine.c (\_gpgme\_engine\_start): Implement for GPGME\_PROTOCOL\_CMS.  
(\_gpgme\_engine\_set\_status\_handler): Likewise.  
(\_gpgme\_engine\_op\_verify): Likewise.

2001-11-21 Marcus Brinkmann <marcus@g10code.de>

\* context.h: Do not include runpgg.h, but engine.h.  
(struct gpgme\_context\_s): Replace member gpg with engine.  
\* gpgme.c (gpgme\_release): Release engine, not gpg.

\* recipient.c (\_gpgme\_append\_gpg\_args\_from\_recipients): Function moved ...

\* runpgg.c (\_gpgme\_append\_gpg\_args\_from\_recipients): ... here.  
Make static, change order of arguments, and return an error value.

\* ops.h (\_gpgme\_append\_gpg\_args\_from\_recipients): Removed prototype.

\* runpgg.h (\_gpgme\_gpg\_op\_verify): Add prototype.

(\_gpgme\_gpg\_op\_encrypt): Likewise.

(\_gpgme\_gpg\_op\_decrypt): Likewise.

(\_gpgme\_gpg\_op\_delete): Likewise.

(\_gpgme\_gpg\_op\_export): Likewise.

(\_gpgme\_gpg\_op\_genkey): Likewise.

(\_gpgme\_gpg\_op\_import): Likewise.

(\_gpgme\_gpg\_op\_keylist): Likewise.

(\_gpgme\_gpg\_op\_sign): Likewise.

(\_gpgme\_gpg\_op\_trustlist): Likewise.

\* runpgg.c (\_gpgme\_gpg\_op\_verify): New function.

(\_gpgme\_gpg\_op\_encrypt): Likewise.

(\_gpgme\_gpg\_op\_decrypt): Likewise.

(\_gpgme\_gpg\_op\_delete): Likewise.

(\_gpgme\_gpg\_op\_export): Likewise.

(\_gpgme\_gpg\_op\_genkey): Likewise.

(\_gpgme\_gpg\_op\_import): Likewise.

(\_gpgme\_gpg\_op\_keylist): Likewise.

(\_gpgme\_gpg\_op\_sign): Likewise.

(\_gpgme\_gpg\_op\_trustlist): Likewise.

\* engine.h (\_gpgme\_engine\_set\_status\_handler): Add prototype.

(\_gpgme\_engine\_set\_command\_handler): Likewise.

(\_gpgme\_engine\_set\_colon\_line\_handler): Likewise.

(\_gpgme\_engine\_op\_decrypt): Likewise.

(\_gpgme\_engine\_op\_delete): Likewise.

(\_gpgme\_engine\_op\_encrypt): Likewise.

(\_gpgme\_engine\_op\_export): Likewise.

(\_gpgme\_engine\_op\_genkey): Likewise.

(\_gpgme\_engine\_op\_import): Likewise.

(\_gpgme\_engine\_op\_keylist): Likewise.

(\_gpgme\_engine\_op\_sign): Likewise.

(\_gpgme\_engine\_op\_trustlist): Likewise.  
(\_gpgme\_engine\_op\_verify): Likewise.  
(\_gpgme\_engine\_start): Likewise.  
\* engine.c (\_gpgme\_engine\_set\_status\_handler): New function.  
(\_gpgme\_engine\_set\_command\_handler): Likewise.  
(\_gpgme\_engine\_set\_colon\_line\_handler): Likewise.  
(\_gpgme\_engine\_op\_decrypt): Likewise.  
(\_gpgme\_engine\_op\_delete): Likewise.  
(\_gpgme\_engine\_op\_encrypt): Likewise.  
(\_gpgme\_engine\_op\_export): Likewise.  
(\_gpgme\_engine\_op\_genkey): Likewise.  
(\_gpgme\_engine\_op\_import): Likewise.  
(\_gpgme\_engine\_op\_keylist): Likewise.  
(\_gpgme\_engine\_op\_sign): Likewise.  
(\_gpgme\_engine\_op\_trustlist): Likewise.  
(\_gpgme\_engine\_op\_verify): Likewise.  
(\_gpgme\_engine\_start): Likewise.

\* verify.c (gpgme\_op\_verify\_start): Reimplement in terms of above functions.  
\* encrypt.c (gpgme\_op\_encrypt\_start): Likewise.  
\* decrypt.c (\_gpgme\_decrypt\_start): Likewise.  
\* passphrase.c (\_gpgme\_passphrase\_start): Likewise.  
\* keylist.c (gpgme\_op\_keylist\_start): Likewise.

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

\* types.h: Add types EngineObject and GpgsmObject.

\* Makefile.am (libgpgme\_la\_SOURCES): Add engine-gpgsm.h, engine-gpgsm.c, engine.h and engine.c.  
\* engine.h: New file.  
\* engine.c: Likewise.  
\* engine-gpgsm.h: Likewise.  
\* engine-gpgsm.c: Likewise.

\* runpg.c (\_gpgme\_gpg\_get\_version): New function.  
(\_gpgme\_gpg\_check\_version): Likewise.  
\* runpg.h: Add prototypes for \_gpgme\_gpg\_get\_version and \_gpgme\_gpg\_check\_version.

\* version.c (compare\_versions): Rename to ...  
(\_gpgme\_compare\_versions): ... this. Make non-static.  
(gpgme\_check\_version): Use \_gpgme\_compare\_versions rather than compare\_versions.  
(gpgme\_check\_engine): Likewise.  
\* ops.h (\_gpgme\_get\_program\_version): Add prototype.

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

- \* Makefile.am (libpggme\_la\_INCLUDES): Remove obsolete directive.
- (AM\_CPPFLAGS): New directive [BUILD\_ASSUAN].
- (libpggme\_la\_LIBADD): Likewise.

2001-11-20 Marcus Brinkmann <marcus@g10code.de>

- \* version.c: Remove global variables lineno and tmp\_engine\_version.
- (version\_handler): Removed.
- (\_pggme\_get\_program\_version): New function.
- (get\_engine\_info): Don't use context and version\_handler, but \_pggme\_get\_program\_version.
- \* ops.h (\_pggme\_get\_program\_version): Add prototype for \_pggme\_get\_program\_version (we expect to use it elsewhere soon).

2001-11-18 Marcus Brinkmann <marcus@g10code.de>

- \* version.c (get\_engine\_info): If GnuPG is not available, return an error message.
- \* posix-util.c (\_pggme\_get\_gpg\_path): Allow GPG\_PATH to be undefined.
- (\_pggme\_get\_gpgsm\_path): New function.
- \* w32-util.c (find\_program\_in\_registry): New static function.
- (\_pggme\_get\_gpg\_path): Allow GPG\_PATH to be undefined. Rework to use find\_program\_in\_registry.
- (\_pggme\_get\_gpgsm\_path): New function.
- (util.h): Prototype \_pggme\_get\_gpgsm\_path).
- \* runpg.c (\_pggme\_gpg\_spawn): Verify that \_pggme\_get\_gpg\_path() returns non-null.

2001-11-16 Marcus Brinkmann <marcus@g10code.de>

- \* decrypt-verify.c: New file.
- \* Makefile.am (libpggme\_la\_SOURCES): Add decrypt-verify.c.
- \* types.h: Add decrypt-verify types.
- \* ops.h: Likewise.
- \* context.h: Add result type for decrypt-verify.
- \* pggme.h: Add decrypt-verify prototypes.
  
- \* decrypt.c (decrypt\_status\_handler): Renamed to ...
- (\_pggme\_decrypt\_status\_handler): ... this. Make non-static.
- (\_pggme\_decrypt\_start): New function, derived from pggme\_op\_decrypt\_start.
- (pggme\_op\_decrypt\_start): Reimplement in terms of \_pggme\_decrypt\_start.
- (\_pggme\_decrypt\_result): New function to retrieve error value.

(gpgme\_op\_decrypt): Use `_gpgme_decrypt_result`.

\* ops.h: Add prototypes for new functions.

\* verify.c (verify\_status\_handler): Renamed to ...

(`_gpgme_verify_status_handler`): ... this. Make non-static.

(gpgme\_op\_verify\_start): Use new function name.

(intersect\_stati): Renamed to ...

(`_gpgme_intersect_stati`): ... this. Make non-static.

(gpgme\_op\_verify): Use new name.

\* ops.h: Add prototypes for new functions.

2001-11-16 Marcus Brinkmann <marcus@g10code.de>

\* passphrase.c: New file.

\* Makefile.am (libgpgme\_la\_SOURCES): Add passphrase.c.

\* ops.h (`_gpgme_passphrase_result`): Add prototypes from  
passphrase.c.

\* types.h: Likewise.

\* context.h: Add member passphrase to result.

\* gpgme.c (`_gpgme_release_result`): Release passphrase member.

\* decrypt.c: Some formatting and variable name changes (like  
CTX instead C).

(struct decrypt\_result\_s): Remove members now found in  
passphrase result.

(`_gpgme_release_decrypt_result`): Don't release removed members.

(decrypt\_status\_handler): Call `_gpgme_passphrase_status_handler`,  
and don't handle the cases caught there.

(command\_handler): Removed.

(gpgme\_op\_decrypt\_start): Don't set command handler, but invoke  
`_gpgme_passphrase_start` which does it.

(gpgme\_op\_decrypt): Invoke `_gpgme_passphrase_result` and drop the  
cases covered by it.

\* sign.c Some formatting and variable name changes (like  
CTX instead C).

(struct sign\_result\_s): Remove members now found in  
passphrase result.

(`_gpgme_release_sign_result`): Don't release removed members.

(sign\_status\_handler): Call `_gpgme_passphrase_status_handler`,  
and don't handle the cases caught there.

(command\_handler): Removed.

(gpgme\_op\_sign\_start): Don't set command handler, but invoke  
`_gpgme_passphrase_start` which does it.

(gpgme\_op\_sign): Invoke `_gpgme_passphrase_result` and drop the  
cases covered by it.

2001-11-15 Marcus Brinkmann <marcus@g10code.de>

\* decrypt.c (command\_handler): Fix last change.

2001-11-15 Marcus Brinkmann <marcus@g10code.de>

\* verify.c (\_gpgme\_release\_verify\_result): Rename RES to RESULT.

Rename R2 to NEXT\_RESULT.

(intersect\_stati): Rename RES to RESULT.

(gpgme\_get\_sig\_status): Likewise. Do not check return\_type, but the member verify of result.

(gpgme\_get\_sig\_key): Likewise.

\* sign.c (\_gpgme\_release\_sign\_result): Rename RES to RESULT. If RESULT is zero, return.

(sign\_status\_handler, command\_handler): Do not check return\_type, but the member sign of result.

(gpgme\_op\_sign): Likewise. Drop assertion.

\* encrypt.c (\_gpgme\_release\_encrypt\_result): Rename RES to RESULT.

If RESULT is zero, return.

(encrypt\_status\_handler): Do not check return\_type, but the member encrypt of result.

(gpgme\_op\_encrypt): Likewise. Drop assertion.

\* decrypt.c (\_gpgme\_release\_decrypt\_result): Rename RES to RESULT.

(create\_result\_struct): Do not set result\_type.

(command\_handler, decrypt\_status\_handler): Do not check return\_type, but the member decrypt of result.

(gpgme\_op\_decrypt): Likewise. Drop assertion.

\* context.h (enum ResultType): Removed.

(struct gpgme\_context\_s): Remove member result\_type.

(struct result): Replaces union result.

\* gpgme.c: Include string.h.

(\_gpgme\_release\_result): Release all members of c->result, which is now a struct. Zero out all members of the struct afterwards.

2001-11-11 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (\_gpgme\_gpg\_release): Release GPG->cmd.cb\_data.

Release all members of the list GPG->arglist.

Reported by Michael Schmidt <mschmidt@cs.uni-sb.de>.

2001-11-02 Marcus Brinkmann <marcus@g10code.de>

\* runpg.c (pipemode\_copy): Change type of NBYTES to size\_t.

\* key.c: Include string.h.



- \* data.c: Likewise.
- \* recipient.c: Likewise.

2001-10-29 Marcus Brinkmann <marcus@g10code.de>

- \* context.h: New member signers\_len.
- \* signers.c (gpgme\_signers\_clear): Require that signers are non-NULL with assertion. Use signers\_len to determine how much keys to release. Add documentation.
- (gpgme\_signers\_add): Use signers\_len to determine if the buffer is large enough. Use xtryrealloc rather than xtrymalloc and copying. Add documentation.
- (gpgme\_signers\_enum): Use signers\_len to determine if key is available. Add documentation.

2001-10-22 Marcus Brinkmann <marcus@g10code.de>

- \* data.c (\_gpgme\_data\_append): Check if LENGTH is smaller than ALLOC\_CHUNK, not DH->length.

2001-10-17 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.c (gpgme\_set\_protocol): Fix last change.

2001-10-15 Werner Koch <wk@gnupg.org>

- \* gpgme.h (GpgmeProtocol): New.
- \* gpgme.c (gpgme\_set\_protocol): New.

2001-09-26 Werner Koch <wk@gnupg.org>

- \* gpgme.c (gpgme\_set\_passphrase\_cb): Ignore a NULL context.
- (gpgme\_set\_progress\_cb): Ditto. Suggested by Mark Mutz.

2001-09-17 Werner Koch <wk@gnupg.org>

- \* keylist.c (finish\_key): Shortcut for no tmp\_key. Changed all callers to use this function without a check for tmp\_key.
- \* keylist.c (gpgme\_op\_keylist\_next): Reset the key\_cond after emptying the queue. Bug reported by Stphane Corthsy.

2001-09-12 Werner Koch <wk@gnupg.org>

- \* data.c (gpgme\_data\_rewind): Allow rewind for callbacks.

2001-09-07 Werner Koch <wk@gnupg.org>

- \* runpgg.h: Add NO\_RECP.
- \* encrypt.c (encrypt\_status\_handler): Take on No\_RECP.
- (gpgme\_op\_encrypt): Better error return.
  
- \* verify.c (verify\_status\_handler): Take on NODATA.

2001-09-03 Werner Koch <wk@gnupg.org>

- \* runpgg.h: Added STATUS\_INV\_RECP.
- \* gpgme.c (\_gpgme\_release\_result): Add support for new EncryptResult object.
- \* encrypt.c (append\_xml\_encinfo): New.
- (encrypt\_status\_handler): Add some status parsing.
- (\_gpgme\_release\_encrypt\_result): New.

2001-08-29 Werner Koch <wk@gnupg.org>

- \* recipient.c (gpgme\_recipients\_release): Free the list. By Timo.
  
- \* keylist.c (keylist\_colon\_handler): Do a finish key if we receive an EOF here. This is probably the reason for a lot of bugs related to keylisting. It is so obvious. Kudos to Enno Cramer for pointing that out.

2001-08-28 Werner Koch <wk@gnupg.org>

- \* gpgme.c, gpgme.h (gpgme\_get\_op\_info): New.
- (\_gpgme\_set\_op\_info): New.
- (\_gpgme\_release\_result): Reset the op\_info here.
- \* sign.c (append\_xml\_siginfo): New.
- (sign\_status\_handler): Store the sig create information.

2001-07-31 Werner Koch <wk@gnupg.org>

- \* encrypt.c (gpgme\_op\_encrypt): Hack to detect no valid recipients.

2001-07-30 Werner Koch <wk@gnupg.org>

- \* gpgme.c (gpgme\_get\_armor,gpgme\_get\_textmode): New.
  
- \* runpgg.c (build\_argv): Disable armor comments
- \* w32-io.c (build\_commandline): Need to add quotes here

2001-07-24 Werner Koch <wk@gnupg.org>

- \* data.c (gpgme\_data\_read): Add a way to return the available bytes.

2001-07-23 Werner Koch <wk@gnupg.org>

\* util.c: Removed stpcpy() because we use the version from jnlib.

2001-07-19 Werner Koch <wk@gnupg.org>

\* mkstatus: Define the collating sequence for sort.

2001-06-26 Werner Koch <wk@gnupg.org>

\* runpgg.h: Add STATUS\_UNEXPECTED as suggested by Timo.

2001-06-15 Werner Koch <wk@gnupg.org>

\* keylist.c (set\_userid\_flags): Fixed the assigned values. Kudos to Timo for pointing this out.

2001-06-01 Werner Koch <wk@gnupg.org>

\* debug.c (\_gpgme\_debug\_begin): Fixed a /tmp race. Noted by Johannes Poehlmann.

2001-05-28 Werner Koch <wk@gnupg.org>

\* version.c (gpgme\_check\_engine): Stop version number parsing at the opening angle and not the closing one. By Tommy Reynolds.

2001-05-01 Jos Carlos Garca Sogo <jose@jaimedelamo.eu.org>

\* encrypt.c (gpgme\_op\_encrypt\_start): Deleted the assert ( !c->gpg ) line, because it gave an error if another operation had been made before using the same context.

\* decrypt.c (gpgme\_op\_decrypt\_start): The same as above. Also added one line to release the gpg object in the context (if any).

2001-04-26 Werner Koch <wk@gnupg.org>

\* key.c, key.h (\_gpgme\_key\_cache\_init): New.

(\_gpgme\_key\_cache\_add): New.

(\_gpgme\_key\_cache\_get): New.

\* version.c (do\_subsystem\_inits): Init the cache.

\* keylist.c (finish\_key): Put key into the cache

\* verify.c (gpgme\_get\_sig\_key): First look into the cache.

2001-04-19 Werner Koch <wk@gnupg.org>

\* keylist.c (parse\_timestamp): Adjusted for the changed

--fixed-list-mode of gpg 1.0.4h.

2001-04-05 Werner Koch <wk@gnupg.org>

\* verify.c (gpgme\_op\_verify\_start): Enabled pipemode for detached sigs.

2001-04-04 Werner Koch <wk@gnupg.org>

\* w32-io.c (\_gpgme\_io\_select): Don't select on the writer if there are still bytes pending. Timo found this not easy to track down race condition.

2001-04-02 Werner Koch <wk@gnupg.org>

\* gpgme.h: Add GPGME\_ATTR\_KEY\_{EXPIRED,DISABLED}.

\* key.c (gpgme\_key\_get\_ulong\_attr): And return those attribs.

\* verify.c (gpgme\_get\_sig\_key): Set keylisting mode depending on the mode set in the current context. Suggested by Timo.

\* key.c (gpgme\_key\_get\_ulong\_attr): Return can\_certify and not can\_encrypt. By Timo.

2001-03-30 Werner Koch <wk@gnupg.org>

\* debug.c (debug\_init): Allow to specify a debug file.

(\_gpgme\_debug\_level): New.

\* posix-io.c (\_gpgme\_io\_read, \_gpgme\_io\_write): Print output.

(\_gpgme\_io\_select): Debug only with level > 2.

2001-03-15 Werner Koch <wk@gnupg.org>

\* runpgg.c: Included time.h.

\* key.h: New keyflags for capabilities.

\* keylist.c (set\_mainkey\_capability, set\_subkey\_capability): New.

(keylist\_colon\_handler): Parse them.

\* gpgme.h: New attribute values for capabilities.

\* key.c (gpgme\_key\_get\_string\_attr): Return them.

(capabilities\_to\_string): New.

(gpgme\_key\_get\_ulong\_attr): Return the global caps.

2001-03-14 Werner Koch <wk@gnupg.org>

\* w32-io.c (destroy\_reader,destroy\_writer): Fixed syntax error.

Thanks to Jan Oliver Wagner.

2001-03-13 Werner Koch <wk@gnupg.org>

\* context.h: Add invalid and revoke flags to user\_id structure.  
\* keylist.c (gpgme\_op\_keylist\_start): Use --fixed-list-mode.  
(keylist\_colon\_handler): Adjust for that.  
(set\_userid\_flags): New.  
(set\_mainkey\_trust\_info): Handle new key invalid flag  
(set\_subkey\_trust\_info): Ditto.  
\* gpgme.h: Add new attributes for key and user ID flags.  
\* key.c (\_gpgme\_key\_append\_name): Init these flags  
(gpgme\_key\_get\_as\_xml): Print them.  
(one\_uid\_as\_xml): New helper for above.  
(gpgme\_key\_get\_string\_attr, gpgme\_key\_get\_ulong\_attr):  
Return the new attributes. Enhanced, so that subkey information  
can be returned now.

2001-02-28 Werner Koch <wk@gnupg.org>

\* w32-io.c (destroy\_reader): Set stop\_me flag.  
(writer,create\_writer,destroy\_writer,find\_writer,kill\_writer): New.  
(\_gpgme\_io\_write): Use a writer thread to avoid blocking.  
(\_gpgme\_io\_close): Cleanup a writer thread  
(\_gpgme\_io\_select): Replace the faked wait on writing by a real  
waiting which is now possible due to the use of a writer thread.

2001-02-20 Werner Koch <wk@gnupg.org>

\* w32-io.c (destroy\_reader,kill\_reader): New.  
(create\_reader, reader): Add a new event to stop the thread.  
(\_gpgme\_io\_close): Kill the reader thread.  
  
\* posix-io.c (\_gpgme\_io\_select): Handle frozen fds here.  
\* 32-io.c (\_gpgme\_io\_select): Ditto. Removed a bunch of unused code.  
  
\* wait.c: Reworked the whole thing.  
\* runpgp.c (\_gpgme\_gpg\_new): Init pid to -1.  
(\_gpgme\_gpg\_release): Remove the process from the wait queue.

2001-02-19 Werner Koch <wk@gnupg.org>

\* w32-io.c (\_gpgme\_io\_set\_close\_notify): New.  
(\_gpgme\_io\_close): Do the notification.  
  
\* posix-io.c (\_gpgme\_io\_select): Use a 1 sec timeout and not 200  
microseconds.  
  
\* wait.c (remove\_process): Don't close the fd here.  
(do\_select): Set the fd to -1 and remove the is\_closed flag everywhere.  
(\_gpgme\_wait\_on\_condition): Remove the assert on the queue and

break out if we could not find the queue. The whole thing should be reworked.

\* posix-io.c (\_gpgme\_io\_set\_close\_notify): New.  
(\_gpgme\_io\_close): Do the notification.

\* runpgg.c (close\_notify\_handler): New.  
(\_gpgme\_gpg\_new): Register a callback for the fd.  
(\_gpgme\_gpg\_set\_colon\_line\_handler): Ditto.  
(build\_argv): Ditto

2001-02-13 Werner Koch <wk@gnupg.org>

\* runpgg.c (struct reap\_s): Replaced pid\_t by int.

\* types.h: Add ulong typedef.

\* runpgg.c (do\_reaping, \_gpgme\_gpg\_housecleaning): New.  
(\_gpgme\_gpg\_release): Reap children.

\* io.h, posix-io.c (\_gpgme\_io\_kill): New.

\* w32-io.c (\_gpgme\_io\_kill): New (dummy).

\* keylist.c (gpgme\_op\_keylist\_start): Cancel a pending request.

\* posix-io.c (\_gpgme\_io\_read): Add some debug output.

(\_gpgme\_io\_write): Ditto.

(\_gpgme\_io\_select): Increased the timeout.

2001-02-12 Werner Koch <wk@gnupg.org>

Enhanced the signature verification, so that it can now handle more than one signature and is able to return more information on the signatures.

\* verify.c (gpgme\_get\_sig\_key): New.

(gpgme\_get\_sig\_status): New.

\* gpgme.h: Add stdio.h.

(GpgmeSigStat): New status DIFF.

2001-02-01 Werner Koch <wk@gnupg.org>

\* w32-io.c (set\_synchronize): Add EVENT\_MODIFY\_STATE. Add Debug code to all Set/ResetEvent().

\* runpgg.c (read\_status): Check for end of stream only if we have an r. By Timo.

2001-01-31 Werner Koch <wk@gnupg.org>

\* wait.c (\_gpgme\_wait\_on\_condition): Removed all exit code processing.  
(propagate\_term\_results,clear\_active\_fds): Removed.  
(count\_active\_fds): Renamed to ..  
(count\_active\_and\_thawed\_fds): .. this and count only thawed fds.

\* runpgg.c (gpg\_colon\_line\_handler): Return colon.eof and not status.eof ;-)

2001-01-30 Werner Koch <wk@gnupg.org>

\* w32-io.c (\_gpgme\_io\_spawn): Use the supplied path arg.

\* version.c (get\_engine\_info): Return better error information.

\* posix-util.c, w32-util.c: New.

(\_gpgme\_get\_gpg\_path): New, suggested by Jan-Oliver.

\* runpgg.c (\_gpgme\_gpg\_spawn): Use new function to get GPG's path.

\* signers.c (gpgme\_signers\_add): Oops, one should test code and not just write it; the newarr was not assigned. Thanks to Jos for pointing this out. Hmmm, still not tested, why should a coder test his fix :-)

\* w32-io.c: Does now use reader threads, so that we can use WaitForMultipleObjects.

\* sema.h, posix-sema.c, w32-sema.c: Support for Critical sections. Does currently only work for W32.

\* debug.c, util.h : New. Changed all fprintfs to use this new set of debugging functions.

2001-01-23 Werner Koch <wk@gnupg.org>

\* data.c (\_gpgme\_data\_release\_and\_return\_string): Fixed string termination.

2001-01-22 Werner Koch <wk@gnupg.org>

\* delete.c: New.

\* signers.c: New.

\* key.c (gpgme\_key\_ref, gpgme\_key\_unref): New.

\* sign.c (gpgme\_op\_sign\_start): Allow the use of other keys.

\* version.c (gpgme\_get\_engine\_info,gpgme\_check\_engine): New.

\* runpgg.c (\_gpgme\_gpg\_set\_simple\_line\_handler): New.

2001-01-05 Werner Koch <wk@gnupg.org>

\* data.c (gpgme\_data\_rewind): Allow to rewind data\_type\_none.

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under certain conditions; type `show c' for details.

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program  
`Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989

Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.

commit 2145348ec54c6027f2ea20f695de0277e2871405

Merge: 348ba88 2036f1a

Author: Ben McGinnes <ben@adversary.org>

Date: Wed May 6 03:04:19 2015 +1000

Merge pull request #4 from Hasimir/master

history

commit 2036f1a0a670a0561993e195c458059220b36114

Merge: dbabf0c 348ba88

Author: Ben McGinnes <ben@adversary.org>

Date: Wed May 6 02:57:44 2015 +1000

Merge branch 'master' of github:adversary-org/pyme3

commit dbabf0cf1f2985755c2293b619011832e34faa9c

Author: Ben McGinnes <ben@adversary.org>

Date: Wed May 6 02:52:23 2015 +1000

Added a short history

- \* A (very) brief summary of the project's history since 2002.
- \* Deals with why the commit log in the GPGME repo does not include the history of PyME.
- \* Mentions that intact git repos will be maintained, but not where they

are (one will be on github, another will be in a user directory on playfair.gnupg.org).

docs/Short\_History.rst | 57 ++++++  
1 file changed, 57 insertions(+)

commit 348ba883424778c711c04ae9b66035ccdb36eb8c  
Merge: 127d0a5 7c37a27  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:21:34 2015 +1000

Merge pull request #3 from Hasimir/master

Version release preparation

commit 7c37a27a6845c58222d4d947c2efbe38e955b612  
Merge: f692cff 127d0a5  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:17:14 2015 +1000

Merge branch 'master' of github:adversary-org/pyme3

commit f692cff50a89c2c61acdbd3d7dd60f5ce3cd15af  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:09:44 2015 +1000

TODO update

\* Removed reference to GitHub, replaced with impending new home at gnupg.org.

docs/TODO.rst | 4 +++-  
1 file changed, 2 insertions(+), 2 deletions(-)

commit bd5ccf9e3bfe69fa681613757577e87b72ca08ec  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 02:00:44 2015 +1000

Version bump

- \* Bumped version number to 0.9.1 to keep it somewhat in line with the existing PyME project, even though there will be some divergence at some point (or even re-merging, depending on how many of the Python 3 modifications can be back-ported to the Python 2 version).
- \* Updated the author and copyright information to reflect the two current authors (Martin and I).
- \* Replaced Igor's contact details with mine.
- \* Replaced project home page with the GnuPG one.



pyme/version.py | 16 ++++++-----  
1 file changed, 9 insertions(+), 7 deletions(-)

commit ec167512f4ca88d8f6e89e2ae831798c8283b4df  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 01:48:01 2015 +1000

README preparation.

\* Changes in preparation for impending move of code to the GnuPG git server as a part of GPGME.

README.rst | 14 ++++++-----  
1 file changed, 7 insertions(+), 7 deletions(-)

commit 8a48515e884c36b5bdb24a13cb4d2e49f4ee6f17  
Author: Ben McGinnes <ben@adversary.org>  
Date: Wed May 6 01:43:53 2015 +1000

TODO moved to docs

\* As it says.

TODO.rst | 25 -----  
docs/TODO.rst | 25 ++++++  
2 files changed, 25 insertions(+), 25 deletions(-)

commit f968c777472f01f308f6e57eac1740bf5c76c205  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 16:52:13 2015 +1000

Started another TODO file.

TODO.rst | 25 ++++++  
1 file changed, 25 insertions(+)

commit 127d0a56fa9f7ad1d4fb39d0b529b890a8d67365  
Merge: db72dea 44837f6  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 14:59:44 2015 +1000

Merge pull request #2 from Hasimir/master

Minor editing.

commit 44837f6e50fc539c86aef1f75a6a3538b02029ea  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 14:56:55 2015 +1000

Minor editing.

- \* Fixed another URL.
- \* Changed Py3 version's version number to v0.9.1-beta0.

README.rst | 4 ++--  
1 file changed, 2 insertions(+), 2 deletions(-)

commit db72deaae19c3513391df040bc66a88d9213af  
Merge: db34286 48eb185  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 14:26:11 2015 +1000

Merge pull request #1 from Hasimir/master

Links

commit 48eb1856cb0739cc9f0b9084da9d965e1fc7fddd  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 14:22:30 2015 +1000

Links

- \* Fixed URLs for authors.
- \* Updated my entry to point to github location.
- \*\* I strongly suspect the result of this work will be concurrent projects, so preparing for that eventuality with this repo.

README.rst | 8 ++++----  
1 file changed, 4 insertions(+), 4 deletions(-)

commit db3428659783f30b9a76204403daedf9fc4cf7cf  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 11:29:00 2015 +1000

Explicit over Implicit ...

... isn't just for code.

- \* Removed the 2to3 working directory and its contents.
- \* Made the README.rst file a little more clear that this branch is for Python 3 (set Python 3.2 as a fairly arbitrary requirement for the moment, but will probably raise this to 3.3).

2to3/2to3-output-remaining.log | 60 ---  
2to3/2to3-output-setup.log | 35 --  
2to3/2to3-output.log | 950 -----

README.rst | 10 +-  
4 files changed, 7 insertions(+), 1048 deletions(-)

commit 3edf07a4ba8a86af3a33246234d6e133074862af  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 11:19:41 2015 +1000

Added authors.

- \* In alphabetical order.
- \* Mine will need updating once Martin and I have decided what to do regarding the two main branches.

README.rst | 12 ++++++++  
1 file changed, 12 insertions(+)

commit 811eb14b53e8856312d99f46b77215f7f9bd672c  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 10:23:00 2015 +1000

Docs and other things.

- \* Now able to import pyme.core without error, indicates port process is successful.
- \* Code is *not* compatible with the Python 2 version.
- \* Will need to consider making this a parallel project with the master branch.
- \* Got rid of the .org TODO file.
- \* Changed the README to use the reST file extension since it's full of reST anyway.

2to3/TODO.org | 5 ----  
README.rst | 32 ++++++++  
README.txt | 32 -----  
3 files changed, 32 insertions(+), 37 deletions(-)

commit 79e784bdcce1de6f7856921b5431044c62c6f015  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 10:18:40 2015 +1000

Fixed another implicit import by making it explicit. Hopefully this is the last one.

pyme/util.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 2b52b46ccda3e7abcc50eed0745062259d698661  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 10:16:01 2015 +1000

Fixed another implicit import by making it explicit.

pyme/errors.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 409c8fd565e21f23cd41daaeffc867e6d23a0863  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 10:08:22 2015 +1000

Bytes vs. Unicode

\* Trying PyBytes instead of PyUnicode.

gpgme.i | 14 ++++++-----  
helpers.c | 8 +++++---  
2 files changed, 11 insertions(+), 11 deletions(-)

commit d8164aa2ae98bf8c807c16e2d9be12c5fba7cfd  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 09:22:58 2015 +1000

String to Unicode

\* Replaced all instances of PyString with PyUnicode (and hoping there's no byte data in there).

gpgme.i | 14 ++++++-----  
helpers.c | 8 +++++---  
2 files changed, 11 insertions(+), 11 deletions(-)

commit bd99b7865656e559b17c419c6b64b412a22c6c44  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 09:17:06 2015 +1000

PyInt\_AsLong

\* Replaced all instances of PyInt with PyLong, as per C API docs.

gpgme.i | 4 +---  
helpers.c | 8 +++++---  
2 files changed, 6 insertions(+), 6 deletions(-)

commit 3c91e2ccf8ca788b51e3308e292c6b64888fdb15  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 05:59:36 2015 +1000

Import correction

\* Once pygpgme.py is generated and moved, it will be in the right directory for the explicit "from . import pygpgme" to be correct.

pyme/core.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 23a49e7070812ff1ce138d8d4cc46d0b80328897

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 05:38:29 2015 +1000

The -py3 flag.

Makefile | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit b1549587d6db5e33081b9c20f75d1348a1d25938

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 05:01:42 2015 +1000

Fixed indentation - 4.

pyme/core.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit a685142ce46761ee6f5176e90717176e38e0d24f

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 05:00:16 2015 +1000

Fixed indentation - 3.

pyme/core.py | 5 +++--  
1 file changed, 2 insertions(+), 3 deletions(-)

commit 488a70b490cc64eb1c47d2483cb2f4079c6767f7

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:53:21 2015 +1000

Pet Peeve

```
def pet_peeve(self):  
    peeve = print("people who don't press return after a colon!")
```

FFS!

pyme/core.py | 5 +++--  
1 file changed, 3 insertions(+), 2 deletions(-)

commit a5d38eb47d64bb17bb609fe594dae2aca480bac9

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:47:54 2015 +1000

Fixed indentation - 2.

pyme/core.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 476a207f732b8559abb1ea3c23147c0e34804730

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:46:01 2015 +1000

Fixed indentation.

pyme/core.py | 4 ++--  
1 file changed, 2 insertions(+), 2 deletions(-)

commit 0572900eba9bcd9b0283c7d8e022e8972f06f9f8

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:43:49 2015 +1000

Replaced all tabs with 4 spaces.

pyme/core.py | 18 ++++++++-----  
1 file changed, 9 insertions(+), 9 deletions(-)

commit 78c0b7677e94ce1e11b8cdb833a9064527187330

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:39:07 2015 +1000

SWIG flags in the wrong place.

Makefile | 4 ++--  
1 file changed, 2 insertions(+), 2 deletions(-)

commit dfa7f2589963494a8f89277560d8c1116604a3c8

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:35:09 2015 +1000

Fixed subprocess call for swig (again).

setup.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 249bfd8c714dcda53127b99b6cc8a6c7c4a99f20

Author: Ben McGinnes <ben@adversary.org>

Date: Sun May 3 04:32:40 2015 +1000

Fixed subprocess call for swig.

setup.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 6fd7e719cf4c975f466ceb39835db7007df36fb2  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sun May 3 03:51:48 2015 +1000

Linking swig to py3

\* Changed the swig invocations to run with the -python -py3 flags explicitly.

Makefile | 4 ++--  
setup.py | 2 +-  
2 files changed, 3 insertions(+), 3 deletions(-)

commit 7a6b584f50ed6ddc8617a642185eea1f24ff791a  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sat May 2 11:12:00 2015 +1000

String fun

\* streamlined confdata details, including decoding strom binary to string.

setup.py | 4 +---  
1 file changed, 1 insertion(+), 3 deletions(-)

commit f7fd3f270592021a95a8f779bfe85ac18f4e390b  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sat May 2 10:46:59 2015 +1000

Open File

\* Removed deprecated file() and replaced with open().

examples/PyGtkGpgKeys.py | 2 +-  
examples/pygpa.py | 6 +++--  
gpgme-h-clean.py | 2 +-  
3 files changed, 5 insertions(+), 5 deletions(-)

commit 4227d486f9558015e7e548d71085e58e1b50ec08  
Author: Ben McGinnes <ben@adversary.org>  
Date: Sat May 2 10:36:15 2015 +1000

print() fix

\* Makefile includes a python print, changed from statement to function.

Makefile | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 406f7f2567b701502186fe0a325dc2a3491ff7f8

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 10:28:42 2015 +1000

Updated Makefile

\* set make to use python3 instead.

\* This will mean a successful port may need to be maintained separately from the original python2 code instead of merged, but ought to be able to share most things. So maybe merge with separated make files or a pre-make script to set python2 or python3 prior to building ... decide later, after it works.

Makefile | 6 +++---  
1 file changed, 3 insertions(+), 3 deletions(-)

commit 90b3efa5b193d37e08dc9b4ee766ba9ebc9412af

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 10:15:20 2015 +1000

Env and a little license issue

\* Updated all the /usr/bin/env paths to point to python3.

\* Also fixed the hard coded /usr/bin/python paths.

\* Updated part of setup.py which gave the impression this package was only licensed under the GPL (it's actually licensed under the LGPL as well, essentially the same dual licensing as the GPGME library).

examples/PyGtkGpgKeys.py | 2 +-  
examples/delkey.py | 2 +-  
examples/encrypt-to-all.py | 2 +-  
examples/exportimport.py | 2 +-  
examples/genkey.py | 2 +-  
examples/inter-edit.py | 2 +-  
examples/pygpa.py | 2 +-  
examples/sign.py | 2 +-  
examples/signverify.py | 2 +-  
examples/simple.py | 2 +-  
examples/t-edit.py | 2 +-  
examples/testCMSgetkey.py | 2 +-  
examples/verifydetails.py | 2 +-  
gpgme-h-clean.py | 2 +-  
setup.py | 4 +++--



15 files changed, 16 insertions(+), 16 deletions(-)

commit 1a4b55dbccd2774344352e579130bf494bc5fa4b

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 08:50:54 2015 +1000

Removed extraneous files.

\* The two .bak files.

pyme/errors.py.bak | 46 -----  
setup.py.bak | 116 -----  
2 files changed, 162 deletions(-)

commit 208879d4f2a6d0514c3f8ee2fc0da8bba42350de

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 08:19:37 2015 +1000

Added TODO.org

\* TODO list in Emacs org-mode.

\* Will eventually be removed along with this entire directory when the porting process is complete.

2to3/TODO.org | 5 +++++  
1 file changed, 5 insertions(+)

commit 1548bf201059638675c5387c6f124d4b703363a9

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 07:58:40 2015 +1000

2to3 conversion of remaining files

\* Ran the extended version against all the unmodified python files.

\* Only pyme/errors.py required additional work.

2to3/2to3-output-remaining.log | 60 +++++  
pyme/errors.py | 2 +-  
pyme/errors.py.bak | 46 +++++  
3 files changed, 107 insertions(+), 1 deletion(-)

commit 1230650bc6bbe4c14d1284f7877aa932f3e86eb4

Author: Ben McGinnes <ben@adversary.org>

Date: Sat May 2 07:50:39 2015 +1000

2to3 conversion of setup.py

\* Ran extended 2to3 command to produce python 3 code for setup.py.

\* Effectively testing for what to run against the other originally unmodified py2 files.

```
2to3/2to3-output-setup.log | 35 ++++++
setup.py | 7 +-
setup.py.bak | 116 ++++++
3 files changed, 154 insertions(+), 4 deletions(-)
```

commit edad44955f59aa879e95a369591717fb19eec6b7

Author: Ben McGinnes <ben@adversary.org>

Date: Fri May 1 21:50:07 2015 +1000

Removing 2to3 generated .bak files.

\* Not really needed with a real VCS, but couldn't hurt to have them for a couple of revisions. ;)

```
examples/PyGtkGpgKeys.py.bak | 663 -----
examples/encrypt-to-all.py.bak | 65 --
examples/exportimport.py.bak | 75 --
examples/genkey.py.bak | 45 -
examples/inter-edit.py.bak | 57 --
examples/pygpa.py.bak | 1457 -----
examples/sign.py.bak | 31 -
examples/signverify.py.bak | 78 --
examples/simple.py.bak | 52 --
examples/t-edit.py.bak | 59 --
examples/testCMSgetkey.py.bak | 45 -
examples/verifydetails.py.bak | 100 ---
gpgme-h-clean.py.bak | 42 -
pyme/callbacks.py.bak | 47 --
pyme/constants/data/__init__.py.bak | 4 -
pyme/constants/keylist/__init__.py.bak | 4 -
pyme/constants/sig/__init__.py.bak | 4 -
pyme/core.py.bak | 463 -----
pyme/util.py.bak | 72 --
pyme/version.py.bak | 41 -
20 files changed, 3404 deletions(-)
```

commit 1cfc3c969f885ed191610bffb6d60ac23fdd349e

Author: Ben McGinnes <ben@adversary.org>

Date: Fri May 1 21:45:50 2015 +1000

2to3 conversion log

\* The output of the command to convert the code from Python 2 to 3.

\* Note: this contains the list of files which were not modified and which will or may need to be modified.

2to3/2to3-output.log | 950 ++++++

1 file changed, 950 insertions(+)

commit 078f6cf878aa62d12704fab424198a613a24cc8c

Author: Ben McGinnes <ben@adversary.org>

Date: Fri May 1 21:36:58 2015 +1000

2to3 conversion of pyme master

\* Branch from commit 459f3eca659b4949e394c4a032d9ce2053e6c721

\* Ran this: or x in `find . | egrep .py\$` ; do 2to3 -w \$x; done ;

\* Multiple files not modified, will record elsewhere (see next commit).

```
examples/PyGtkGpgKeys.py      | 10 +-
examples/PyGtkGpgKeys.py.bak  | 663 ++++++
examples/encrypt-to-all.py   | 12 +-
examples/encrypt-to-all.py.bak | 65 ++
examples/exportimport.py      | 20 +-
examples/exportimport.py.bak  | 75 ++
examples/genkey.py            | 2 +-
examples/genkey.py.bak        | 45 +
examples/inter-edit.py        | 8 +-
examples/inter-edit.py.bak    | 57 ++
examples/pygpa.py             | 40 +-
examples/pygpa.py.bak         | 1457 ++++++
examples/sign.py              | 2 +-
examples/sign.py.bak          | 31 +
examples/signverify.py        | 18 +-
examples/signverify.py.bak    | 78 ++
examples/simple.py            | 8 +-
examples/simple.py.bak        | 52 ++
examples/t-edit.py            | 12 +-
examples/t-edit.py.bak        | 59 ++
examples/testCMSgetkey.py     | 8 +-
examples/testCMSgetkey.py.bak | 45 +
examples/verifydetails.py     | 34 +-
examples/verifydetails.py.bak | 100 +++
gpgme-h-clean.py             | 2 +-
gpgme-h-clean.py.bak         | 42 +
pyme/callbacks.py            | 6 +-
pyme/callbacks.py.bak        | 47 ++
pyme/constants/data/__init__.py | 2 +-
pyme/constants/data/__init__.py.bak | 4 +
pyme/constants/keylist/__init__.py | 2 +-
pyme/constants/keylist/__init__.py.bak | 4 +
pyme/constants/sig/__init__.py | 2 +-
pyme/constants/sig/__init__.py.bak | 4 +
```

pyme/core.py | 26 +-  
pyme/core.py.bak | 463 ++++++++  
pyme/util.py | 6 +-  
pyme/util.py.bak | 72 ++  
pyme/version.py | 2 +-  
pyme/version.py.bak | 41 +  
40 files changed, 3515 insertions(+), 111 deletions(-)

commit 459f3eca659b4949e394c4a032d9ce2053e6c721

Merge: c5966ab dae7f14

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Wed Jul 9 10:48:33 2014 +0100

Merged in jerrykan/pyme/fix\_setup\_26 (pull request #1)

Provide support for using setup.py with Python v2.6

commit dae7f14a54e6c2bde0ad4da7308cc7fc0d0c0469

Author: John Kristensen <john.kristensen@dpipwe.tas.gov.au>

Date: Wed Jul 9 15:54:39 2014 +1000

Provide support for using setup.py with Python v2.6

The setup.py script uses subprocess.check\_output() which was introduced in Python v2.7. The equivalent functionality can be achieved without adding much extra code and provide support for Python v2.6.

setup.py | 4 +++-

1 file changed, 3 insertions(+), 1 deletion(-)

commit c5966abec9d772b3922d32650da288fd50a217be

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Thu May 15 19:43:00 2014 +0100

README.txt in ReST, including headlines

README.txt | 8 ++++++--

1 file changed, 6 insertions(+), 2 deletions(-)

commit 43ee8c6f34fa9b6d3975aa6ea60b3d4a741fa721

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Thu May 15 19:37:15 2014 +0100

README.txt in ReST

README.txt | 25 ++++++-----

1 file changed, 13 insertions(+), 12 deletions(-)

commit f71a369484cba8801df23ccc5842335fa496c0df  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Thu May 15 19:28:12 2014 +0100

added MANIFEST.in and README.txt (instead of .md)

MANIFEST.in | 6 ++++++  
README.md | 27 -----  
README.txt | 27 ++++++  
3 files changed, 33 insertions(+), 27 deletions(-)

commit d0d6755229f920b0bed043e9c2731de2d57c096c  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Tue May 13 09:52:44 2014 +0100

added mailing list to README

README.md | 19 ++++++  
1 file changed, 16 insertions(+), 3 deletions(-)

commit 30ca60ddf92df684de261cb24c83c68089be0adc  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sun May 11 13:34:28 2014 +0100

we don't need a separate out of date ChangeLog file

ChangeLog | 802 -----  
1 file changed, 802 deletions(-)

commit 8263f1a6d38fdb7f5f3dd5c7e28f83caa7528a08  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sun May 11 13:32:31 2014 +0100

adding README.md

README.md | 14 ++++++  
1 file changed, 14 insertions(+)

commit 3fc71b47e9e14b0b984801c28d722723baa4b406  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:43:06 2014 +0100

ValueError -> RuntimeError

setup.py | 4 +---  
1 file changed, 2 insertions(+), 2 deletions(-)

commit eec432abea56296b9fa36aac0d10926a2335b739

Merge: eea6537 d2738b3  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:41:02 2014 +0100

Merge branch 'master' of bitbucket.org:malb/pyme

Conflicts:  
setup.py

commit eea6537921061b4dcfc54e00a99d3fa110e71433  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:39:51 2014 +0100

check for swig

setup.py | 8 ++++++++  
1 file changed, 8 insertions(+)

commit 53867bf9715ee1b4ea873bf5e2fbb7d9740a2b4a  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:35:04 2014 +0100

more friendly error message if gpgme is missing

setup.py | 8 ++++++--  
1 file changed, 7 insertions(+), 1 deletion(-)

commit d2738b35d63b1492d69641c5466103685f2d3a30  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Sat May 10 15:35:04 2014 +0100

more friendly error message if gpgme is missing

setup.py | 8 ++++++--  
1 file changed, 7 insertions(+), 1 deletion(-)

commit c0b01240becf8ba6cf1d4c1f64b2cb4c056f5163  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Fri May 9 15:20:24 2014 +0100

version number should have three digits

pyme/version.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 6672bb60b9bec60d38e854016c48658b57774578  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Wed May 7 15:11:08 2014 +0100

bump version number for upcoming release

pyme/version.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 7bd6de700f33ca5d1f27bc16ebbd401f21d2e788

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Sat May 3 19:36:25 2014 +0100

bump version number to indicate changes

pyme/version.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 4fb6bd9b3f47c1a343242ac83b326cacd12a136e

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Sat May 3 19:34:07 2014 +0100

pyme instead of pygpgme

setup.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 9548973138d78241a45ccb82333b25f2cf36ce7d

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Sat May 3 19:31:10 2014 +0100

dirty hack to make 'python setup.py install' work

setup.py | 7 +++++--  
1 file changed, 4 insertions(+), 3 deletions(-)

commit a961d7eab9db478b7e603324bc5d243bd3c84bad

Author: Martin Albrecht <martinralbrecht@googlemail.com>

Date: Sat May 3 19:05:44 2014 +0100

moved everything down to the toplevel directory

COPYING	340 ++
COPYING.LESSER	510 +++
ChangeLog	802 +++++
INSTALL	15 +
Makefile	104 +
debian/README.Debian	6 +
debian/changelog	93 +
debian/control	34 +
debian/copyright	25 +

```

debian/docs                | 2 +
debian/examples           | 2 +
debian/rules              | 99 +
examples/PyGtkGpgKeys.glade | 1394 ++++++++
examples/PyGtkGpgKeys.gladep | 8 +
examples/PyGtkGpgKeys.py  | 663 +++++
examples/delkey.py        | 34 +
examples/encrypt-to-all.py | 65 +
examples/exportimport.py  | 75 +
examples/genkey.py        | 45 +
examples/inter-edit.py    | 57 +
examples/pygpa.glade      | 5546 ++++++
examples/pygpa.py         | 1457 ++++++
examples/sign.py          | 31 +
examples/signverify.py    | 78 +
examples/simple.py        | 52 +
examples/t-edit.py        | 59 +
examples/testCMSgetkey.py | 45 +
examples/verifydetails.py | 100 +
gpgme-h-clean.py         | 42 +
gpgme.i                  | 267 ++
helpers.c                 | 154 +
helpers.h                 | 36 +
pyme/COPYING              | 340 --
pyme/COPYING.LESSER      | 510 ---
pyme/ChangeLog            | 802 -----
pyme/INSTALL              | 15 -
pyme/Makefile             | 104 -
pyme/__init__.py          | 137 +
pyme/callbacks.py         | 47 +
pyme/constants/__init__.py | 7 +
pyme/constants/data/__init__.py | 4 +
pyme/constants/data/encoding.py | 20 +
pyme/constants/event.py   | 20 +
pyme/constants/import.py  | 20 +
pyme/constants/keylist/__init__.py | 4 +
pyme/constants/keylist/mode.py | 20 +
pyme/constants/md.py      | 20 +
pyme/constants/pk.py      | 20 +
pyme/constants/protocol.py | 20 +
pyme/constants/sig/__init__.py | 4 +
pyme/constants/sig/mode.py | 20 +
pyme/constants/sigsum.py  | 20 +
pyme/constants/status.py  | 20 +
pyme/constants/validity.py | 20 +
pyme/core.py              | 463 +++
pyme/debian/README.Debian | 6 -
pyme/debian/changelog     | 93 -

```



pyme/debian/control	34 -
pyme/debian/copyright	25 -
pyme/debian/docs	2 -
pyme/debian/examples	2 -
pyme/debian/rules	99 -
pyme/errors.py	46 +
pyme/examples/PyGtkGpgKeys.glade	1394 -----
pyme/examples/PyGtkGpgKeys.gladep	8 -
pyme/examples/PyGtkGpgKeys.py	663 ----
pyme/examples/delkey.py	34 -
pyme/examples/encrypt-to-all.py	65 -
pyme/examples/exportimport.py	75 -
pyme/examples/genkey.py	45 -
pyme/examples/inter-edit.py	57 -
pyme/examples/pygpa.glade	5546 -----
pyme/examples/pygpa.py	1457 -----
pyme/examples/sign.py	31 -
pyme/examples/signverify.py	78 -
pyme/examples/simple.py	52 -
pyme/examples/t-edit.py	59 -
pyme/examples/testCMSgetkey.py	45 -
pyme/examples/verifydetails.py	100 -
pyme/gpgme-h-clean.py	42 -
pyme/gpgme.i	267 --
pyme/helpers.c	154 -
pyme/helpers.h	36 -
pyme/pyme/__init__.py	137 -
pyme/pyme/callbacks.py	47 -
pyme/pyme/constants/__init__.py	7 -
pyme/pyme/constants/data/__init__.py	4 -
pyme/pyme/constants/data/encoding.py	20 -
pyme/pyme/constants/event.py	20 -
pyme/pyme/constants/import.py	20 -
pyme/pyme/constants/keylist/__init__.py	4 -
pyme/pyme/constants/keylist/mode.py	20 -
pyme/pyme/constants/md.py	20 -
pyme/pyme/constants/pk.py	20 -
pyme/pyme/constants/protocol.py	20 -
pyme/pyme/constants/sig/__init__.py	4 -
pyme/pyme/constants/sig/mode.py	20 -
pyme/pyme/constants/sigsum.py	20 -
pyme/pyme/constants/status.py	20 -
pyme/pyme/constants/validity.py	20 -
pyme/pyme/core.py	463 ---
pyme/pyme/errors.py	46 -
pyme/pyme/util.py	72 -
pyme/pyme/version.py	41 -
pyme/setup.py	99 -

```
pyme/util.py          | 72 +
pyme/version.py      | 41 +
setup.py             | 99 +
108 files changed, 13384 insertions(+), 13384 deletions(-)
```

```
commit 8148cdd424c434e833ce427612ea8c89abc6e41c
Author: Martin Albrecht <martinralbrecht@googlemail.com>
Date: Sat May 3 18:58:52 2014 +0100
```

removing pyme-web

```
pyme-web/Makefile          | 15 -
pyme-web/default.css      | 37 --
pyme-web/doc/gpgme/ASCII-Armor.html      | 57 ---
pyme-web/doc/gpgme/Advanced-Key-Editing.html | 98 ----
pyme-web/doc/gpgme/Algorithms.html      | 47 --
pyme-web/doc/gpgme/Building-the-Source.html | 82 ----
.../doc/gpgme/Callback-Based-Data-Buffers.html | 148 -----
pyme-web/doc/gpgme/Cancellation.html     | 67 ---
pyme-web/doc/gpgme/Concept-Index.html    | 186 -----
pyme-web/doc/gpgme/Context-Attributes.html | 52 --
pyme-web/doc/gpgme/Contexts.html        | 61 ---
pyme-web/doc/gpgme/Creating-Contexts.html | 49 --
pyme-web/doc/gpgme/Creating-Data-Buffers.html | 47 --
pyme-web/doc/gpgme/Creating-a-Signature.html | 143 -----
pyme-web/doc/gpgme/Crypto-Engine.html    | 79 ---
pyme-web/doc/gpgme/Crypto-Operations.html | 67 ---
.../doc/gpgme/Cryptographic-Message-Syntax.html | 42 --
.../doc/gpgme/Data-Buffer-I_002fO-Operations.html | 104 ----
pyme-web/doc/gpgme/Data-Buffer-Meta_002dData.html | 100 ----
pyme-web/doc/gpgme/Decrypt-and-Verify.html | 79 ---
pyme-web/doc/gpgme/Decrypt.html         | 123 -----
pyme-web/doc/gpgme/Deleting-Keys.html    | 67 ---
pyme-web/doc/gpgme/Destroying-Contexts.html | 46 --
pyme-web/doc/gpgme/Destroying-Data-Buffers.html | 70 ---
pyme-web/doc/gpgme/Encrypt.html         | 45 --
pyme-web/doc/gpgme/Encrypting-a-Plaintext.html | 147 -----
pyme-web/doc/gpgme/Engine-Configuration.html | 65 ---
pyme-web/doc/gpgme/Engine-Information.html | 119 -----
pyme-web/doc/gpgme/Engine-Version-Check.html | 48 --
pyme-web/doc/gpgme/Error-Codes.html     | 133 -----
pyme-web/doc/gpgme/Error-Handling.html   | 72 ---
pyme-web/doc/gpgme/Error-Sources.html    | 89 ----
pyme-web/doc/gpgme/Error-Strings.html    | 80 ---
pyme-web/doc/gpgme/Error-Values.html     | 159 -----
pyme-web/doc/gpgme/Exchanging-Data.html  | 58 ---
pyme-web/doc/gpgme/Exporting-Keys.html   | 101 ----
pyme-web/doc/gpgme/Features.html        | 59 ---
```

pyme-web/doc/gpgme/File-Based-Data-Buffers.html	74 ---
pyme-web/doc/gpgme/Function-and-Data-Index.html	229 -----
pyme-web/doc/gpgme/Generating-Keys.html	144 -----
pyme-web/doc/gpgme/Getting-Started.html	55 ---
pyme-web/doc/gpgme/Hash-Algorithms.html	59 ---
pyme-web/doc/gpgme/Header.html	53 --
.../doc/gpgme/I_002fO-Callback-Example-GDK.html	85 ----
.../gpgme/I_002fO-Callback-Example-GTK_002b.html	86 ----
.../doc/gpgme/I_002fO-Callback-Example-Qt.html	99 ----
pyme-web/doc/gpgme/I_002fO-Callback-Example.html	259 -----
pyme-web/doc/gpgme/I_002fO-Callback-Interface.html	142 -----
pyme-web/doc/gpgme/Importing-Keys.html	171 -----
pyme-web/doc/gpgme/Included-Certificates.html	70 ---
pyme-web/doc/gpgme/Information-About-Keys.html	207 -----
.../doc/gpgme/Information-About-Trust-Items.html	75 ---
pyme-web/doc/gpgme/Introduction.html	53 --
pyme-web/doc/gpgme/Key-Listing-Mode.html	99 ----
pyme-web/doc/gpgme/Key-Management.html	260 -----
pyme-web/doc/gpgme/Key-Signatures.html	130 -----
.../doc/gpgme/Largefile-Support-_0028LFS_0029.html	110 -----
pyme-web/doc/gpgme/Library-Copying.html	542 -----
pyme-web/doc/gpgme/Library-Version-Check.html	97 ----
pyme-web/doc/gpgme/Listing-Keys.html	204 -----
pyme-web/doc/gpgme/Listing-Trust-Items.html	88 ----
pyme-web/doc/gpgme/Locale.html	69 ---
pyme-web/doc/gpgme/Manipulating-Data-Buffers.html	45 --
pyme-web/doc/gpgme/Manipulating-Keys.html	63 ---
pyme-web/doc/gpgme/Manipulating-Trust-Items.html	62 ---
pyme-web/doc/gpgme/Memory-Based-Data-Buffers.html	107 ----
pyme-web/doc/gpgme/Multi-Threading.html	93 ----
pyme-web/doc/gpgme/OpenPGP.html	44 --
pyme-web/doc/gpgme/Overview.html	57 ---
pyme-web/doc/gpgme/Passphrase-Callback.html	101 ----
pyme-web/doc/gpgme/Preparation.html	54 --
pyme-web/doc/gpgme/Progress-Meter-Callback.html	80 ---
pyme-web/doc/gpgme/Protocol-Selection.html	60 ---
pyme-web/doc/gpgme/Protocols-and-Engines.html	82 ----
pyme-web/doc/gpgme/Public-Key-Algorithms.html	74 ---
.../doc/gpgme/Registering-I_002fO-Callbacks.html	81 ---
pyme-web/doc/gpgme/Run-Control.html	53 --
pyme-web/doc/gpgme/Selecting-Signers.html	64 ---
pyme-web/doc/gpgme/Sign.html	50 --
pyme-web/doc/gpgme/Signal-Handling.html	61 ---
pyme-web/doc/gpgme/Signature-Notation-Data.html	85 ----
pyme-web/doc/gpgme/Text-Mode.html	63 ---
pyme-web/doc/gpgme/Trust-Item-Management.html	68 ---
pyme-web/doc/gpgme/Using-Automake.html	74 ---
pyme-web/doc/gpgme/Using-External-Event-Loops.html	74 ---

pyme-web/doc/gpgme/Using-Libtool.html | 44 --  
pyme-web/doc/gpgme/Verify.html | 492 -----  
pyme-web/doc/gpgme/Waiting-For-Completion.html | 77 ---  
pyme-web/doc/gpgme/index.html | 169 -----  
pyme-web/doc/pyme/index.html | 164 -----  
pyme-web/doc/pyme/pyme.callbacks.html | 42 --  
.../doc/pyme/pyme.constants.data.encoding.html | 48 --  
pyme-web/doc/pyme/pyme.constants.data.html | 29 --  
pyme-web/doc/pyme/pyme.constants.event.html | 48 --  
pyme-web/doc/pyme/pyme.constants.html | 39 --  
pyme-web/doc/pyme/pyme.constants.import.html | 49 --  
pyme-web/doc/pyme/pyme.constants.keylist.html | 29 --  
pyme-web/doc/pyme/pyme.constants.keylist.mode.html | 49 --  
pyme-web/doc/pyme/pyme.constants.md.html | 58 ---  
pyme-web/doc/pyme/pyme.constants.pk.html | 50 --  
pyme-web/doc/pyme/pyme.constants.protocol.html | 48 --  
pyme-web/doc/pyme/pyme.constants.sig.html | 29 --  
pyme-web/doc/pyme/pyme.constants.sig.mode.html | 47 --  
pyme-web/doc/pyme/pyme.constants.sigsum.html | 55 ---  
pyme-web/doc/pyme/pyme.constants.status.html | 126 -----  
pyme-web/doc/pyme/pyme.constants.validity.html | 50 --  
pyme-web/doc/pyme/pyme.core.html | 277 -----  
pyme-web/doc/pyme/pyme.errors.html | 82 ----  
pyme-web/doc/pyme/pyme.html | 164 -----  
pyme-web/doc/pyme/pyme.util.html | 81 ---  
pyme-web/doc/pyme/pyme.version.html | 37 --  
pyme-web/index.html | 72 ---  
112 files changed, 10551 deletions(-)

commit 684d95feb7e10e538a56fb1b27f1456111bacb60  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Mon Jan 6 17:44:20 2014 +0100

fixing op\_export\_keys()

the conversion of gpgme\_key\_t [] was restricted to gpgme\_key\_t [] with the name recv, i.e. only the use-cases of encryption were covered.

see: [http://sourceforge.net/mailarchive/forum.php?forum\\_name=pyme-help&max\\_rows=25&style=nested&viewmonth=201309](http://sourceforge.net/mailarchive/forum.php?forum_name=pyme-help&max_rows=25&style=nested&viewmonth=201309)

pyme/gpgme.i | 6 +++---  
1 file changed, 3 insertions(+), 3 deletions(-)

commit 658d23b95110d21eeb50abf4e74701a667521a88  
Author: Martin Albrecht <martinralbrecht@googlemail.com>  
Date: Mon Jan 6 17:41:33 2014 +0100

deleting CVSROOT

```
CVSROOT/checkoutlist | 13 -----
CVSROOT/commitinfo  | 15 -----
CVSROOT/config       | 21 -----
CVSROOT/cvswrappers | 19 -----
CVSROOT/editinfo     | 21 -----
CVSROOT/loginfo      | 26 -----
CVSROOT/modules      | 26 -----
CVSROOT/notify       | 12 -----
CVSROOT/rcsinfo      | 13 -----
CVSROOT/taginfo      | 20 -----
CVSROOT/verifymsg    | 21 -----
11 files changed, 207 deletions(-)
```

```
commit 576b555499c094c4786d42de9e59aa9826009b89
Author: convert-repo <devnull@localhost>
Date: Mon Jan 6 15:22:44 2014 +0000
```

update tags

```
commit 2dcf0c5b702eb5a18c66ff1e42a72eaa7427af1d
Author: belyi <devnull@localhost>
Date: Wed Nov 26 02:38:33 2008 +0000
```

Move Windows specific fix from helpers.c to helpers.h so that it works for edit callback as well as for the passphrase one.

```
pyme/helpers.c | 5 ----
pyme/helpers.h | 5 +++++
2 files changed, 5 insertions(+), 5 deletions(-)
```

```
commit 42a035f2ef62470fea7a7f8ee33a1297fa90a603
Author: belyi <devnull@localhost>
Date: Mon Nov 24 21:44:30 2008 +0000
```

Update the way build directives are constructed on MinGW to have a bit more robust. Update PyMe build version to 0.8.1 in version.py

```
pyme/pyme/version.py | 2 +-
pyme/setup.py        | 10 ++++++++--
2 files changed, 9 insertions(+), 3 deletions(-)
```

```
commit 3aaa20fbcba17066c9ffd580f5209946022793a2
Author: belyi <devnull@localhost>
Date: Mon Nov 24 06:57:11 2008 +0000
```

Update changelog

pyme/debian/changelog | 5 ++++-  
1 file changed, 4 insertions(+), 1 deletion(-)

commit 689ff46b2550547e3883f809a6dc40c22c3e137e

Author: belyi <devnull@localhost>

Date: Mon Nov 24 06:50:41 2008 +0000

Fix hang problem on Windows when password is written to a filehandle.  
Fix the way path is constructed on MinGW platform.

pyme/helpers.c | 5 +++++

pyme/setup.py | 4 +++-

2 files changed, 7 insertions(+), 2 deletions(-)

commit 852a60d541d66cb56f40378182b976fd87a02c46

Author: belyi <devnull@localhost>

Date: Sun Nov 23 04:31:31 2008 +0000

Add Bernard's example testCMSgetkey.py and his updates for  
verifydetails.py

pyme/examples/testCMSgetkey.py | 45 ++

pyme/examples/verifydetails.py | 43 ++++++++++++++++++++++++++++++++++++++-----

2 files changed, 77 insertions(+), 11 deletions(-)

commit f080527d9184f3360f0a8ef6136b9a188d8e7d2a

Author: belyi <devnull@localhost>

Date: Thu May 29 18:29:37 2008 +0000

Remove debian packaging for python2.3 since it is removed from both  
testing and unstable dists.  
Update docs build target to have correct PYTHONPATH set.

pyme/Makefile | 2 +-  
pyme/debian/changelog | 4 +++-

pyme/debian/control | 4 +++-

pyme/debian/rules | 2 --

4 files changed, 6 insertions(+), 6 deletions(-)

commit c25d133fcbadf3c7f6e655586b4a05d6e3cf6f0b

Author: belyi <devnull@localhost>

Date: Thu Apr 3 13:37:12 2008 +0000

Forgot to adjust mainText margin. Doing it now.

pyme-web/default.css | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)

commit 897286a54a32336d060cd03305cdec7905f34f1  
Author: belyi <devnull@localhost>  
Date: Thu Apr 3 13:00:11 2008 +0000

Fix an error in default.css and make index.html "Standards Compliant".

pyme-web/default.css | 2 +-  
pyme-web/index.html | 7 ++++---  
2 files changed, 5 insertions(+), 4 deletions(-)

commit 4e049212bd214449cc0ba1ce06e00782783f328a  
Author: belyi <devnull@localhost>  
Date: Thu Apr 3 12:38:42 2008 +0000

Adjust spacing between links.

pyme-web/default.css | 9 ++++++---  
1 file changed, 6 insertions(+), 3 deletions(-)

commit cb2bddfbd77483b1deb14f2eab0715a03dd33fcd  
Author: belyi <devnull@localhost>  
Date: Wed Apr 2 22:50:21 2008 +0000

Make style a big more IE friendly.

pyme-web/default.css | 15 ++++++++-----  
1 file changed, 11 insertions(+), 4 deletions(-)

commit ad66f0a1bb01b46baac328e9fee439b35a60c232  
Author: belyi <devnull@localhost>  
Date: Wed Apr 2 11:58:32 2008 +0000

Make GPGME documentation a bit more web friendly on the index.html page.

pyme-web/doc/gpgme/Algorithms.html | 2 +-  
pyme-web/doc/gpgme/Concept-Index.html | 2 +-  
pyme-web/doc/gpgme/Contexts.html | 2 +-  
pyme-web/doc/gpgme/Error-Handling.html | 2 +-  
pyme-web/doc/gpgme/Exchanging-Data.html | 2 +-  
pyme-web/doc/gpgme/Function-and-Data-Index.html | 2 +-  
pyme-web/doc/gpgme/Introduction.html | 4 +-  
pyme-web/doc/gpgme/Library-Copying.html | 2 +-  
pyme-web/doc/gpgme/Preparation.html | 2 +-  
pyme-web/doc/gpgme/Protocols-and-Engines.html | 2 +-  
pyme-web/doc/gpgme/index.html | 229 +-----  
11 files changed, 12 insertions(+), 239 deletions(-)

commit 4f57c0ccb049d4442e7732e2d1d05dabffd2a21d

Author: belyi <devnull@localhost>

Date: Wed Apr 2 06:12:57 2008 +0000

Add missing core.set\_locale() to set default locale for contexts.

pyme/debian/changelog | 2 +-  
pyme/pyme/core.py | 4 ++++

2 files changed, 5 insertions(+), 1 deletion(-)

commit acf7ead3dea8590cf9fe86b67bb125837ad6ed4f

Author: belyi <devnull@localhost>

Date: Wed Apr 2 05:50:24 2008 +0000

Avoid leaks caused by keys.

Add set/get methods for engine info.

pyme/debian/changelog | 10 ++++++++  
pyme/pyme/core.py | 24 ++++++++

2 files changed, 34 insertions(+)

commit df4a2fb518adbb6420d95ce74af212c87abff7e7

Author: belyi <devnull@localhost>

Date: Wed Apr 2 04:04:41 2008 +0000

Update index.html to reflect new versions on the web.

pyme-web/Makefile | 3 +-  
pyme-web/doc/gpgme/index.html | 4 +---  
pyme-web/index.html | 4 +-+

3 files changed, 5 insertions(+), 6 deletions(-)

commit bd3ffc9bdf98d6aafde6b689c6c8215fa468612d

Author: belyi <devnull@localhost>

Date: Wed Apr 2 04:01:04 2008 +0000

Update PyMe documentation to match 0.8.0 version of the package.

pyme-web/doc/pyme/index.html | 14 ++++-----  
pyme-web/doc/pyme/pyme.constants.keylist.mode.html | 1 +  
pyme-web/doc/pyme/pyme.constants.protocol.html | 4 +-+  
pyme-web/doc/pyme/pyme.constants.status.html | 9 ++++++  
pyme-web/doc/pyme/pyme.core.html | 36 ++++++++  
pyme-web/doc/pyme/pyme.errors.html | 8 +----  
pyme-web/doc/pyme/pyme.html | 14 ++++-----  
pyme-web/doc/pyme/pyme.util.html | 17 ++++++++  
pyme-web/doc/pyme/pyme.version.html | 14 ++++-----

9 files changed, 82 insertions(+), 35 deletions(-)



commit 6973a69a317608a0d0661590d701f4e3f3a21b32

Author: belyi <devnull@localhost>

Date: Wed Apr 2 02:35:24 2008 +0000

Have a fix for Contents being put onto 'Function and Data Index' page.

```
pyme-web/doc/gpgme/Concept-Index.html      | 2 +-
pyme-web/doc/gpgme/Function-and-Data-Index.html | 153 +-----
pyme-web/doc/gpgme/index.html              | 154 ++++++
3 files changed, 155 insertions(+), 154 deletions(-)
```

commit 086315964cbc2abad1187f306dcb9c72ac3257f3

Author: belyi <devnull@localhost>

Date: Wed Apr 2 01:00:29 2008 +0000

Update GPGME documentation. It's for v1.1.6 now.

```
pyme-web/doc/gpgme/ASCII-Armor.html        | 57 ++
pyme-web/doc/gpgme/Advanced-Key-Editing.html | 98 +++
pyme-web/doc/gpgme/Algorithms.html         | 47 ++
pyme-web/doc/gpgme/Building-the-Source.html | 82 +++
../doc/gpgme/Callback-Based-Data-Buffers.html | 148 +++++
pyme-web/doc/gpgme/Cancellation.html       | 67 ++
pyme-web/doc/gpgme/Concept-Index.html     | 186 ++++++
pyme-web/doc/gpgme/Context-Attributes.html | 52 ++
pyme-web/doc/gpgme/Contexts.html          | 61 ++
pyme-web/doc/gpgme/Creating-Contexts.html  | 49 ++
pyme-web/doc/gpgme/Creating-Data-Buffers.html | 47 ++
pyme-web/doc/gpgme/Creating-a-Signature.html | 143 +++++
pyme-web/doc/gpgme/Crypto-Engine.html     | 79 +++
pyme-web/doc/gpgme/Crypto-Operations.html  | 67 ++
../doc/gpgme/Cryptographic-Message-Syntax.html | 42 ++
../doc/gpgme/Data-Buffer-I_002fO-Operations.html | 104 +++++
pyme-web/doc/gpgme/Data-Buffer-Meta_002dData.html | 100 +++
pyme-web/doc/gpgme/Decrypt-and-Verify.html | 79 +++
pyme-web/doc/gpgme/Decrypt.html           | 123 +++++
pyme-web/doc/gpgme/Deleting-Keys.html     | 67 ++
pyme-web/doc/gpgme/Destroying-Contexts.html | 46 ++
pyme-web/doc/gpgme/Destroying-Data-Buffers.html | 70 +++
pyme-web/doc/gpgme/Encrypt.html           | 45 ++
pyme-web/doc/gpgme/Encrypting-a-Plaintext.html | 147 +++++
pyme-web/doc/gpgme/Engine-Configuration.html | 65 ++
pyme-web/doc/gpgme/Engine-Information.html | 119 +++++
pyme-web/doc/gpgme/Engine-Version-Check.html | 48 ++
pyme-web/doc/gpgme/Error-Codes.html       | 133 +++++
pyme-web/doc/gpgme/Error-Handling.html    | 72 +++
pyme-web/doc/gpgme/Error-Sources.html     | 89 +++
```

pyme-web/doc/gpgme/Error-Strings.html | 80 +++  
 pyme-web/doc/gpgme/Error-Values.html | 159 +++++  
 pyme-web/doc/gpgme/Exchanging-Data.html | 58 ++  
 pyme-web/doc/gpgme/Exporting-Keys.html | 101 +++  
 pyme-web/doc/gpgme/Features.html | 59 ++  
 pyme-web/doc/gpgme/File-Based-Data-Buffers.html | 74 +++  
 pyme-web/doc/gpgme/Function-and-Data-Index.html | 380 ++++++  
 pyme-web/doc/gpgme/Generating-Keys.html | 144 +++++  
 pyme-web/doc/gpgme/Getting-Started.html | 55 ++  
 pyme-web/doc/gpgme/Hash-Algorithms.html | 59 ++  
 pyme-web/doc/gpgme/Header.html | 53 ++  
 ../doc/gpgme/I\_002fO-Callback-Example-GDK.html | 85 +++  
 ../gpgme/I\_002fO-Callback-Example-GTK\_002b.html | 86 +++  
 ../doc/gpgme/I\_002fO-Callback-Example-Qt.html | 99 +++  
 pyme-web/doc/gpgme/I\_002fO-Callback-Example.html | 259 ++++++  
 pyme-web/doc/gpgme/I\_002fO-Callback-Interface.html | 142 +++++  
 pyme-web/doc/gpgme/Importing-Keys.html | 171 +++++  
 pyme-web/doc/gpgme/Included-Certificates.html | 70 +++  
 pyme-web/doc/gpgme/Information-About-Keys.html | 207 ++++++  
 ../doc/gpgme/Information-About-Trust-Items.html | 75 +++  
 pyme-web/doc/gpgme/Introduction.html | 53 ++  
 pyme-web/doc/gpgme/Key-Listing-Mode.html | 99 +++  
 pyme-web/doc/gpgme/Key-Management.html | 260 ++++++  
 pyme-web/doc/gpgme/Key-Signatures.html | 130 ++++  
 ../doc/gpgme/Largefile-Support-\_0028LFS\_0029.html | 110 ++++  
 pyme-web/doc/gpgme/Library-Copying.html | 542 ++++++  
 pyme-web/doc/gpgme/Library-Version-Check.html | 97 +++  
 pyme-web/doc/gpgme/Listing-Keys.html | 204 ++++++  
 pyme-web/doc/gpgme/Listing-Trust-Items.html | 88 +++  
 pyme-web/doc/gpgme/Locale.html | 69 +++  
 pyme-web/doc/gpgme/Manipulating-Data-Buffers.html | 45 ++  
 pyme-web/doc/gpgme/Manipulating-Keys.html | 63 ++  
 pyme-web/doc/gpgme/Manipulating-Trust-Items.html | 62 ++  
 pyme-web/doc/gpgme/Memory-Based-Data-Buffers.html | 107 ++++  
 pyme-web/doc/gpgme/Multi-Threading.html | 93 +++  
 pyme-web/doc/gpgme/OpenPGP.html | 44 ++  
 pyme-web/doc/gpgme/Overview.html | 57 ++  
 pyme-web/doc/gpgme/Passphrase-Callback.html | 101 +++  
 pyme-web/doc/gpgme/Preparation.html | 54 ++  
 pyme-web/doc/gpgme/Progress-Meter-Callback.html | 80 +++  
 pyme-web/doc/gpgme/Protocol-Selection.html | 60 ++  
 pyme-web/doc/gpgme/Protocols-and-Engines.html | 82 +++  
 pyme-web/doc/gpgme/Public-Key-Algorithms.html | 74 +++  
 ../doc/gpgme/Registering-I\_002fO-Callbacks.html | 81 +++  
 pyme-web/doc/gpgme/Run-Control.html | 53 ++  
 pyme-web/doc/gpgme/Selecting-Signers.html | 64 ++  
 pyme-web/doc/gpgme/Sign.html | 50 ++  
 pyme-web/doc/gpgme/Signal-Handling.html | 61 ++

pyme-web/doc/gpgme/Signature-Notation-Data.html	85 +++
pyme-web/doc/gpgme/Text-Mode.html	63 ++
pyme-web/doc/gpgme/Trust-Item-Management.html	68 ++
pyme-web/doc/gpgme/Using-Automake.html	74 +++
pyme-web/doc/gpgme/Using-External-Event-Loops.html	74 +++
pyme-web/doc/gpgme/Using-Libtool.html	44 ++
pyme-web/doc/gpgme/Verify.html	492 ++++++
pyme-web/doc/gpgme/Waiting-For-Completion.html	77 +++
pyme-web/doc/gpgme/gpgme.html	251 -----
pyme-web/doc/gpgme/gpgme_1.html	76 ---
pyme-web/doc/gpgme/gpgme_10.html	61 --
pyme-web/doc/gpgme/gpgme_11.html	130 ----
pyme-web/doc/gpgme/gpgme_12.html	82 ---
pyme-web/doc/gpgme/gpgme_13.html	130 ----
pyme-web/doc/gpgme/gpgme_14.html	108 ----
pyme-web/doc/gpgme/gpgme_15.html	69 ---
pyme-web/doc/gpgme/gpgme_16.html	169 -----
pyme-web/doc/gpgme/gpgme_17.html	63 --
pyme-web/doc/gpgme/gpgme_18.html	63 --
pyme-web/doc/gpgme/gpgme_19.html	66 --
pyme-web/doc/gpgme/gpgme_2.html	79 ---
pyme-web/doc/gpgme/gpgme_20.html	120 ----
pyme-web/doc/gpgme/gpgme_21.html	102 ---
pyme-web/doc/gpgme/gpgme_22.html	108 ----
pyme-web/doc/gpgme/gpgme_23.html	237 -----
pyme-web/doc/gpgme/gpgme_24.html	154 -----
pyme-web/doc/gpgme/gpgme_25.html	248 -----
pyme-web/doc/gpgme/gpgme_26.html	107 ----
pyme-web/doc/gpgme/gpgme_27.html	80 ---
pyme-web/doc/gpgme/gpgme_28.html	67 --
pyme-web/doc/gpgme/gpgme_29.html	164 -----
pyme-web/doc/gpgme/gpgme_3.html	86 ---
pyme-web/doc/gpgme/gpgme_30.html	106 ----
pyme-web/doc/gpgme/gpgme_31.html	232 -----
pyme-web/doc/gpgme/gpgme_32.html	85 ---
pyme-web/doc/gpgme/gpgme_33.html	223 -----
pyme-web/doc/gpgme/gpgme_34.html	83 ---
pyme-web/doc/gpgme/gpgme_35.html	70 ---
pyme-web/doc/gpgme/gpgme_36.html	63 --
pyme-web/doc/gpgme/gpgme_37.html	66 --
pyme-web/doc/gpgme/gpgme_38.html	86 ---
pyme-web/doc/gpgme/gpgme_39.html	79 ---
pyme-web/doc/gpgme/gpgme_4.html	83 ---
pyme-web/doc/gpgme/gpgme_40.html	89 ---
pyme-web/doc/gpgme/gpgme_41.html	99 ---
pyme-web/doc/gpgme/gpgme_42.html	144 -----
pyme-web/doc/gpgme/gpgme_43.html	152 -----
pyme-web/doc/gpgme/gpgme_44.html	112 ----

pyme-web/doc/gpgme/gpgme_45.html	101 ---
pyme-web/doc/gpgme/gpgme_46.html	459 -----
pyme-web/doc/gpgme/gpgme_47.html	292 -----
pyme-web/doc/gpgme/gpgme_48.html	363 -----
pyme-web/doc/gpgme/gpgme_49.html	209 -----
pyme-web/doc/gpgme/gpgme_5.html	74 ---
pyme-web/doc/gpgme/gpgme_50.html	88 ---
pyme-web/doc/gpgme/gpgme_51.html	208 -----
pyme-web/doc/gpgme/gpgme_52.html	154 ----
pyme-web/doc/gpgme/gpgme_53.html	291 -----
pyme-web/doc/gpgme/gpgme_54.html	91 ---
pyme-web/doc/gpgme/gpgme_55.html	107 ----
pyme-web/doc/gpgme/gpgme_56.html	140 ----
pyme-web/doc/gpgme/gpgme_57.html	106 ----
pyme-web/doc/gpgme/gpgme_58.html	89 ---
pyme-web/doc/gpgme/gpgme_59.html	97 ---
pyme-web/doc/gpgme/gpgme_6.html	77 ---
pyme-web/doc/gpgme/gpgme_60.html	142 ----
pyme-web/doc/gpgme/gpgme_61.html	626 -----
pyme-web/doc/gpgme/gpgme_62.html	107 ----
pyme-web/doc/gpgme/gpgme_63.html	67 --
pyme-web/doc/gpgme/gpgme_64.html	95 ---
pyme-web/doc/gpgme/gpgme_65.html	233 -----
pyme-web/doc/gpgme/gpgme_66.html	65 --
pyme-web/doc/gpgme/gpgme_67.html	220 -----
pyme-web/doc/gpgme/gpgme_68.html	75 ---
pyme-web/doc/gpgme/gpgme_69.html	119 ----
pyme-web/doc/gpgme/gpgme_7.html	123 ----
pyme-web/doc/gpgme/gpgme_70.html	107 ----
pyme-web/doc/gpgme/gpgme_71.html	218 -----
pyme-web/doc/gpgme/gpgme_72.html	134 ----
pyme-web/doc/gpgme/gpgme_73.html	299 -----
pyme-web/doc/gpgme/gpgme_74.html	103 ----
pyme-web/doc/gpgme/gpgme_75.html	104 ----
pyme-web/doc/gpgme/gpgme_76.html	118 ----
pyme-web/doc/gpgme/gpgme_77.html	95 ---
pyme-web/doc/gpgme/gpgme_78.html	71 ---
pyme-web/doc/gpgme/gpgme_79.html	686 -----
pyme-web/doc/gpgme/gpgme_8.html	155 ----
pyme-web/doc/gpgme/gpgme_80.html	120 ----
pyme-web/doc/gpgme/gpgme_81.html	278 -----
pyme-web/doc/gpgme/gpgme_82.html	272 -----
pyme-web/doc/gpgme/gpgme_83.html	180 -----
pyme-web/doc/gpgme/gpgme_84.html	99 ---
pyme-web/doc/gpgme/gpgme_9.html	104 ----
pyme-web/doc/gpgme/gpgme_abt.html	206 -----
pyme-web/doc/gpgme/gpgme_fot.html	53 --
pyme-web/doc/gpgme/gpgme_ovr.html	68 --

```
pyme-web/doc/gpgme/gpgme_toc.html | 247 -----
pyme-web/doc/gpgme/index.html | 497 ++++++-----
176 files changed, 9054 insertions(+), 13378 deletions(-)
```

commit 163c1053dc761682f5a4231da163bdd0ff7162d7

Author: belyi <devnull@localhost>

Date: Tue Apr 1 21:14:29 2008 +0000

Update Home page to be a bit more visitor friendly.

```
pyme-web/Makefile | 2 +-
pyme-web/default.css | 27 ++++++-----
pyme-web/index.html | 70 ++++++-----
3 files changed, 75 insertions(+), 24 deletions(-)
```

commit 05db2d17d8fda0ab8c948bbdc0643dfc1466830d

Author: belyi <devnull@localhost>

Date: Sun Mar 30 21:27:38 2008 +0000

Add a rule to build binary distribution for Windows.

```
pyme/Makefile | 16 ++++++-----
1 file changed, 14 insertions(+), 2 deletions(-)
```

commit 57acb1089f5f8c24323ee62fc0a7f492a496b9c0

Author: belyi <devnull@localhost>

Date: Sat Mar 29 22:50:11 2008 +0000

Switch to using central location for python files (pycentral)

Update docs rule to fix location of the python source files.

```
pyme/Makefile | 5 +++-
pyme/debian/changelog | 4 +-
pyme/debian/control | 74 +++++-----
pyme/debian/dirs | 2 --
pyme/debian/docs | 1 +
pyme/debian/postinst.ex | 48 -----
pyme/debian/posrm.ex | 38 -----
pyme/debian/preinst.ex | 44 -----
pyme/debian/prerm.ex | 39 -----
pyme/debian/rules | 50 +++++-----
pyme/debian/setup.cfg-2.2 | 8 ----
pyme/debian/setup.cfg-2.3 | 8 ----
pyme/debian/setup.cfg-2.4 | 8 ----
pyme/gpgme-h-clean.py | 2 +-
pyme/pyme/core.py | 2 +-
pyme/pyme/util.py | 2 +-
16 files changed, 28 insertions(+), 307 deletions(-)
```

commit 2b56fd10517cfbcffaa4ba98d8ea42f40f0d38a9

Author: belyi <devnull@localhost>

Date: Sun Mar 23 02:01:12 2008 +0000

Turn SWIG's autodoc feature on. Ignore 'next' in the types which are lists now.  
Use new style for class declarations. Specify None as a default value for  
core.check\_version() method. Update version.py for 0.8.0 version.

```
pyme/examples/pygpa.py | 2 +-
pyme/gpgme.i           | 5 +++++
pyme/pyme/core.py     | 2 +-
pyme/pyme/util.py     | 5 +++--
pyme/pyme/version.py  | 6 +++---
5 files changed, 13 insertions(+), 7 deletions(-)
```

commit df5e25d7ee4dc0aa0d429f9d009322dd8ac33bb8

Author: belyi <devnull@localhost>

Date: Thu Mar 20 19:07:00 2008 +0000

Improve matching for DEPRECATED typedefs

```
pyme/gpgme-h-clean.py | 4 +++-
1 file changed, 2 insertions(+), 2 deletions(-)
```

commit 78d8fc732848ac267ec65e9069265cd500587cdf

Author: belyi <devnull@localhost>

Date: Wed Mar 19 19:28:40 2008 +0000

Update API to use list when types containing 'next' field are return.  
Update examples accordingly  
Add verifydetails.py example  
Start adding bullets for 0.8.0 version.

```
pyme/Makefile          | 2 +-
pyme/debian/changelog  | 14 +++++++-
pyme/examples/PyGtkGpgKeys.py | 53 ++++++++-----
pyme/examples/delkey.py | 7 +++-
pyme/examples/encrypt-to-all.py | 7 +++-
pyme/examples/exportimport.py | 7 +++-
pyme/examples/pygpa.py  | 70 ++++++++-----
pyme/examples/signverify.py | 11 +++---
pyme/examples/verifydetails.py | 79 ++++++++-----
pyme/gpgme.i           | 19 ++++++++-
10 files changed, 180 insertions(+), 89 deletions(-)
```

commit 342d85b07475e7360bcd62804bf5facda039494f

Author: belyi <devnull@localhost>

Date: Mon Mar 10 01:14:16 2008 +0000

Change references to source files so that they point to the WebCVS browse location.

```
pyme-web/doc/pyme/index.html          | 2 +-
pyme-web/doc/pyme/pyme.callbacks.html  | 2 +-
pyme-web/doc/pyme/pyme.constants.data.encoding.html | 2 +-
pyme-web/doc/pyme/pyme.constants.data.html      | 2 +-
pyme-web/doc/pyme/pyme.constants.event.html     | 2 +-
pyme-web/doc/pyme/pyme.constants.html          | 2 +-
pyme-web/doc/pyme/pyme.constants.import.html    | 2 +-
pyme-web/doc/pyme/pyme.constants.keylist.html   | 2 +-
pyme-web/doc/pyme/pyme.constants.keylist.mode.html | 2 +-
pyme-web/doc/pyme/pyme.constants.md.html        | 2 +-
pyme-web/doc/pyme/pyme.constants.pk.html        | 2 +-
pyme-web/doc/pyme/pyme.constants.protocol.html  | 2 +-
pyme-web/doc/pyme/pyme.constants.sig.html       | 2 +-
pyme-web/doc/pyme/pyme.constants.sig.mode.html  | 2 +-
pyme-web/doc/pyme/pyme.constants.sigsum.html    | 2 +-
pyme-web/doc/pyme/pyme.constants.status.html    | 2 +-
pyme-web/doc/pyme/pyme.constants.validity.html  | 2 +-
pyme-web/doc/pyme/pyme.core.html              | 2 +-
pyme-web/doc/pyme/pyme.errors.html             | 2 +-
pyme-web/doc/pyme/pyme.html                  | 2 +-
pyme-web/doc/pyme/pyme.util.html              | 2 +-
pyme-web/doc/pyme/pyme.version.html            | 2 +-
22 files changed, 22 insertions(+), 22 deletions(-)
```

commit 4139dd1d066c1a6c892d84fe45dc3e6c4aa1b803

Author: belyi <devnull@localhost>

Date: Sat Mar 8 18:21:08 2008 +0000

Add core.check\_version(None) to all examples since this function is used by Gpgme to do internal initialization. Update debian/rules to use dh\_pysupport instead of deprecated dh\_python.

```
pyme/debian/rules          | 8 +++-----
pyme/examples/PyGtkGpgKeys.py | 7 ++++++-
pyme/examples/delkey.py     | 2 ++
pyme/examples/encrypt-to-all.py | 3 +++
pyme/examples/exportimport.py | 2 ++
pyme/examples/genkey.py     | 1 +
pyme/examples/inter-edit.py | 3 +++
pyme/examples/pygpa.py      | 5 +++++
pyme/examples/sign.py       | 2 ++
pyme/examples/signverify.py | 2 ++
pyme/examples/simple.py     | 2 ++
```

pyme/examples/t-edit.py | 3 +++  
12 files changed, 34 insertions(+), 6 deletions(-)

commit ae76c6176457dd38e0634cbc17d794294a3a81d2  
Author: belyi <devnull@localhost>  
Date: Wed Apr 12 22:20:38 2006 +0000

Change name of internal package name from 'gpgme' to 'pygpgme' to avoid conflict with gpgme.dll on Windows.  
Fix build with SWIG 1.3.28.  
Change version to 0.7.1 in a preparation for new release.

pyme/Makefile | 3 +-  
pyme/debian/changelog | 12 +++++  
pyme/gpgme.i | 19 +++---  
pyme/pyme/callbacks.py | 1 -  
pyme/pyme/core.py | 153 ++++++-----  
pyme/pyme/errors.py | 12 ++--  
pyme/pyme/util.py | 10 ++--  
pyme/pyme/version.py | 2 +-  
pyme/setup.py | 4 +-  
9 files changed, 116 insertions(+), 100 deletions(-)

commit d644383a76e9f83bc2d426628319e3c4a989dc2d  
Author: belyi <devnull@localhost>  
Date: Sat Dec 17 01:34:53 2005 +0000

Put all constants into pyme.constants package to avoid stepping on python reserved words.  
Add build rules for Mingw32 and Cygwin on Windows. Rules for Mingw under Debian are still to come.  
Fixed a small bug in pygpa.py example.

pyme/Makefile | 11 ++++++---  
pyme/examples/pygpa.py | 3 +-  
pyme/pyme/\_\_init\_\_.py | 2 +-  
pyme/pyme/constants/\_\_init\_\_.py | 3 +++  
pyme/setup.py | 42 ++++++-----  
5 files changed, 51 insertions(+), 10 deletions(-)

commit 89eb370fcaa8adc9d219eadbaa579dde7bf06329  
Author: belyi <devnull@localhost>  
Date: Mon Aug 1 03:08:32 2005 +0000

Imported changes provided by Joost van Baal:  
Use dh\_python in debian/rules and change the Section pyme belongs to from 'libs' to 'python'.



pyme/debian/control | 6 +++---  
pyme/debian/rules | 2 ++  
2 files changed, 5 insertions(+), 3 deletions(-)

commit ad76d10c2a77b45b7459c62131279e946b860891

Author: belyi <devnull@localhost>

Date: Fri Jun 10 03:01:22 2005 +0000

Update 'docs' rule in Makefile to build packages first to ensure that documentation is build for the current version of pyme and not for the installed one.

Added 'callbacks' into the list of visible pyme modules (\_\_all\_\_ var.)

Slightly updated INSTALL file.

pyme/INSTALL | 11 ++++++----  
pyme/Makefile | 4 +++-  
pyme/pyme/\_\_init\_\_.py | 2 +-  
3 files changed, 11 insertions(+), 6 deletions(-)

commit 2fe1a81e00721698bfa6850b3db2eb85e43d1724

Author: belyi <devnull@localhost>

Date: Wed Jun 8 16:16:18 2005 +0000

Update pyme documentation to remove dead links to pyme.gpgme.html and pyme.\_gpgme.html

Added reference to the installed GPGME and PyMe documentation to the head web page.

Updated Makefile to install all \*.html files and to clean \*~ files in all subdirectories

pyme-web/Makefile | 10 ++++++----  
pyme-web/doc/pyme/index.html | 8 +++-----  
pyme-web/doc/pyme/pyme.callbacks.html | 8 -----  
pyme-web/doc/pyme/pyme.core.html | 1 -  
pyme-web/doc/pyme/pyme.errors.html | 8 -----  
pyme-web/doc/pyme/pyme.html | 8 +++-----  
pyme-web/doc/pyme/pyme.util.html | 8 -----  
pyme-web/index.html | 9 ++++++---  
8 files changed, 19 insertions(+), 41 deletions(-)

commit 6aa34cce4ea0099e50b4936dfce59778157b8ca8

Author: belyi <devnull@localhost>

Date: Wed Jun 8 15:18:20 2005 +0000

Added pyme and gpgme documentation.

pyme-web/doc/gpgme/gpgme.html	251 ++++++++
pyme-web/doc/gpgme/gpgme_1.html	76 +++
pyme-web/doc/gpgme/gpgme_10.html	61 ++
pyme-web/doc/gpgme/gpgme_11.html	130 +++++
pyme-web/doc/gpgme/gpgme_12.html	82 +++
pyme-web/doc/gpgme/gpgme_13.html	130 +++++
pyme-web/doc/gpgme/gpgme_14.html	108 +++++
pyme-web/doc/gpgme/gpgme_15.html	69 +++
pyme-web/doc/gpgme/gpgme_16.html	169 ++++++
pyme-web/doc/gpgme/gpgme_17.html	63 ++
pyme-web/doc/gpgme/gpgme_18.html	63 ++
pyme-web/doc/gpgme/gpgme_19.html	66 ++
pyme-web/doc/gpgme/gpgme_2.html	79 +++
pyme-web/doc/gpgme/gpgme_20.html	120 +++++
pyme-web/doc/gpgme/gpgme_21.html	102 +++
pyme-web/doc/gpgme/gpgme_22.html	108 +++++
pyme-web/doc/gpgme/gpgme_23.html	237 ++++++++
pyme-web/doc/gpgme/gpgme_24.html	154 ++++++
pyme-web/doc/gpgme/gpgme_25.html	248 ++++++++
pyme-web/doc/gpgme/gpgme_26.html	107 +++++
pyme-web/doc/gpgme/gpgme_27.html	80 +++
pyme-web/doc/gpgme/gpgme_28.html	67 ++
pyme-web/doc/gpgme/gpgme_29.html	164 ++++++
pyme-web/doc/gpgme/gpgme_3.html	86 +++
pyme-web/doc/gpgme/gpgme_30.html	106 +++++
pyme-web/doc/gpgme/gpgme_31.html	232 ++++++++
pyme-web/doc/gpgme/gpgme_32.html	85 +++
pyme-web/doc/gpgme/gpgme_33.html	223 ++++++++
pyme-web/doc/gpgme/gpgme_34.html	83 +++
pyme-web/doc/gpgme/gpgme_35.html	70 +++
pyme-web/doc/gpgme/gpgme_36.html	63 ++
pyme-web/doc/gpgme/gpgme_37.html	66 ++
pyme-web/doc/gpgme/gpgme_38.html	86 +++
pyme-web/doc/gpgme/gpgme_39.html	79 +++
pyme-web/doc/gpgme/gpgme_4.html	83 +++
pyme-web/doc/gpgme/gpgme_40.html	89 +++
pyme-web/doc/gpgme/gpgme_41.html	99 +++
pyme-web/doc/gpgme/gpgme_42.html	144 ++++++
pyme-web/doc/gpgme/gpgme_43.html	152 ++++++
pyme-web/doc/gpgme/gpgme_44.html	112 +++++
pyme-web/doc/gpgme/gpgme_45.html	101 +++
pyme-web/doc/gpgme/gpgme_46.html	459 ++++++++
pyme-web/doc/gpgme/gpgme_47.html	292 ++++++++
pyme-web/doc/gpgme/gpgme_48.html	363 ++++++++
pyme-web/doc/gpgme/gpgme_49.html	209 ++++++
pyme-web/doc/gpgme/gpgme_5.html	74 +++
pyme-web/doc/gpgme/gpgme_50.html	88 +++
pyme-web/doc/gpgme/gpgme_51.html	208 ++++++

pyme-web/doc/gpgme/gpgme_52.html	154 +++++
pyme-web/doc/gpgme/gpgme_53.html	291 ++++++++
pyme-web/doc/gpgme/gpgme_54.html	91 +++
pyme-web/doc/gpgme/gpgme_55.html	107 +++++
pyme-web/doc/gpgme/gpgme_56.html	140 +++++
pyme-web/doc/gpgme/gpgme_57.html	106 +++++
pyme-web/doc/gpgme/gpgme_58.html	89 +++
pyme-web/doc/gpgme/gpgme_59.html	97 +++
pyme-web/doc/gpgme/gpgme_6.html	77 +++
pyme-web/doc/gpgme/gpgme_60.html	142 +++++
pyme-web/doc/gpgme/gpgme_61.html	626 ++++++
pyme-web/doc/gpgme/gpgme_62.html	107 +++++
pyme-web/doc/gpgme/gpgme_63.html	67 ++
pyme-web/doc/gpgme/gpgme_64.html	95 +++
pyme-web/doc/gpgme/gpgme_65.html	233 ++++++
pyme-web/doc/gpgme/gpgme_66.html	65 ++
pyme-web/doc/gpgme/gpgme_67.html	220 ++++++
pyme-web/doc/gpgme/gpgme_68.html	75 +++
pyme-web/doc/gpgme/gpgme_69.html	119 +++++
pyme-web/doc/gpgme/gpgme_7.html	123 +++++
pyme-web/doc/gpgme/gpgme_70.html	107 +++++
pyme-web/doc/gpgme/gpgme_71.html	218 ++++++
pyme-web/doc/gpgme/gpgme_72.html	134 +++++
pyme-web/doc/gpgme/gpgme_73.html	299 ++++++
pyme-web/doc/gpgme/gpgme_74.html	103 +++++
pyme-web/doc/gpgme/gpgme_75.html	104 +++++
pyme-web/doc/gpgme/gpgme_76.html	118 +++++
pyme-web/doc/gpgme/gpgme_77.html	95 +++
pyme-web/doc/gpgme/gpgme_78.html	71 +++
pyme-web/doc/gpgme/gpgme_79.html	686 ++++++
pyme-web/doc/gpgme/gpgme_8.html	155 +++++
pyme-web/doc/gpgme/gpgme_80.html	120 +++++
pyme-web/doc/gpgme/gpgme_81.html	278 ++++++
pyme-web/doc/gpgme/gpgme_82.html	272 ++++++
pyme-web/doc/gpgme/gpgme_83.html	180 +++++
pyme-web/doc/gpgme/gpgme_84.html	99 +++
pyme-web/doc/gpgme/gpgme_9.html	104 +++++
pyme-web/doc/gpgme/gpgme_abt.html	206 ++++++
pyme-web/doc/gpgme/gpgme_fot.html	53 ++
pyme-web/doc/gpgme/gpgme_ovr.html	68 ++
pyme-web/doc/gpgme/gpgme_toc.html	247 ++++++
pyme-web/doc/gpgme/index.html	251 ++++++
pyme-web/doc/pyme/index.html	166 +++++
pyme-web/doc/pyme/pyme.callbacks.html	50 ++
../doc/pyme/pyme.constants.data.encoding.html	48 ++
pyme-web/doc/pyme/pyme.constants.data.html	29 +
pyme-web/doc/pyme/pyme.constants.event.html	48 ++
pyme-web/doc/pyme/pyme.constants.html	39 ++

```
pyme-web/doc/pyme/pyme.constants.import.html | 49 ++
pyme-web/doc/pyme/pyme.constants.keylist.html | 29 +
pyme-web/doc/pyme/pyme.constants.keylist.mode.html | 48 ++
pyme-web/doc/pyme/pyme.constants.md.html | 58 ++
pyme-web/doc/pyme/pyme.constants.pk.html | 50 ++
pyme-web/doc/pyme/pyme.constants.protocol.html | 46 ++
pyme-web/doc/pyme/pyme.constants.sig.html | 29 +
pyme-web/doc/pyme/pyme.constants.sig.mode.html | 47 ++
pyme-web/doc/pyme/pyme.constants.sigsum.html | 55 ++
pyme-web/doc/pyme/pyme.constants.status.html | 117 ++++
pyme-web/doc/pyme/pyme.constants.validity.html | 50 ++
pyme-web/doc/pyme/pyme.core.html | 254 ++++++++
pyme-web/doc/pyme/pyme.errors.html | 90 +++
pyme-web/doc/pyme/pyme.html | 166 ++++
pyme-web/doc/pyme/pyme.util.html | 78 +++
pyme-web/doc/pyme/pyme.version.html | 37 ++
pyme-web/index.html | 6 +-
113 files changed, 14966 insertions(+), 1 deletion(-)
```

commit 2d6fe54479f042644f7b0f3d2fe35877d2056144

Author: belyi <devnull@localhost>

Date: Thu May 19 02:06:09 2005 +0000

Added INSTALL file.

```
pyme/INSTALL | 10 ++++++++
```

1 file changed, 10 insertions(+)

commit d6892fff0c3cedf41dba4c25ab8608e7f2bc039c

Author: belyi <devnull@localhost>

Date: Tue May 17 16:49:28 2005 +0000

Update copyright note on simple.py

```
pyme/examples/simple.py | 4 +++-
```

1 file changed, 2 insertions(+), 2 deletions(-)

commit c2cd9cdf5995843aad7b200b929db2969effc9d2

Author: belyi <devnull@localhost>

Date: Tue May 17 15:03:58 2005 +0000

Update simple.py to catch errors.

```
pyme/examples/simple.py | 17 ++++++++-----
```

1 file changed, 11 insertions(+), 6 deletions(-)

commit eaedae7c6a0ea993caab067efe781a59b6769c44

Author: belyi <devnull@localhost>

Date: Tue May 17 01:18:23 2005 +0000

Added 'PYTHON = python' into Makefile for bug #1199122

pyme/Makefile | 1 +  
pyme/examples/signverify.py | 1 +  
2 files changed, 2 insertions(+)

commit 56fd244bb2636a4d58629899ea3cde1d96428198

Author: belyi <devnull@localhost>

Date: Wed Apr 27 21:37:06 2005 +0000

Added pygpa example.

pyme/debian/changelog | 3 +-  
pyme/examples/pygpa.glade | 5546 +++  
pyme/examples/pygpa.py | 1459 ++++++  
3 files changed, 7007 insertions(+), 1 deletion(-)

commit 2d9a2a91a59ac3fee5410c953b7e0859e9e7cd35

Author: belyi <devnull@localhost>

Date: Thu Apr 21 15:17:51 2005 +0000

Change version to 0.7.0 due to the change in license.

pyme/debian/changelog | 2 +-  
pyme/pyme/version.py | 2 +-  
2 files changed, 2 insertions(+), 2 deletions(-)

commit 94e34e38d742f145385bd235825b6ba1e30d8339

Author: belyi <devnull@localhost>

Date: Thu Apr 21 03:53:12 2005 +0000

Changed license on PyMe from GPL to LGPL.

PyMe examples keep GPL license.

pyme/COPYING.LESSER | 510 +++  
pyme/Makefile | 20 +-  
pyme/debian/changelog | 4 +-  
pyme/debian/copyright | 22 +-  
pyme/gpgme-h-clean.py | 16 ++  
pyme/gpgme.i | 20 +-  
pyme/helpers.c | 20 +-  
pyme/helpers.h | 20 +-  
pyme/pyme/\_\_init\_\_.py | 20 +-  
pyme/pyme/callbacks.py | 20 +-  
pyme/pyme/constants/data/encoding.py | 20 +-  
pyme/pyme/constants/event.py | 20 +-

```
pyme/pyme/constants/import.py | 20 +-
pyme/pyme/constants/keylist/mode.py | 20 +-
pyme/pyme/constants/md.py | 20 +-
pyme/pyme/constants/pk.py | 20 +-
pyme/pyme/constants/protocol.py | 20 +-
pyme/pyme/constants/sig/mode.py | 20 +-
pyme/pyme/constants/sigsum.py | 20 +-
pyme/pyme/constants/status.py | 20 +-
pyme/pyme/constants/validity.py | 20 +-
pyme/pyme/core.py | 20 +-
pyme/pyme/errors.py | 20 +-
pyme/pyme/util.py | 20 +-
pyme/pyme/version.py | 22 +-
pyme/setup.py | 20 +-
26 files changed, 761 insertions(+), 233 deletions(-)
```

commit 0d8aa0f6335cb1506a37085095ed45173b099a02

Author: belyi <devnull@localhost>

Date: Tue Apr 19 01:46:06 2005 +0000

Added `__hash__` and `__eq__` methods to `GpgmeWrapper` to allow both `Context()` and `Data()` to be used as a dictionary key.

Changed `core.wait()` function to always return a tuple. On timeout now it returns `(0, None)` instead of just `None`. Plus, return context is now a `Context()` object instead of a wrapper return by underlying `gpgme`.

```
pyme/helpers.c | 1 -
pyme/pyme/core.py | 25 ++++++-----
pyme/pyme/util.py | 9 +++++++
3 files changed, 24 insertions(+), 11 deletions(-)
```

commit 63ff6d10637be1dcbcd78c939ac1ef1ac30b1024

Author: belyi <devnull@localhost>

Date: Wed Apr 6 04:58:40 2005 +0000

Made hook parameter optional in `passphrase_cb` and `progress_cb`.

Allowed `None` for callbacks to unset ones set previously.

Removed cleanup of exception in callbacks - now just retrieve the error code.

Added `prev_bad` parameter in `passphrase_cb` since it can be used in change password protocols.

Updated examples to follow new sets of arguments in callbacks

Updated `op_edit` to check if passed key is `None` (otherwise `gpgme` dumps core)

God rid of annoying warning "function declaration isn't a prototype" in `helpers.c` and `helpers.h` by changing from `()` to `(void)` list of arguments.

```
pyme/debian/changelog | 10 +++++-
pyme/examples/signverify.py | 2 +-
pyme/examples/t-edit.py | 2 +-

```

```
pyme/gpgme.i      | 18 ++++++-----
pyme/helpers.c    | 60 ++++++-----
pyme/helpers.h    | 4 +--
pyme/pyme/callbacks.py | 6 +---
pyme/pyme/core.py | 47 ++++++-----
pyme/pyme/errors.py | 2 +-
9 files changed, 96 insertions(+), 55 deletions(-)
```

commit 8f0ab8138c7aa190936376ccbff33bb09c64d6f1

Author: belyi <devnull@localhost>

Date: Thu Mar 31 23:50:59 2005 +0000

Added exception handling in passphrase\_cb and edit\_cb. If GPGMEEError exception is thrown in those callbacks it will be converted into its core representation and return as an error code to the caller. On all other exceptions error code will be GPG\_ERR\_GENERAL.

```
pyme/Makefile     | 1 +
pyme/debian/changelog | 8 ++++++
pyme/gpgme.i      | 20 ++++++-----
pyme/helpers.c    | 51 ++++++-----
pyme/helpers.h    | 3 +++
5 files changed, 71 insertions(+), 12 deletions(-)
```

commit 9903d1fb11231e7e3d920e58d1ecb674c5988b07

Author: belyi <devnull@localhost>

Date: Thu Mar 31 05:12:15 2005 +0000

Remove workaround from Context.wait() method since the bug report and patch fixing gpgme\_wait's behavior is sent to GPMGE developers already. Added errorcheck into op\_edit() so that it can report an error.

```
pyme/pyme/core.py | 10 +++++-----
1 file changed, 5 insertions(+), 5 deletions(-)
```

commit 45e8a5f4e13d3ca797ec3b0037242874a6be5562

Author: belyi <devnull@localhost>

Date: Sat Mar 26 19:44:18 2005 +0000

Updated version number to 0.6.2 in version.py  
Added examples/\*.glade files into documentation package.

```
pyme/debian/examples | 1 +
pyme/pyme/version.py | 2 +-
2 files changed, 2 insertions(+), 1 deletion(-)
```

commit 270b87bb40e180cb6e8f1de9a0e8161525ffa4ab

Author: belyi <devnull@localhost>

Date: Sat Mar 26 19:31:14 2005 +0000

Updated debian/changelog regarding PyGtkGpgKeys example and a fix in errors.

pyme/debian/changelog | 5 ++++-  
1 file changed, 4 insertions(+), 1 deletion(-)

commit ea4682009a506db91e5174ffd038fe7e4406b591

Author: belyi <devnull@localhost>

Date: Sat Mar 26 19:25:36 2005 +0000

Added handling of right mouse button click.  
Changed reporting a string instead of a number on key generation failure.

pyme/examples/PyGtkGpgKeys.glade | 2 ++  
pyme/examples/PyGtkGpgKeys.py | 30 ++++++-----  
2 files changed, 29 insertions(+), 3 deletions(-)

commit f65ad1a703d0098a3204fb8527a54d253e5847e7

Author: belyi <devnull@localhost>

Date: Sat Mar 26 18:11:11 2005 +0000

Added another column indicating if a key has a secret part.  
Automated generation of the View menu from the view field of the KeyColumn class.

pyme/examples/PyGtkGpgKeys.glade | 93 ++-----  
pyme/examples/PyGtkGpgKeys.py | 74 ++++++-----  
2 files changed, 44 insertions(+), 123 deletions(-)

commit b54e83a7a7a5785502f3c7e8b95f15e23b40e65a

Author: belyi <devnull@localhost>

Date: Sat Mar 26 16:45:13 2005 +0000

Small change to the way gtk.TreeModel object is used.

pyme/examples/PyGtkGpgKeys.py | 21 ++++++-----  
1 file changed, 10 insertions(+), 11 deletions(-)

commit 7078db75cef4c1fd70cf03e37172bdb4f933fd1b

Author: belyi <devnull@localhost>

Date: Fri Mar 25 23:33:06 2005 +0000

Use more comprehensible error reporting since gpgme\_strerror\_r returns None all the time.

pyme/pyme/errors.py | 6 +++---  
1 file changed, 3 insertions(+), 3 deletions(-)



commit 151213f4344d9984975721440af07de09e3df61c

Author: belyi <devnull@localhost>

Date: Fri Mar 25 04:30:17 2005 +0000

Improved PyGtkGpgKeys example to manage owner\_trust on keys.  
Added another example inter-edit.py which is just a helper to write  
scripts for Context.op\_edit() command.

```
pyme/examples/PyGtkGpgKeys.glade | 78 ++++++
pyme/examples/PyGtkGpgKeys.py   | 68 ++++++
pyme/examples/inter-edit.py     | 54 ++++++
pyme/examples/t-edit.py         | 18 ++++++
4 files changed, 212 insertions(+), 6 deletions(-)
```

commit fc7235af217bcee5231ce7fbd7f234712d5ad3b0

Author: belyi <devnull@localhost>

Date: Fri Mar 25 00:30:39 2005 +0000

Updated PyGtkGpgKeys example to include import, export and reload  
functionality. Also added ability to remove number of keys simultaneously.  
Rearranged how KeyColumn is used to avoid unnecessary sorts and duplication  
of information in different parts of the code.

```
pyme/examples/PyGtkGpgKeys.glade | 86 ++++++
pyme/examples/PyGtkGpgKeys.py   | 332 ++++++
2 files changed, 325 insertions(+), 93 deletions(-)
```

commit 9f65749ccb1b7cab562e19c03f4371d5f7d94912

Author: belyi <devnull@localhost>

Date: Thu Mar 24 05:51:03 2005 +0000

Added example of PyGTK+ and PyMe integration.  
For now it does only simple things - listing, deleting, and generating keys.

```
pyme/examples/PyGtkGpgKeys.glade | 1321 ++++++
pyme/examples/PyGtkGpgKeys.gladep | 8 +
pyme/examples/PyGtkGpgKeys.py     | 424 ++++++
3 files changed, 1753 insertions(+)
```

commit 59e23f32c3b46413c9ec09e23e1a385a110fb103

Author: belyi <devnull@localhost>

Date: Thu Mar 24 05:44:58 2005 +0000

Added wait method Context class which handles asynchronous calls a little  
bit better than the one generated by SWIG.

```
pyme/debian/changelog | 7 ++++++
```

```
pyme/gpgme.i      | 1 +
pyme/pyme/core.py | 40 ++++++
3 files changed, 48 insertions(+)
```

commit 4c1b5259e4985df2cba0ae4fc09f12cd94603a75

Author: belyi <devnull@localhost>

Date: Tue Mar 22 18:29:31 2005 +0000

Added correct handling of Context.op\_edit() method.  
Added example/t-edit.py showing usage for this method.  
Output of this example should match output of the tests/gpg/t-edit  
from the GPGME test suite.  
Remove unused static function from helpers.c

```
pyme/examples/t-edit.py | 38 ++++++
pyme/gpgme.i           | 36 ++++++
pyme/helpers.c         | 36 -----
pyme/pyme/core.py      | 5 ++++-
4 files changed, 78 insertions(+), 37 deletions(-)
```

commit dc587e215283bfef2dd594f86a7b2945f74f5155

Author: belyi <devnull@localhost>

Date: Sat Mar 19 01:43:59 2005 +0000

Update changelog to include note about deprecated function in 0.6.1 release

```
pyme/debian/changelog | 3 +-
pyme/examples/encrypt-to-all.py | 3 +-
2 files changed, 3 insertions(+), 3 deletions(-)
```

commit 86de4b3ad777f980ccf7ba3462c85bbe1787d1fd

Author: belyi <devnull@localhost>

Date: Sat Mar 19 01:40:07 2005 +0000

Remove deprecated functions from helpers.[ch]  
Use gpgme-h-clean.py to remove deprecated functions and typedefs from  
the GPGME header file. This will reduce the number of unused methods.

```
pyme/Makefile      | 4 +++-
pyme/gpgme-h-clean.py | 26 ++++++
pyme/helpers.c     | 8 -----
pyme/helpers.h     | 2 --
4 files changed, 28 insertions(+), 12 deletions(-)
```

commit 2483efcbd0d73c628c4d7717928a766c3b58f0aa

Author: belyi <devnull@localhost>

Date: Fri Mar 18 22:15:52 2005 +0000

Update copyright and author values in pyme/version.py  
Create rules to build distribution files - one full and one without  
debian bits.

```
pyme/Makefile      | 28 ++++++-----  
pyme/pyme/version.py | 12 ++++++-----  
2 files changed, 28 insertions(+), 12 deletions(-)
```

commit 168593285380f5a7805f3dd08657d429a72d3621

Author: belyi <devnull@localhost>

Date: Fri Mar 18 19:09:33 2005 +0000

Added package building for python2.4

Updated copyright notes to include myself and avoid confusion who's the  
maintainer. In John's own words: "I'd prefer to just step out of the picture".  
Jonh's copyright notice left intact.

```
pyme/Makefile          | 6 +++--  
pyme/debian/changelog  | 7 ++++++  
pyme/debian/control    | 30 ++++++-----  
pyme/debian/copyright  | 10 ++++++-----  
pyme/debian/rules      | 4 +++++  
pyme/debian/setup.cfg-2.4 | 8 ++++++  
pyme/examples/genkey.py | 4 +++-  
pyme/gpgme.i           | 4 +++-  
pyme/helpers.c         | 4 +++-  
pyme/helpers.h         | 4 +++-  
pyme/pyme/__init__.py  | 4 +++-  
pyme/pyme/callbacks.py | 4 +++-  
pyme/pyme/constants/data/encoding.py | 4 +++-  
pyme/pyme/constants/event.py | 4 +++-  
pyme/pyme/constants/import.py | 4 +++-  
pyme/pyme/constants/keylist/mode.py | 4 +++-  
pyme/pyme/constants/md.py | 4 +++-  
pyme/pyme/constants/pk.py | 4 +++-  
pyme/pyme/constants/protocol.py | 4 +++-  
pyme/pyme/constants/sig/mode.py | 4 +++-  
pyme/pyme/constants/sigsum.py | 4 +++-  
pyme/pyme/constants/status.py | 4 +++-  
pyme/pyme/constants/validity.py | 4 +++-  
pyme/pyme/core.py      | 4 +++-  
pyme/pyme/errors.py    | 4 +++-  
pyme/pyme/util.py      | 4 +++-  
pyme/pyme/version.py   | 2 +-  
pyme/setup.py          | 3 +-  
28 files changed, 96 insertions(+), 54 deletions(-)
```

commit 6dbbb252771133724b2879ed6d767cd708196dae

Author: belyi <devnull@localhost>

Date: Fri Mar 18 18:04:35 2005 +0000

Remove the note about gpgme.i to be generated - it's been the primary source for some time.

pyme/gpgme.i | 6 -----

1 file changed, 6 deletions(-)

commit 9d449fa4889c6bda6d14583c0625b8d5c4ffe759

Author: belyi <devnull@localhost>

Date: Fri May 7 18:31:22 2004 +0000

Added my copyright in genkey.py since there's enough changes made.  
Updated signverify to use only keys generated by genkey.py, to check that keys added to singers are able to sign and to check that the list of signers is not empty. The last check is necessary to prevent signing with the key of the user running signverify.py script.  
Added delkey.py script to delete keys generated by genkey.py  
Added exportimport.py example for key export/import.

pyme/examples/delkey.py | 29 ++++++

pyme/examples/exportimport.py | 76 ++++++

pyme/examples/genkey.py | 6 ++-

pyme/examples/signverify.py | 18 +++++-

4 files changed, 119 insertions(+), 10 deletions(-)

commit df98c8d28245ad2c14b0ab50fc8f8932853bec8b

Author: belyi <devnull@localhost>

Date: Tue May 4 17:34:15 2004 +0000

Added examples/signverify.py for unattended sing/verify.  
Updated examples/genkey.py to work correctly.  
Updated gpgme.i to allow None as a value for gpgme\_data\_t

pyme/examples/genkey.py | 14 +++-----

pyme/examples/signverify.py | 72 ++++++

pyme/gpgme.i | 21 +++++-

3 files changed, 87 insertions(+), 20 deletions(-)

commit ba45931abf530ab89ead46d7233ff1b62b629a18

Author: belyi <devnull@localhost>

Date: Thu Apr 8 16:15:09 2004 +0000

Ensure that we support only python2.2 and up. :-)  
Use generators in core.Context class which makes pyme.aux obsolete  
Remove importing future nested\_scopes since they are standard starting

with python2.2

```
pyme/pyme/___init___py | 5 +++-  
pyme/pyme/aux.py      | 56 -----  
pyme/pyme/core.py     | 15 ++++++++  
pyme/pyme/errors.py  | 1 -  
pyme/pyme/util.py    | 2 +-  
5 files changed, 15 insertions(+), 64 deletions(-)
```

commit 4e9be5a55ecffa4da7ad5c192cc892eddaaa9586  
Author: belyi <devnull@localhost>  
Date: Sun Mar 21 03:53:30 2004 +0000

Small change to index.html  
Added clean: rule to the Makefile

```
pyme-web/Makefile    | 3 +++  
pyme-web/index.html | 6 +++-  
2 files changed, 6 insertions(+), 3 deletions(-)
```

commit 2efb95176f4edf56ed61c9ac0c3aa09c56534df0  
Author: belyi <devnull@localhost>  
Date: Sun Mar 21 03:00:32 2004 +0000

Added Makefile rules for pyme module installation.

```
pyme/Makefile | 5 ++++  
1 file changed, 4 insertions(+), 1 deletion(-)
```

commit 2b83d5d8b513029cc3e54f2fa502ccc85618104b  
Author: belyi <devnull@localhost>  
Date: Sun Mar 21 02:29:54 2004 +0000

Decorative change.

```
pyme/pyme/aux.py | 2 +-  
1 file changed, 1 insertion(+), 1 deletion(-)
```

commit e3478015d763a036c1d806ae01433fce59712204  
Author: belyi <devnull@localhost>  
Date: Sun Mar 21 02:25:55 2004 +0000

Added RCS Id: tags

```
pyme/Makefile          | 1 +  
pyme/examples/encrypt-to-all.py | 3 +-  
pyme/examples/genkey.py | 3 +-  
pyme/examples/sign.py   | 3 +-
```

```

pyme/examples/simple.py      | 3 +-
pyme/gpgme.i                | 1 +
pyme/helpers.c              | 1 +
pyme/helpers.h              | 1 +
pyme/pyme/__init__.py       | 1 +
pyme/pyme/aux.py            | 1 +
pyme/pyme/callbacks.py      | 1 +
pyme/pyme/constants/__init__.py | 2 ++
pyme/pyme/constants/data/__init__.py | 2 ++
pyme/pyme/constants/data/encoding.py | 1 +
pyme/pyme/constants/event.py | 1 +
pyme/pyme/constants/import.py | 1 +
pyme/pyme/constants/keylist/__init__.py | 2 ++
pyme/pyme/constants/keylist/mode.py | 1 +
pyme/pyme/constants/md.py   | 1 +
pyme/pyme/constants/pk.py   | 1 +
pyme/pyme/constants/protocol.py | 1 +
pyme/pyme/constants/sig/__init__.py | 2 ++
pyme/pyme/constants/sig/mode.py | 1 +
pyme/pyme/constants/sigsum.py | 1 +
pyme/pyme/constants/status.py | 1 +
pyme/pyme/constants/validity.py | 1 +
pyme/pyme/core.py           | 1 +
pyme/pyme/errors.py         | 1 +
pyme/pyme/util.py           | 1 +
pyme/pyme/version.py        | 2 ++
30 files changed, 39 insertions(+), 4 deletions(-)

```

commit b3b3712645332c5bc3e8d9d557aab21d48ff0f86

Author: belyi <devnull@localhost>

Date: Sun Mar 21 02:07:36 2004 +0000

Added Id: RCS tags to all files.

```

pyme-web/Makefile | 2 ++
pyme-web/index.html | 3 +-
2 files changed, 4 insertions(+), 1 deletion(-)

```

commit 6aea2426beaaa8c43e6f2310a37a2737c0c3a1b5

Author: belyi <devnull@localhost>

Date: Sun Mar 21 01:50:55 2004 +0000

Update example on the init pyme.html page to match simple.py example.  
 Fix core.py to use getcode() instead of getvalue() method of the exception.

```

pyme/pyme/__init__.py | 22 ++++++-----
pyme/pyme/core.py     | 4 +---
2 files changed, 16 insertions(+), 10 deletions(-)

```

commit dee337455ffd624d3f83e1c159c4bb2cefc692c9  
Author: belyi <devnull@localhost>  
Date: Sat Mar 20 20:32:29 2004 +0000

Added Makefile to simplify publishing web files.

pyme-web/Makefile | 7 +++++++  
1 file changed, 7 insertions(+)

commit af7129baa8260697d85c2ddb434562e8a80b62d8  
Author: belyi <devnull@localhost>  
Date: Sat Mar 20 20:15:53 2004 +0000

Added minimum of formatting and SF icon.

pyme-web/index.html | 18 ++++++++-----  
1 file changed, 11 insertions(+), 7 deletions(-)

commit 2e64dcfb99cee796b51667b04d8961e390edde87  
Author: belyi <devnull@localhost>  
Date: Sat Mar 20 18:30:09 2004 +0000

Initial revision

pyme-web/index.html | 33 ++++++++  
1 file changed, 33 insertions(+)

commit 1c51644b3d0b6611422d971758e35f303d2ad5df  
Author: belyi <devnull@localhost>  
Date: Sat Mar 20 05:10:46 2004 +0000

Update examples and package information on the initial pyme doc page.

pyme/pyme/\_\_init\_\_.py | 27 ++++++++-----  
1 file changed, 12 insertions(+), 15 deletions(-)

commit b2d31b0bfbffdf5247d6db4e3c95140cc1b1f19  
Author: belyi <devnull@localhost>  
Date: Sat Mar 20 04:47:42 2004 +0000

Deleted unnecessary files.

Updated debian/control to remove dependency on python-xml package since there's none now.

Move example files from 'doc' into separate control file.

Update debian/rules to build documentation from \*.py files and to exclude CVS directories from the installation.

```
pyme/Makefile          | 26 ++-----
pyme/debian/control    | 8 +-
pyme/debian/docs       | 1 -
pyme/debian/ex.package.doc-base | 22 -----
pyme/debian/examples   | 1 +
pyme/debian/manpage.1.ex | 60 -----
pyme/debian/manpage.sgml.ex | 152 -----
pyme/debian/rules      | 12 +++
8 files changed, 15 insertions(+), 267 deletions(-)
```

commit 1b517dd9b82a433499b4696b06d94d756cd36e53

Author: belyi <devnull@localhost>

Date: Sat Mar 20 02:59:15 2004 +0000

Remove doc/gpgme directory containing GPGME documentation since this belongs to a different project. Need to add reference in our documentation.

```
pyme/doc/gpgme/fdl.texi | 402 -----
pyme/doc/gpgme/gpgme.texi | 3372 -----
pyme/doc/gpgme/gpl.texi | 397 -----
pyme/doc/gpgme/version.texi | 4 -
4 files changed, 4175 deletions(-)
```

commit 95d7d171da115a0fedfe2a4a7e5acc8aa408f673

Author: belyi <devnull@localhost>

Date: Sat Mar 20 02:45:03 2004 +0000

Change debian/rules to generate files by swig during build and to cleanup those files on 'clean' rule.  
Plus, leave generated gpgme\_wrap.c in the root directory instead of moving it into subdirectory 'generated'.

```
pyme/Makefile | 8 +++-----
pyme/debian/rules | 3 +-
pyme/setup.py | 2 +-
3 files changed, 6 insertions(+), 7 deletions(-)
```

commit 545b3d90d445c5c78e8d72b2c1780863e02c789a

Author: belyi <devnull@localhost>

Date: Sat Mar 20 02:18:01 2004 +0000

Initial revision

```
pyme/COPYING          | 340 ++++
pyme/ChangeLog        | 802 ++++++++
pyme/Makefile         | 79 +
pyme/debian/README.Debian | 6 +
pyme/debian/changelog | 19 +
```



pyme/debian/control	68 +
pyme/debian/copyright	27 +
pyme/debian/dirs	2 +
pyme/debian/docs	2 +
pyme/debian/ex.package.doc-base	22 +
pyme/debian/manpage.1.ex	60 +
pyme/debian/manpage.sgml.ex	152 ++
pyme/debian/postinst.ex	48 +
pyme/debian/postrm.ex	38 +
pyme/debian/preinst.ex	44 +
pyme/debian/prerm.ex	39 +
pyme/debian/rules	130 ++
pyme/debian/setup.cfg-2.2	8 +
pyme/debian/setup.cfg-2.3	8 +
pyme/doc/gpgme/fdl.texi	402 ++++
pyme/doc/gpgme/gpgme.texi	3372 ++++++
pyme/doc/gpgme/gpl.texi	397 ++++
pyme/doc/gpgme/version.texi	4 +
pyme/examples/encrypt-to-all.py	63 +
pyme/examples/genkey.py	55 +
pyme/examples/sign.py	28 +
pyme/examples/simple.py	44 +
pyme/gpgme.i	191 ++
pyme/helpers.c	139 ++
pyme/helpers.h	29 +
pyme/pyme/__init__.py	134 ++
pyme/pyme/aux.py	55 +
pyme/pyme/callbacks.py	45 +
pyme/pyme/constants/__init__.py	2 +
pyme/pyme/constants/data/__init__.py	2 +
pyme/pyme/constants/data/encoding.py	19 +
pyme/pyme/constants/event.py	19 +
pyme/pyme/constants/import.py	19 +
pyme/pyme/constants/keylist/__init__.py	2 +
pyme/pyme/constants/keylist/mode.py	19 +
pyme/pyme/constants/md.py	19 +
pyme/pyme/constants/pk.py	19 +
pyme/pyme/constants/protocol.py	19 +
pyme/pyme/constants/sig/__init__.py	2 +
pyme/pyme/constants/sig/mode.py	19 +
pyme/pyme/constants/sigsum.py	19 +
pyme/pyme/constants/status.py	19 +
pyme/pyme/constants/validity.py	19 +
pyme/pyme/core.py	367 ++++
pyme/pyme/errors.py	46 +
pyme/pyme/util.py	61 +
pyme/pyme/version.py	39 +
pyme/setup.py	60 +

53 files changed, 7642 insertions(+)

commit a3d5a442dc713b6c4d6fc4134db5b47e379dc41d

Author: root <devnull@localhost>

Date: Fri Mar 19 14:12:30 2004 +0000

initial checkin

```
CVSROOT/checkoutlist | 13 ++++++
CVSROOT/commitinfo  | 15 ++++++
CVSROOT/config       | 21 ++++++
CVSROOT/cvswrappers | 19 ++++++
CVSROOT/editinfo     | 21 ++++++
CVSROOT/loginfo     | 26 ++++++
CVSROOT/modules     | 26 ++++++
CVSROOT/notify      | 12 ++++++
CVSROOT/rcsinfo     | 13 ++++++
CVSROOT/taginfo     | 20 ++++++
CVSROOT/verifysmsg  | 21 ++++++
```

11 files changed, 207 insertions(+)

```
\input texinfo @c -*- texinfo -*-
@c %**start of header
@setfilename short-history.info
@settitle A Short History of the GPGME bindings for Python
@documentencoding utf-8
@documentlanguage en
@c %**end of header
```

```
@finalout
@titlepage
@title A Short History of the GPGME bindings for Python
@author Ben McGinnes
@end titlepage
```

```
@contents
```

```
@ifnottex
@node Top
@top A Short History of the GPGME bindings for Python
@end ifnottex
```

```
@menu
* Overview::
* Relics of the past::
```

```
@detailmenu
--- The Detailed Node Listing ---
```

## Overview

- \* In the beginning::
- \* Keeping the flame alive::
- \* Passing the torch::
- \* Coming full circle::

## Relics of the past

- \* The Annoyances of Git::
- \* The Perils of PyPI::

## The Perils of PyPI

- \* GPG 180 - Python bindings for GPGME GnuPG cryptography library::
- \* PyME 090 - Python support for GPGME GnuPG cryptography library::

@end detailmenu

@end menu

@node Overview

@chapter Overview

@multitable {aaaaaaaaaaaaaaaa} {aa}

@item Version:

@tab 0.0.1

@item GPGME Version:

@tab 1.13.0

@item Author:

@tab Ben McGinnes <ben@@gnupg.org>

@item Author GPG Key:

@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D

@item Language:

@tab Australian English, British English

@item xml:lang:

@tab en-AU, en-GB, en

@end multitable

The GPGME Python bindings passed through many hands and numerous phases before, after a fifteen year journey, coming full circle to return to the source. This is a short explanation of that journey.

@menu

- \* In the beginning::
- \* Keeping the flame alive::
- \* Passing the torch::
- \* Coming full circle::

@end menu

@node In the beginning

@section In the beginning

In 2002 John Goerzen released PyME; Python bindings for the GPGME module which utilised the current release of Python of the time and SWIG. @footnote{In all likelihood this would have been Python 2.2 or possibly Python 2.3.} Shortly after creating it and ensuring it worked he stopped supporting it, though he left his work available on his Gopher site.

@node Keeping the flame alive

@section Keeping the flame alive

A couple of years later the project was picked up by Igor Belyi and actively developed and maintained by him from 2004 to 2008. Igor's whereabouts at the time of this document's creation are unknown, but the current authors do hope he is well. We're assuming (or hoping) that life did what life does and made continuing untenable.

@node Passing the torch

@section Passing the torch

In 2014 Martin Albrecht wanted to patch a bug in the PyME code and discovered the absence of Igor. Following a discussion on the PyME mailing list he became the new maintainer for PyME, releasing version 0.9.0 in May of that year. He remains the maintainer of the original PyME release in Python 2.6 and 2.7 (available via PyPI).

@node Coming full circle

@section Coming full circle

In 2015 Ben McGinnes approached Martin about a Python 3 version, while investigating how complex a task this would be the task ended up being completed. A subsequent discussion with Werner Koch led to the decision to fold the Python 3 port back into the original GPGME release in the languages subdirectory for non-C bindings under the module name of @samp{pyme3}.

In 2016 this PyME module was integrated back into the GPGME project by Justus Winter. During the course of this work Justus adjusted the port to restore limited support for Python 2, but not as many minor point releases as the original PyME package supports. During the course of this integration the package was renamed to more accurately reflect its status as a component of GPGME. The @samp{pyme3} module was renamed to @samp{gpg} and adopted by the upstream GnuPG team.

In 2017 Justus departed G10code and the GnuPG team. Following this Ben returned to maintain of gpgme Python bindings and continue building them from that point.

@node Relics of the past  
@chapter Relics of the past

There are a few things, in addition to code specific factors, such as SWIG itself, which are worth noting here.

@menu  
\* The Annoyances of Git::  
\* The Perils of PyPI::  
@end menu

@node The Annoyances of Git  
@section The Annoyances of Git

As anyone who has ever worked with git knows, submodules are horrible way to deal with pretty much anything. In the interests of avoiding migraines, that was skipped with addition of the PyME code to GPGME.

Instead the files were added to a subdirectory of the @samp{lang/} directory, along with a copy of the entire git log up to that point as a separate file within the @samp{lang/python/docs/} directory. @footnote{The entire PyME git log and other preceding VCS logs are located in the @samp{gpgme/lang/python/docs/old-commits.log} file.} As the log for PyME is nearly 100KB and the log for GPGME is approximately 1MB, this would cause considerable bloat, as well as some confusion, should the two be merged.

Hence the unfortunate, but necessary, step to simply move the files. A regular repository version has been maintained should it be possible to implement this better in the future.

@node The Perils of PyPI  
@section The Perils of PyPI

The early port of the Python 2 @samp{pyme} module as @samp{pyme3} was never added to PyPI while the focus remained on development and testing during 2015 and early 2016. Later in 2016, however, when Justus completed his major integration work and subsequently renamed the module from @samp{pyme3} to @samp{gpg}, some prior releases were also provided through PyPI.

Since these bindings require a matching release of the GPGME libraries in order to function, it was determined that there was

little benefit in also providing a copy through PyPI since anyone obtaining the GPGME source code would obtain the Python bindings source code at the same time. Whereas there was the potential to sew confusion amongst Python users installing the module from PyPI, only to discover that without the relevant C files, header files or SWIG compiled binaries, the Python module did them little good.

There are only two files on PyPI which might turn up in a search for this module or a sample of its content:

```
@enumerate
```

```
@item
```

```
gpg (1.8.0) - Python bindings for GPGME GnuPG cryptography library
```

```
@item
```

```
pyme (0.9.0) - Python support for GPGME GnuPG cryptography library
```

```
@end enumerate
```

```
@menu
```

```
* GPG 180 - Python bindings for GPGME GnuPG cryptography library::
```

```
* PyME 090 - Python support for GPGME GnuPG cryptography library::
```

```
@end menu
```

```
@node GPG 180 - Python bindings for GPGME GnuPG cryptography library
```

```
@subsection GPG 180 - Python bindings for GPGME GnuPG cryptography library
```

This is the most recent version to reach PyPI and is the version of the official Python bindings which shipped with GPGME 1.8.0. If you have GPGME 1.8.0 installed and `@emph{only}` 1.8.0 installed, then it is probably safe to use this copy from PyPI.

As there have been a lot of changes since the release of GPGME 1.8.0, the GnuPG Project recommends not using this version of the module and instead installing the current version of GPGME along with the Python bindings included with that package.

```
@node PyME 090 - Python support for GPGME GnuPG cryptography library
```

```
@subsection PyME 090 - Python support for GPGME GnuPG cryptography library
```

This is the last release of the PyME bindings maintained by Martin Albrecht and is only compatible with Python 2, it will not work with Python 3. This is the version of the software from which the port from Python 2 to Python 3 code was made in 2015.

Users of the more recent Python bindings will recognise numerous points of similarity, but also significant differences. It is likely that the more recent official bindings will feel "more pythonic."

For those using Python 2, there is essentially no harm in using this module, but it may lack a number of more recent features added to GPGME.

```
@bye
# -*- mode: org -*-
#+TITLE: GNU Privacy Guard (GnuPG) Made Easy Python Bindings
#+AUTHOR: Ben McGinnes
#+LATEX_COMPILER: xelatex
#+LATEX_CLASS: article
#+LATEX_CLASS_OPTIONS: [12pt]
#+LATEX_HEADER: \usepackage{xltextra}
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
#+LATEX_HEADER: \author{Ben McGinnes <ben@gnupg.org>}
```

\* GPGME Python Bindings

```
:PROPERTIES:
:CUSTOM_ID: top
:END:
```

\*\* Contents

```
:PROPERTIES:
:CUSTOM_ID: contents
:END:
```

```
- [[file:short-history][A short history of the project]]
- [[file:what-is-new][What's New]]
- [[file:maintenance-mode][Maintenance Mode]] (from January, 2019)
- [[file:what-was-new][What Was New]]
- [[file:pgpme-python-howto][GPGME Python Bindings HOWTO]]
-----BEGIN PGP PUBLIC KEY BLOCK-----
```

```
mQENBFrsKEkBCADKw4Wt8J6M/88qD8PO6lSMCxH1cpwH8iK0uPaFFYsJkkXo7kWf
PTAtrV+REqF/o80dvYcdLvRsV21pvncZz/HXLu1yQ18mC3XObrKokbdgrTTKA5XE
BZkNsqyaMMJauT18H4hYkSg62/tTdO1cu/zWv/LFf7Xyn6+uA74ovXCJIO1s0N2c
PSht98QRzPMf2owgVk37JnDNp4gGVDGHxSZOuUwxgYAZYnA8SFc+c+3ZrQfY870
+O4j3Mz4p7yD13AwP4buQLBsb/icxekeQCqpRJhLH9f7MdEcGXa1x36RcEkHdu+M
yJ392eMgD+dKNfRCyTPhjZTxvbNELIBYICfABEBAAG0EHRlc3RAZXhhbXBsZS5v
cmeJAVQEEwEIAAD4WIQTUFzW5Ejb9uIEEjFojAWNe7/DLBQUCWuwoSQIbAwUJA8Jn
AAULCQgHAgYVCgkICwIEFgIDAQIeAQIXgAAKCRajAWNe7/DLBf9kB/wOQ/S60HGw
Fq07W9N01HWULyhHKoMmcHL6rfZ64oDqLxolPSasz7WAMW1jN4qtWJ0mFzwO83V6
kaBe+wF6Kqir6udFSBW9rPcFg6/VZXPltT0a6uacIHq6DyQ5iMW4YQWbVY9OR2rN
GkYo1JCBR0XdRjYCSX3yB4TWv/eXnZ37/WjmiTOIZh35rjs+NuU/S5JPDfAp2/k7
0DevQeBsv+UjVXjWpNTZmPbvDnd995uSmC6UY4hzyP84ORYMYn9n1QAR0goxDN6U
```

unOf9Rlp1oMzdxMool/d1MICxg2h3jheuhv7lgUF4KpvHOuEPXQ7UO417E0TYcDZ  
1J8Nsv87SZeEuQENBFrsKEkBCADjoEBhg/QPqZHg8VyoD1xYRAWGxyDJkX/GrSs6  
yE+x2hk5FoQCajxKa/d4AVxOnJpdwhAfeXeSNaql5Ejgaz+Tdj9BV6vtGVJVv0p  
O7bgAiZxkA6RHxtNqhpPnPQoXvUzkzpRgpuL+Nj4yIg7z1ITH6KQH4u5SI9vd+j/  
8i9Taz67pdZwuJjac8qBuJHjzAo1bjYctFYUSG5pbmMQyNLySzgiNkFa4DajODlt  
3RuqVGP316Fk+Sy2+60tC/HIX8jgMyMONfOGBQx6jk8tvAphS/LAqrrNepnagIyL  
UGKU+L8cB2g1PGGp2biBFWqZbudZoyRBet/0yH/zirBdQJw1ABEBAAGJATwEGAEI  
ACYWIQTUFzW5Ejb9uIIEjFojAWNe7/DLBQUCWuwoSQIbDAUJA8JnAAAKCRAjAWNe  
7/DLBf0pCACPP5hBuUWngu2Hqvg+tNiujsiYzId3MffFxEk3CbXeHcJ5F32NDJ9  
PYCnra4L8wSv+NZt9gIa8IFwoFSFQCjzH7KE86XcV3MhfdJTnb/+9CR7Jq3e/4Iy  
0N5ip7PNYMCyakcAsxvsNCJKrSaDuYe/OAoTXRBtgRWE2uyT315em02Lkr+2Cc/Q  
k6H+vlNOHGRgnpl/OZZjnUuUfBUvMGHr1phW+y7aeymC9PnUGdViRdJe23nntMSD  
A+0/I7ESO9JsWvJbyBmuiZpu9JjScOjYH9xpQLqRNYw4WHpZriN69F0t9Mmd7bM1  
+UyPgbPEr0iWMeyctYsuOLeUyQKMscDT  
=QyY6

-----END PGP PUBLIC KEY BLOCK-----

\input texinfo @c \*- texinfo \*-

@c %\*\*start of header

@setfilename what-is-new.info

@settitle What's New in the GPGME Python Bindings and Documentation

@documentencoding utf-8

@documentlanguage en

@c %\*\*end of header

@finalout

@titlepage

@title What's New in the GPGME Python Bindings and Documentation

@author Ben McGinnes

@end titlepage

@contents

@ifnottex

@node Top

@top What's New in the GPGME Python Bindings and Documentation

@end ifnottex

@menu

\* What's New::

@detailmenu

--- The Detailed Node Listing ---

What's New

\* New in GPGME 1130::

@end detailmenu



@end menu

@node What's New

@chapter What's New

@multitable {aaaaaaaaaaaaaaaa} {aa}

@item Version:

@tab 0.0.1

@item GPGME Version:

@tab 1.13.0

@item Author:

@tab Ben McGinnes <ben@gnupg.org>

@item Author GPG Key:

@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D

@item Language:

@tab Australian English, British English

@item xml:lang:

@tab en-AU, en-GB, en

@end multitable

Last time the most obviously new thing was adding the @emph{What's New} section to the HOWTO. Now it's moving it out of the HOWTO.

@menu

\* New in GPGME 1130::

@end menu

@node New in GPGME 1130

@section New in GPGME 1130

Additions since GPGME 1.12.0 include:

@itemize

@item

Moving the @emph{What's New} section out of the basic @uref{gpgme-python-howto.org, HOWTO} document and into its own file so as to more readily include other documents beyond that HOWTO.

@item

Moving the preceding, archival, segments into @uref{what-was-new.org, another file}.

@item

Added @samp{gpg.version.versionintlist} to make it easier for Python developers to check for a specific version number, even with beta versions (it will drop the "-betaN" part).

@item

Added expanded detail on issues pertaining to installing for Windows users.

@item

Bindings enter `@uref{maintenance-mode, maintenance mode}` from January, 2019.

@item

Added documentation on maintenance mode and what changes can be made to the code when in that status. Essentially that boils down to bug fixes only and no feature requests.

@item

The `import-keys-hkp.py` example script, which uses the `@samp{hkp4py}` module to search the SKS servers for a key, has been tightened up to search for both hexadecimal key IDs and user ID strings with reduced chance of unnecessary repetition. There may still be some repetition if a key includes a user ID matching the hexadecimal value of a key ID.

@end itemize

@bye

Using `gpgme.js`

-----

At first, make sure that the environment you want to use `gpgme.js` in has access and permissions for `nativeMessaging`, and `gpgme-json` installed. For details, see the `README`.

The library itself is started via the `{ @link init }` method. This will test the `nativeMessaging` connection, and then resolve into an Object offering the top level API:

```
* [encrypt]{ @link GpgME#encrypt}
* [decrypt]{ @link GpgME#decrypt}
* [sign]{ @link GpgME#sign}
* [verify]{ @link GpgME#verify}
* [Keyring]{ @link GPGME_Keyring}
```

...

```
gpgmejs.init()
  .then(function(GPGME) {
    // using GPGME
  }, function(error){
    // error handling;
  })

```

...

All methods that require communication with `nativeMessaging` are asynchronous, using Promises. Rejections will be instances of `{ @link GPGME_Error }`.

An exception are Keys, which can be initialized in a 'sync' mode, allowing them to be cached and used synchronously until manually refreshed.

Keyring and Keys

-----

The gnupg keys can be accessed via the [Keyring]{ @link GPGME\_Keyring}.

The Keyring offers the methods for accessing information on all Keys known to gnupg.

**\*\*Due to security constraints, the javascript-binding currently only offers limited support for secret-Key interaction.\*\***

The existence of secret Keys is not secret, and those secret Keys can be used for signing, but Operations that may expose, modify or delete secret Keys are not supported.

- \* [getKeysArmored]{ @link GPGME\_Keyring#getKeysArmored }
- \* [getKeys]{ @link GPGME\_Keyring#getKeys }
- \* [getDefaultKey]{ @link GPGME\_Keyring#getDefaultKey }
- \* [generateKey]{ @link GPGME\_Keyring#generateKey }
- \* [deleteKey]{ @link GPGME\_Keyring#deleteKey }

For a list of the authors of the source code of GPGME, please see the file AUTHORS. The following people supported GPGME development in various ways (for example by finding bugs or giving advice), and we want to thank them for their help. If we forgot you, please let us know.

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WITHOUT ANY WARRANTY, to the extent permitted by law; without even the  
implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

```
(21:protected-private-key(3:elg(1:p129:W#} }1;;m>
;4YV$Qg
LoLy~*Tru*+ID8"-9,:17^g*({ #7)(1:g1:)(1:y128:2o62,Tj/
rRi3sSS iCAYNYbVtAHKi7(UPp)?Od{ 'R^f)(9:protected25:openpgp-s2k3-sha1-aes-
cbc((4:sha18:fw`E7:5242880)16:aqR)192:5f1a-`{^EV699WoB\,:Rs1*W6Lu iZ
:=ZqURM47;pA3#DL
so8O)Th^P@IP0&.DR;"rkN7)(12:protected-at15:20101008T070216)))
;;; gpgme-grovel.lisp
```

;;; This file is part of GPGME-CL.

;;;

;;; GPGME-CL is free software; you can redistribute it and/or modify it  
;;; under the terms of the GNU General Public License as published by  
;;; the Free Software Foundation; either version 2 of the License, or  
;;; (at your option) any later version.

;;;

;;; GPGME-CL is distributed in the hope that it will be useful, but  
;;; WITHOUT ANY WARRANTY; without even the implied warranty of  
;;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU  
;;; Lesser General Public License for more details.

;;;

;;; You should have received a copy of the GNU General Public License  
;;; along with GPGME; if not, write to the Free Software Foundation,  
;;; Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA.

(in-package :gpgme)

(include "errno.h" "sys/types.h")

(constant (+ebadf+ "EBADF"))

(ctype off-t "off\_t")

(ctype size-t "size\_t")

(ctype ssize-t "ssize\_t")

(cvar ("errno" \*errno\*) :int)

# This is a template. The dist target uses it to create the real file.

Summary: GPGME - GnuPG Made Easy

Name: gpgme

Version: 1.13.1

Release: 1

URL: <https://gnupg.org/gpgme.html>

Source: <https://www.gnupg.org/ftp/gcrypt/gpgme/%{name}-%{version}.tar.gz>

Group: Development/Libraries

Copyright: GPL

BuildRoot: %{\_tmppath}/%{name}-%{version}

BuildRequires: make

Prereq: /sbin/ldconfig /sbin/install-info

Requires: gnupg

%description

GnuPG Made Easy (GPGME) is a library designed to make access to GnuPG easier for applications. It provides a High-Level Crypto API for encryption, decryption, signing, signature verification and key management.

%prep

%setup -q

%build

CFLAGS="\$RPM\_OPT\_FLAGS"; export CFLAGS

./configure --prefix=/usr

make

%install

rm -fr \$RPM\_BUILD\_ROOT

mkdir -p \$RPM\_BUILD\_ROOT

make install prefix=\$RPM\_BUILD\_ROOT/usr infodir=\$RPM\_BUILD\_ROOT%{\_infodir}

rm -f \$RPM\_BUILD\_ROOT%{\_infodir}/dir

%clean

rm -fr \$RPM\_BUILD\_ROOT

make distclean

%post

/sbin/ldconfig

/sbin/install-info %{\_infodir}/gpgme.info.gz %{\_infodir}/dir

/sbin/install-info %{\_infodir}/gpgme-python-howto.info.gz %{\_infodir}/dir

%preun

if [ "\$1" = 0 ]; then

/sbin/install-info --delete %{\_infodir}/gpgme.info.gz %{\_infodir}/dir

/sbin/install-info --delete %{\_infodir}/gpgme-python-howto.info.gz %{\_infodir}/dir

fi

%postun

/sbin/ldconfig

%files

%defattr(-,root,root)

%doc COPYING COPYING.LESSER AUTHORS README INSTALL NEWS ChangeLog TODO THANKS

```

%attr(0755,root,root) % {_bindir}/gpgme-config
%attr(0755,root,root) % {_libdir}/*gpgme.so*
%attr(0755,root,root) % {_libdir}/*gpgme.la
%attr(0644,root,root) % {_libdir}/*gpgme.a
% {_includedir}/gpgme.h
% {_datadir}/aclocal/gpgme.m4
% {_infodir}/gpgme.info*
% {_infodir}/gpgme-python-howto.info*

%changelog
* Sat Aug 30 2003 Robert Schiele <rschiele@uni-mannheim.de>
- % {_infodir}/dir is not packaged, remove to prevent checking failure
* Mon Jul 01 2002 Wojciech Polak <polak@lodz.pdi.net>
- initial specfile release for GPGME.

# EOF
# -*- mode: org -*-
#+TITLE: GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO (English)
#+AUTHOR: Ben McGinnes
#+LATEX_COMPILER: xelatex
#+LATEX_CLASS: article
#+LATEX_CLASS_OPTIONS: [12pt]
#+LATEX_HEADER: \usepackage{xltextra}
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
#+LATEX_HEADER: \author{Ben McGinnes <ben@gnupg.org>}

* Introduction
:PROPERTIES:
:CUSTOM_ID: intro
:END:

| Version:      | 0.1.5          |
| GPGME Version: | 1.13.0        |
| Author:       | Ben McGinnes <ben@gnupg.org> |
| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |
| Language:     | Australian English, British English |
| Language codes: | en-AU, en-GB, en |

This document provides basic instruction in how to use the GPGME
Python bindings to programmatically leverage the GPGME library.

** Python 2 versus Python 3
:PROPERTIES:
:CUSTOM_ID: py2-vs-py3
:END:

```

Though the GPGME Python bindings themselves provide support for both Python 2 and 3, the focus is unequivocally on Python 3 and specifically from Python 3.4 and above. As a consequence all the examples and instructions in this guide use Python 3 code.

Much of it will work with Python 2, but much of it also deals with Python 3 byte literals, particularly when reading and writing data. Developers concentrating on Python 2.7, and possibly even 2.6, will need to make the appropriate modifications to support the older string and unicode types as opposed to bytes.

There are multiple reasons for concentrating on Python 3; some of which relate to the immediate integration of these bindings, some of which relate to longer term plans for both GPGME and the python bindings and some of which relate to the impending EOL period for Python 2.7. Essentially, though, there is little value in tying the bindings to a version of the language which is a dead end and the advantages offered by Python 3 over Python 2 make handling the data types with which GPGME deals considerably easier.

#### \*\* Examples

```
:PROPERTIES:  
:CUSTOM_ID: howto-python3-examples  
:END:
```

All of the examples found in this document can be found as Python 3 scripts in the `=lang/python/examples/howto=` directory.

#### \*\* Unofficial Drafts

```
:PROPERTIES:  
:CUSTOM_ID: unofficial-drafts  
:END:
```

In addition to shipping with each release of GPGME, there is a section on locations to read or download `[[#draft-editions]][draft editions]` of this document from at the end of it. These are unofficial versions produced in between major releases.

#### \*\* What's New

```
:PROPERTIES:  
:CUSTOM_ID: new-stuff  
:END:
```

Full details of what is new are now available in the `[[file:what-is-new.org]][What's New]` file

and archives of the preceding /What's New/ sections are available in the [\[\[file:what-was-new\]\[What Was New\]\]](#) file.

\*\*\* New in GPGME 1130

```
:PROPERTIES:  
:CUSTOM_ID: new-stuff-1-13-0  
:END:
```

See the [\[\[file:what-is-new#new-stuff-1-13-0\]\[What's New\]\]](#) document for what is new in version 1.13.0.

\*\*\* New in GPGME 1120

```
:PROPERTIES:  
:CUSTOM_ID: new-stuff-1-12-0  
:END:
```

See the [\[\[file:what-was-new#new-stuff-1-12-0\]\[What Was New\]\]](#) document for what was new in version 1.12.0.

\* GPGME Concepts

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-concepts  
:END:
```

\*\* A C API

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-c-api  
:END:
```

Unlike many modern APIs with which programmers will be more familiar with these days, the GPGME API is a C API. The API is intended for use by C coders who would be able to access its features by including the `=gpgme.h=` header file with their own C source code and then access its functions just as they would any other C headers.

This is a very effective method of gaining complete access to the API and in the most efficient manner possible. It does, however, have the drawback that it cannot be directly used by other languages without some means of providing an interface to those languages. This is where the need for bindings in various languages stems.

\*\* Python bindings

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-python-bindings  
:END:
```



The Python bindings for GPGME provide a higher level means of accessing the complete feature set of GPGME itself. It also provides a more pythonic means of calling these API functions.

The bindings are generated dynamically with SWIG and the copy of `=gpgme.h=` generated when GPGME is compiled.

This means that a version of the Python bindings is fundamentally tied to the exact same version of GPGME used to generate that copy of `=gpgme.h=`.

**\*\* Difference between the Python bindings and other GnuPG Python packages**

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-python-bindings-diffs  
:END:
```

There have been numerous attempts to add GnuPG support to Python over the years. Some of the most well known are listed here, along with what differentiates them.

**\*\*\* The python-gnupg package maintained by Vinay Sajip**

```
:PROPERTIES:  
:CUSTOM_ID: diffs-python-gnupg  
:END:
```

This is arguably the most popular means of integrating GPG with Python. The package utilises the `=subprocess=` module to implement wrappers for the `=gpg=` and `=gpg2=` executables normally invoked on the command line (`=gpg.exe=` and `=gpg2.exe=` on Windows).

The popularity of this package stemmed from its ease of use and capability in providing the most commonly required features.

Unfortunately it has been beset by a number of security issues in the past; most of which stemmed from using unsafe methods of accessing the command line via the `=subprocess=` calls. While some effort has been made over the last two to three years (as of 2018) to mitigate this, particularly by no longer providing shell access through those subprocess calls, the wrapper is still somewhat limited in the scope of its GnuPG features coverage.

The python-gnupg package is available under the MIT license.

**\*\*\* The gnupg package created and maintained by Isis Lovecruft**

```
:PROPERTIES:  
:CUSTOM_ID: diffs-isis-gnupg  
:END:
```

In 2015 Isis Lovecruft from the Tor Project forked and then re-implemented the python-gnupg package as just gnupg. This new package also relied on subprocess to call the =gpg= or =gpg2= binaries, but did so somewhat more securely.

The naming and version numbering selected for this package, however, resulted in conflicts with the original python-gnupg and since its functions were called in a different manner to python-gnupg, the release of this package also resulted in a great deal of consternation when people installed what they thought was an upgrade that subsequently broke the code relying on it.

The gnupg package is available under the GNU General Public License version 3.0 (or any later version).

```
*** The PyME package maintained by Martin Albrecht  
:PROPERTIES:  
:CUSTOM_ID: diffs-pyme  
:END:
```

This package is the origin of these bindings, though they are somewhat different now. For details of when and how the PyME package was folded back into GPGME itself see the [\[\[file:short-history.org\]\]](http://file:short-history.org) [\[Short History\]](#) document.<sup>[fn:1]</sup>

The PyME package was first released in 2002 and was also the first attempt to implement a low level binding to GPGME. In doing so it provided access to considerably more functionality than either the =python-gnupg= or =gnupg= packages.

The PyME package is only available for Python 2.6 and 2.7.

Porting the PyME package to Python 3.4 in 2015 is what resulted in it being folded into the GPGME project and the current bindings are the end result of that effort.

The PyME package is available under the same dual licensing as GPGME itself: the GNU General Public License version 2.0 (or any later version) and the GNU Lesser General Public License version 2.1 (or any later version).

```
* GPGME Python bindings installation  
:PROPERTIES:
```

```
:CUSTOM_ID: gpgme-python-install
```

```
:END:
```

```
** No PyPI
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: do-not-use-pypi
```

```
:END:
```

Most third-party Python packages and modules are available and distributed through the Python Package Installer, known as PyPI.

Due to the nature of what these bindings are and how they work, it is infeasible to install the GPGME Python bindings in the same way.

This is because the bindings use SWIG to dynamically generate C bindings against `gpgme.h` and `gpgme.h` is generated from `gpgme.h.in` at compile time when GPGME is built from source. Thus to include a package in PyPI which actually built correctly would require either statically built libraries for every architecture bundled with it or a full implementation of C for each architecture.

See the additional notes regarding [CFFI and SWIG](#) at the end of this section for further details.

```
** Requirements
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: gpgme-python-requirements
```

```
:END:
```

The GPGME Python bindings only have three requirements:

1. A suitable version of Python 2 or Python 3. With Python 2 that means CPython 2.7 and with Python 3 that means CPython 3.4 or higher.
2. <https://www.swig.org> [SWIG].
3. GPGME itself. Which also means that all of GPGME's dependencies must be installed too.

```
*** Recommended Additions
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: gpgme-python-recommendations
```

```
:END:
```

Though none of the following are absolute requirements, they are all recommended for use with the Python bindings. In some cases these

recommendations refer to which version(s) of CPython to use the bindings with, while others refer to third party modules which provide a significant advantage in some way.

1. If possible, use Python 3 instead of 2.
2. Favour a more recent version of Python since even 3.4 is due to reach EOL soon. In production systems and services, Python 3.6 should be robust enough to be relied on.
3. If possible add the following Python modules which are not part of the standard library: [\[\[http://docs.python-requests.org/en/latest/index.html\]\]](http://docs.python-requests.org/en/latest/index.html)[\[\[Requests\]\]](#), [\[\[https://cython.org/\]\]](https://cython.org/)[\[\[Cython\]\]](#), [\[\[https://pendulum.eustace.io/\]\]](https://pendulum.eustace.io/)[\[\[Pendulum\]\]](#) and [\[\[https://github.com/Selfnet/hkp4py\]\]](https://github.com/Selfnet/hkp4py)[\[\[hkp4py\]\]](#).

Chances are quite high that at least the first one and maybe two of those will already be installed.

Note that, as with Cython, some of advanced use case scenarios will bring with them additional requirements. Most of these will be fairly well known and commonly installed ones, however, which are in many cases likely to have already been installed on many systems or be familiar to Python programmers.

#### \*\* Installation

```
:PROPERTIES:  
:CUSTOM_ID: installation  
:END:
```

Installing the Python bindings is effectively achieved by compiling and installing GPGME itself.

Once SWIG is installed with Python and all the dependencies for GPGME are installed you only need to confirm that the version(s) of Python you want the bindings installed for are in your `=PATH=`.

By default GPGME will attempt to install the bindings for the most recent or highest version number of Python 2 and Python 3 it detects in `=PATH=`. It specifically checks for the `=python=` and `=python3=` executables first and then checks for specific version numbers.

For Python 2 it checks for these executables in this order: `=python=`, `=python2=` and `=python2.7=`.

For Python 3 it checks for these executables in this order: `=python3=`, `=python3.7=`, `=python3.6=`, `=python3.5=` and `=python3.4=`.[\[fn:2\]](#)

On systems where `=python=` is actually `=python3=` and not `=python2=` it may be possible that `=python2=` may be overlooked, but there have been

no reports of that actually occurring as yet.

In the three months or so since the release of Python 3.7.0 there has been extensive testing and work with these bindings with no issues specifically relating to the new version of Python or any of the new features of either the language or the bindings. This has also been the case with Python 3.7.1rc1. With that in mind and given the release of Python 3.7.1 is scheduled for around the same time as GPGME 1.12.0, the order of preferred Python versions has been changed to move Python 3.7 ahead of Python 3.6.

\*\*\* Installing GPGME

```
:PROPERTIES:  
:CUSTOM_ID: install-gpgme  
:END:
```

See the GPGME `=README=` file for details of how to install GPGME from source.

\*\* Known Issues

```
:PROPERTIES:  
:CUSTOM_ID: snafu  
:END:
```

There are a few known issues with the current build process and the Python bindings. For the most part these are easily addressed should they be encountered.

\*\*\* Breaking Builds

```
:PROPERTIES:  
:CUSTOM_ID: snafu-a-swig-of-this-builds-character  
:END:
```

Occasionally when installing GPGME with the Python bindings included it may be observed that the `=make=` portion of that process induces a large very number of warnings and, eventually errors which end that part of the build process. Yet following that with `=make check=` and `=make install=` appears to work seamlessly.

The cause of this is related to the way SWIG needs to be called to dynamically generate the C bindings for GPGME in the first place. So the entire process will always produce `=lang/python/python2-gpg/=` and `=lang/python/python3-gpg/=` directories. These should contain the build output generated during compilation, including the complete bindings and module installed into `=site-packages=`.

Occasionally the errors in the early part or some other conflict (e.g. not installing as `*/root/*` or `*/su/*`) may result in nothing being installed to the relevant `=site-packages=` directory and the build directory missing a lot of expected files. Even when this occurs, the solution is actually quite simple and will always work.

That solution is simply to run the following commands as either the `*root*` user or prepended with `=sudo -H=[fn:3]` in the `=lang/python/=` directory:

```
#+BEGIN_SRC shell
/path/to/pythonX.Y setup.py build
/path/to/pythonX.Y setup.py build
/path/to/pythonX.Y setup.py install
#+END_SRC
```

Yes, the build command does need to be run twice. Yes, you still need to run the potentially failing or incomplete steps during the `=configure=`, `=make=` and `=make install=` steps with installing GPGME. This is because those steps generate a lot of essential files needed, both by and in order to create, the bindings (including both the `=setup.py=` and `=gpgme.h=` files).

\*\*\*\* IMPORTANT Note

```
:PROPERTIES:
:CUSTOM_ID: snafu-swig-build-note
:END:
```

If specifying a selected number of languages to create bindings for, try to leave Python last. Currently the majority of the other language bindings are also preceding Python of either version when listed alphabetically (not counting the Qt bindings).

If Python is set to precede one of the other languages then it is possible that the errors described here may interrupt the build process before generating bindings for those other languages. In these cases it may be preferable to configure all preferred language bindings separately with alternative `=configure=` steps for GPGME using the `=--enable-languages=$LANGUAGE=` option.

Alternatively `=make=` (or `=gmake=`, depending on your platform) may be run with the `=-k=` option, which tells make to keep going even if errors are encountered. In that case the failure of one language's set of bindings to build should not hamper another language's bindings to build.

### \*\*\* Reinstalling Responsibly

```
:PROPERTIES:  
:CUSTOM_ID: snafu-lessons-for-the-lazy  
:END:
```

Regardless of whether you're installing for one version of Python or several, there will come a point where reinstallation is required. With most Python module installations, the installed files go into the relevant site-packages directory and are then forgotten about. Then the module is upgraded, the new files are copied over the old and that's the end of the matter.

While the same is true of these bindings, there have been intermittent issues observed on some platforms which have benefited significantly from removing all the previous installations of the bindings before installing the updated versions.

Removing the previous version(s) is simply a matter of changing to the relevant =site-packages= directory for the version of Python in question and removing the =gpg/= directory and any accompanying egg-info files for that module.

In most cases this will require root or administration privileges on the system, but the same is true of installing the module in the first place.

### \*\*\* Multiple installations

```
:PROPERTIES:  
:CUSTOM_ID: snafu-the-full-monty  
:END:
```

For a variety of reasons it may be either necessary or just preferable to install the bindings to alternative installed Python versions which meet the requirements of these bindings.

On POSIX systems this will generally be most simply achieved by running the manual installation commands (build, build, install) as described in the previous section for each Python installation the bindings need to be installed to.

As per the SWIG documentation: the compilers, libraries and runtime used to build GPGME and the Python Bindings *must* match those used to compile Python itself, including the version number(s) (at least going by major version numbers and probably minor numbers too).

On most POSIX systems, including OS X, this will very likely be the

case in most, if not all, cases.

Note that from GPGME [<https://dev.gnupg.org/rMff6ff616aea6f59b7f2ce1176492850ecdf3851e>][1.12.1]] the default installation installs to each version of Python it can find first. That is that it will currently install for the first copies of Python versions 2.7, 3.4, 3.5, 3.6, 3.7 and 3.8 (dev branch) that it finds. Usually this will be in the same prefix as GPGME itself, but is dictated by the `=$PATH=` when the installation is performed. The above instructions can still be performed on other python installations which the installer does not find, including alternative prefixes.

\*\*\* Won't Work With Windows

```
:PROPERTIES:  
:CUSTOM_ID: snafu-runtime-not-funtime  
:END:
```

There are semi-regular reports of Windows users having considerable difficulty in installing and using the Python bindings at all. Very often, possibly even always, these reports come from Cygwin users and/or MinGW users and/or Msys2 users. Though not all of them have been confirmed, it appears that these reports have also come from people who installed Python using the Windows installer files from the [<https://python.org>][Python website]] (i.e. mostly MSI installers, sometimes self-extracting `.exe` files).

The Windows versions of Python are not built using Cygwin, MinGW or Msys2; they're built using Microsoft Visual Studio. Furthermore the version used is /considerably/ more advanced than the version which MinGW obtained a small number of files from many years ago in order to be able to compile anything at all. Not only that, but there are changes to the version of Visual Studio between some micro releases, though that is particularly the case with Python 2.7, since it has been kept around far longer than it should have been.

There are two theoretical solutions to this issue:

1. Compile and install the GnuPG stack, including GPGME and the Python bindings using the same version of Microsoft Visual Studio used by the Python Foundation to compile the version of Python installed.

If there are multiple versions of Python then this will need to be done with each different version of Visual Studio used for those versions of Python.



2. Compile and install Python using the same tools used by choice, such as MinGW or Msys2.

Do *\*not\** use the official Windows installer for Python unless following the first method.

In this type of situation it may even be for the best to accept that there are less limitations on permissive software than free software and simply opt to use a recent version of the Community Edition of Microsoft Visual Studio to compile and build all of it, no matter what.

Investigations into the extent or the limitations of this issue are ongoing.

The following table lists the version of Microsoft Visual Studio which needs to be used when compiling GPGME and the Python bindings with each version of the CPython binary released [<https://www.python.org/downloads/windows/>][for Windows]:

CPython	Microsoft product name	runtime filename	
2.7.6	Visual Studio 2008	MSVCR90.DLL	
3.4.0	Visual Studio 2010	MSVCR100.DLL	
3.5.0	Visual Studio 2015	*see below*	
3.6.0	Visual Studio 2015	*see below*	
3.7.0	Visual Studio 2017*	*see below*	

It is important to note that MingW and Msys2 ship with the Visual C runtime from Microsoft Visual Studio 2005 and are thus *\*incompatible\** with all the versions of CPython which can be used with the GPGME Python bindings.

It is also important to note that from CPython 3.5 onwards, the Python Foundation has adopted the reworking of the Visual C runtime which was performed for Visual Studio 2015 and aimed at resolving many of these kinds of issues. Much greater detail on these issues and the correct file(s) to link to are available from Matthew Brett's invaluable page, [[https://matthew-brett.github.io/pydagogue/python\\_msvc.html](https://matthew-brett.github.io/pydagogue/python_msvc.html)][Using Microsoft Visual C with Python]. It is also worth reading the Microsoft Developer Network blog post on [<http://blogs.msdn.com/b/vcblog/archive/2015/03/03/introducing-the-universal-crt.aspx>][the universal CRT]] and Steve Dower's blog posts on Python extensions ([<http://stevedower.id.au/blog/building-for-python-3-5>][part 1]] and [<http://stevedower.id.au/blog/building-for-python-3-5-part-two>][part 2]]).

The second of those two posts by Steve Dower contains the details of specific configuration options required for compiling anything to be used with official CPython releases. In addition to those configuration and compiler settings to use, the versions of Visual Studio prior to Visual Studio 2015 did not support 64-bit systems by

default. So compiling a 64-bit version of these bindings for a 64-bit version of CPython 2.7 or 3.4 requires additional work.

In addition to the blog posts, the [\[\[https://wiki.python.org/moin/WindowsCompilers\]\]](https://wiki.python.org/moin/WindowsCompilers) [\[Windows compilers\]](#) wiki page on the CPython wiki is another essential reference on the relevant versions of Visual Studio to use and the degree of compatibility with CPython releases.

Eventually someone will ask why there isn't an installable binary for Windows, which the GPGME of the licenses do not preclude as long as the source code is available in conjunction with such a release.

The sheer number of versions of Visual Studio in conjunction with differing configuration options depending on the target Windows version and whether the architecture is 64-bit or 32-bit makes it difficult to provide a correct binary installer for Windows users. At the bare minimum doing so would require the GnuPG project compile ten different versions of the bindings with each release; both 32-bit and 64-bit versions for CPython 2.7 and 3.4, with 64-bit versions for both x86-64 (i.e. Intel and AMD) and ARM architectures for CPython 3.5, 3.6, 3.7 and later releases. That's the bare \*minimum\*, it'd probably be higher.

Additionally, with only a binary installation used in conjunction with the CPython installer from `=python.org=` the advanced options available which utilise `[[#cython]]` `[[Cython]]` will not be able to be used at all. Cython depends on being able to compile the C code it generates and that too would need to utilise a matching runtime to both the installed version of CPython and these bindings in order to work with the bindings.

Considering all of that, what do we recommend?

1. Use a recent version of CPython; at least 3.5, but ideally 3.6 or later.
2. Use Visual Studio 2015 or the standalone build tools for Visual Studio 2017 (or later).
3. Compile both CPython and GPGME with these bindings using the tools selected in step 2.
4. Ignore MingW, Msys2 and the official CPython binary installers.
5. Be thankful the answer to this question wasn't simply to say something like, install Linux or install FreeBSD (or even Apple's OS X).

\*\*\* CFFI is the Best and GPGME should use it instead of SWIG

```
:PROPERTIES:  
:CUSTOM_ID: snafu-cffi  
:END:
```

There are many reasons for favouring [\[\[https://cffi.readthedocs.io/en/latest/overview.html\]\]](https://cffi.readthedocs.io/en/latest/overview.html)[CFFI] and proponents of it are

quite happy to repeat these things as if all it would take to switch from SWIG to CFFI is repeating that list as if it were a new concept.

The fact is that there are things which Python's CFFI implementation cannot handle in the GPGME C code. Beyond that there are features of SWIG which are simply not available with CFFI at all. SWIG generates the bindings to Python using the `=gpgme.h=` file, but that file is not a single version shipped with each release, it too is generated when GPGME is compiled.

CFFI is currently unable to adapt to such a potentially mutable codebase. If there were some means of applying SWIG's dynamic code generation to produce the Python/CFFI API modes of accessing the GPGME libraries (or the source source code directly), but such a thing does not exist yet either and it currently appears that work is needed in at least one of CFFI's dependencies before any of this can be addressed.

So if you're a massive fan of CFFI; that's great, but if you want this project to switch to CFFI then rather than just insisting that it should, I'd suggest you volunteer to bring CFFI up to the level this project needs.

If you're actually seriously considering doing so, then I'd suggest taking the `=gpgme-tool.c=` file in the GPGME `=src/=` directory and getting that to work with any of the CFFI API methods (not the ABI methods, they'll work with pretty much anything). When you start running into trouble with "ifdefs" then you'll know what sort of things are lacking. That doesn't even take into account the amount of work saved via SWIG's code generation techniques either.

\*\*\* Virtualised Environments

```
:PROPERTIES:  
:CUSTOM_ID: snafu-venv  
:END:
```

It is fairly common practice amongst Python developers to, as much as possible, use packages like `virtualenv` to keep various things that are to be installed from interfering with each other. Given how much of

the GPGME bindings is often at odds with the usual pythonic way of doing things, it stands to reason that this would be called into question too.

As it happens the answer as to whether or not the bindings can be used with virtualenv, the answer is both yes and no.

In general we recommend installing to the relevant path and matching prefix of GPGME itself. Which means that when GPGME, and ideally the rest of the GnuPG stack, is installed to a prefix like `=/usr/local=` or `=/opt/local=` then the bindings would need to be installed to the main Python installation and not a virtualised abstraction. Attempts to separate the two in the past have been known to cause weird and intermittent errors ranging from minor annoyances to complete failures in the build process.

As a consequence we only recommend building with and installing to the main Python installations within the same prefix as GPGME is installed to or which are found by GPGME's configuration stage immediately prior to running the make commands. Which is exactly what the compiling and installing process of GPGME does by default.

Once that is done, however, it appears that a copy of the compiled module may be installed into a virtualenv of the same major and minor version matching the build. Alternatively it is possible to utilise a `=sites.pth=` file in the `=site-packages/=` directory of a virtualenv installation, which links back to the system installations corresponding directory in order to import anything installed system wide. This may or may not be appropriate on a case by case basis.

Though extensive testing of either of these options is not yet complete, preliminary testing of them indicates that both are viable as long as the main installation is complete. Which means that certain other options normally restricted to virtual environments are also available, including integration with pythonic test suites (e.g. [\[\[https://docs.pytest.org/en/latest/index.html\]\]](https://docs.pytest.org/en/latest/index.html)`[[pytest]]`) and other large projects.

That said, it is worth reiterating the warning regarding non-standard installations. If one were to attempt to install the bindings only to a virtual environment without somehow also including the full GnuPG stack (or enough of it as to include GPGME) then it is highly likely that errors would be encountered at some point and more than a little likely that the build process itself would break.

If a degree of separation from the main operating system is still required in spite of these warnings, then consider other forms of virtualisation. Either a virtual machine (e.g. [\[\[https://www.virtualbox.org/\]\]](https://www.virtualbox.org/)`[[VirtualBox]]`), a hardware emulation layer (e.g. [\[\[https://www.qemu.org/\]\]](https://www.qemu.org/)`[[QEMU]]`) or an application container

(e.g. [\[\[https://www.docker.com/why-docker\]\]](https://www.docker.com/why-docker)[[Docker]]).

Finally it should be noted that the limited tests conducted thus far have been using the `=virtualenv=` command in a new directory to create the virtual python environment. As opposed to the standard `=python3 -m venv=` and it is possible that this will make a difference depending on the system and version of Python in use. Another option is to run the command `=python3 -m virtualenv /path/to/install/virtual/thingy=` instead.

\*\*\* Post installation

```
:PROPERTIES:  
:CUSTOM_ID: snafu-docs  
:END:
```

Following installation it is recommended to move the `=post_installer.py=` script from the `=lang/python/examples/howto/=` directory to the `=lang/python/=` directory and run it. This will fix or restore files needed by Sphinx which may be removed during a distribution build for release. It will also generate reST files from Org mode files with Pandoc and generate Texinfo files from Org mode files with GNU Emacs and Org mode (in batch mode). Additionally it will fix the UTF-8 declaration line in the Texinfo files (Emacs expects "UTF-8" to be "utf-8").

\* Fundamentals

```
:PROPERTIES:  
:CUSTOM_ID: howto-fund-a-mental  
:END:
```

Before we can get to the fun stuff, there are a few matters regarding GPGME's design which hold true whether you're dealing with the C code directly or these Python bindings.

\*\* No REST

```
:PROPERTIES:  
:CUSTOM_ID: no-rest-for-the-wicked  
:END:
```

The first part of which is or will be fairly blatantly obvious upon viewing the first example, but it's worth reiterating anyway. That being that this API is *not* a REST API. Nor indeed could it ever be one.

Most, if not all, Python programmers (and not just Python programmers)

know how easy it is to work with a RESTful API. In fact they've become so popular that many other APIs attempt to emulate REST-like behaviour as much as they are able. Right down to the use of JSON formatted output to facilitate the use of their API without having to retrain developers.

This API does not do that. It would not be able to do that and also provide access to the entire C API on which it's built. It does, however, provide a very pythonic interface on top of the direct bindings and it's this pythonic layer that this HOWTO deals with.

\*\* Context

:PROPERTIES:

:CUSTOM\_ID: howto-get-context

:END:

One of the reasons which prevents this API from being RESTful is that most operations require more than one instruction to the API to perform the task. Sure, there are certain functions which can be performed simultaneously, particularly if the result known or strongly anticipated (e.g. selecting and encrypting to a key known to be in the public keybox).

There are many more, however, which cannot be manipulated so readily: they must be performed in a specific sequence and the result of one operation has a direct bearing on the outcome of subsequent operations. Not merely by generating an error either.

When dealing with this type of persistent state on the web, full of both the RESTful and REST-like, it's most commonly referred to as a session. In GPGME, however, it is called a context and every operation type has one.

\* Working with keys

:PROPERTIES:

:CUSTOM\_ID: howto-keys

:END:

\*\* Key selection

:PROPERTIES:

:CUSTOM\_ID: howto-keys-selection

:END:

Selecting keys to encrypt to or to sign with will be a common occurrence when working with GPGMe and the means available for doing

so are quite simple.

They do depend on utilising a Context; however once the data is recorded in another variable, that Context does not need to be the same one which subsequent operations are performed.

The easiest way to select a specific key is by searching for that key's key ID or fingerprint, preferably the full fingerprint without any spaces in it. A long key ID will probably be okay, but is not advised and short key IDs are already a problem with some being generated to match specific patterns. It does not matter whether the pattern is upper or lower case.

So this is the best method:

```
#+BEGIN_SRC python -i
import gpg

k = gpg.Context().keylist(pattern="258E88DCBD3CD44D8E7AB43F6ECB6AF0DEADBEEF")
keys = list(k)
#+END_SRC
```

This is passable and very likely to be common:

```
#+BEGIN_SRC python -i
import gpg

k = gpg.Context().keylist(pattern="0x6ECB6AF0DEADBEEF")
keys = list(k)
#+END_SRC
```

And this is a really bad idea:

```
#+BEGIN_SRC python -i
import gpg

k = gpg.Context().keylist(pattern="0xDEADBEEF")
keys = list(k)
#+END_SRC
```

Alternatively it may be that the intention is to create a list of keys which all match a particular search string. For instance all the addresses at a particular domain, like this:

```
#+BEGIN_SRC python -i
import gpg

ncsc = gpg.Context().keylist(pattern="ncsc.mil")
```

```
nsa = list(ncsc)
#+END_SRC
```

```
*** Counting keys
:PROPERTIES:
:CUSTOM_ID: howto-keys-counting
:END:
```

Counting the number of keys in your public keybox (=pubring.kbx=), the format which has superseded the old keyring format (=pubring.gpg= and =secring.gpg=), or the number of secret keys is a very simple task.

```
#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
seckeys = c.keylist(pattern=None, secret=True)
pubkeys = c.keylist(pattern=None, secret=False)

seclist = list(seckeys)
secnum = len(seclist)

publist = list(pubkeys)
pubnum = len(publist)

print("""
Number of secret keys: {0}
Number of public keys: {1}
""".format(secnum, pubnum))
#+END_SRC
```

NOTE: The `Cython` introduction in the `Advanced and Experimental` section uses this same key counting code with `Cython` to demonstrate some areas where `Cython` can improve performance even with the bindings. Users with large public keyrings or keyboxes, for instance, should consider these options if they are comfortable with using `Cython`.

```
** Get key
:PROPERTIES:
:CUSTOM_ID: howto-get-key
:END:
```

An alternative method of getting a single key via its fingerprint is available directly within a `Context` with `Context().get_key`. This is the preferred method of selecting a key in order to modify it, sign or



certify it and for obtaining relevant data about a single key as a part of other functions; when verifying a signature made by that key, for instance.

By default this method will select public keys, but it can select secret keys as well.

This first example demonstrates selecting the current key of Werner Koch, which is due to expire at the end of 2018:

```
#+BEGIN_SRC python -i
import gpg

fingerprint = "80615870F5BAD690333686D0F2AD85AC1E42B367"
key = gpg.Context().get_key(fingerprint)
#+END_SRC
```

Whereas this example demonstrates selecting the author's current key with the `=secret=` key word argument set to `=True=`:

```
#+BEGIN_SRC python -i
import gpg

fingerprint = "DB4724E6FA4286C92B4E55C4321E4E2373590E5D"
key = gpg.Context().get_key(fingerprint, secret=True)
#+END_SRC
```

It is, of course, quite possible to select expired, disabled and revoked keys with this function, but only to effectively display information about those keys.

It is also possible to use both unicode or string literals and byte literals with the fingerprint when getting a key in this way.

```
** Importing keys
:PROPERTIES:
:CUSTOM_ID: howto-import-key
:END:
```

Importing keys is possible with the `=key_import(=` method and takes one argument which is a bytes literal object containing either the binary or ASCII armoured key data for one or more keys.

The following example retrieves one or more keys from the SKS keyservers via the web using the `requests` module. Since `requests` returns the content as a bytes literal object, we can then use that directly to import the resulting data into our keybox.

```

#+BEGIN_SRC python -i
import gpg
import os.path
import requests

c = gpg.Context()
url = "https://sks-keyservers.net/pks/lookup"
pattern = input("Enter the pattern to search for key or user IDs: ")
payload = {"op": "get", "search": pattern}

r = requests.get(url, verify=True, params=payload)
result = c.key_import(r.content)

if result is not None and hasattr(result, "considered") is False:
    print(result)
elif result is not None and hasattr(result, "considered") is True:
    num_keys = len(result.imports)
    new_revs = result.new_revocations
    new_sigs = result.new_signatures
    new_subs = result.new_sub_keys
    new_uids = result.new_user_ids
    new_scr = result.secret_imported
    nochange = result.unchanged
    print("""
The total number of keys considered for import was: {0}

    Number of keys revoked: {1}
    Number of new signatures: {2}
    Number of new subkeys: {3}
    Number of new user IDs: {4}
    Number of new secret keys: {5}
    Number of unchanged keys: {6}

The key IDs for all considered keys were:
""".format(num_keys, new_revs, new_sigs, new_subs, new_uids, new_scr,
           nochange))
    for i in range(num_keys):
        print("{0}\n".format(result.imports[i].fpr))
else:
    pass
#+END_SRC

```

NOTE: When searching for a key ID of any length or a fingerprint (without spaces), the SKS servers require the the leading =0x= indicative of hexadecimal be included. Also note that the old short key IDs (e.g. =0xDEADBEEF=) should no longer be used due to the relative ease by which such key IDs can be reproduced, as demonstrated

by the Evil32 Project in 2014 (which was subsequently exploited in 2016).

Testing for whether a string in any given search is or may be a hexadecimal value which may be missing the leading =0x= is a simple matter of using a try/except statement which attempts to convert the string as hex to an integer and then back to hex; then using that to search with. Raising a ValueError simply results in treating the string as a string. This is the method and logic utilised in the =import-keys-hkp.py= script (see below).

```
*** Working with ProtonMail
:PROPERTIES:
:CUSTOM_ID: import-protonmail
:END:
```

Here is a variation on the example above which checks the constrained ProtonMail keyserver for ProtonMail public keys.

```
#+BEGIN_SRC python -i
import gpg
import requests
import sys

print("""
This script searches the ProtonMail key server for the specified key and
imports it.
""")

c = gpg.Context(armor=True)
url = "https://api.protonmail.ch/pks/lookup"
ksearch = []

if len(sys.argv) >= 2:
    keyterm = sys.argv[1]
else:
    keyterm = input("Enter the key ID, UID or search string: ")

if keyterm.count("@") == 2 and keyterm.startswith("@") is True:
    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
elif keyterm.count("@") == 1 and keyterm.startswith("@") is True:
    ksearch.append("{0}@protonmail.com".format(keyterm[1:]))
    ksearch.append("{0}@protonmail.ch".format(keyterm[1:]))
    ksearch.append("{0}@pm.me".format(keyterm[1:]))
elif keyterm.count("@") == 0:
```

```

ksearch.append("{0}@protonmail.com".format(keyterm))
ksearch.append("{0}@protonmail.ch".format(keyterm))
ksearch.append("{0}@pm.me".format(keyterm))
elif keyterm.count("@") == 2 and keyterm.startswith("@") is False:
    uidlist = keyterm.split("@")
    for uid in uidlist:
        ksearch.append("{0}@protonmail.com".format(uid))
        ksearch.append("{0}@protonmail.ch".format(uid))
        ksearch.append("{0}@pm.me".format(uid))
elif keyterm.count("@") > 2:
    uidlist = keyterm.split("@")
    for uid in uidlist:
        ksearch.append("{0}@protonmail.com".format(uid))
        ksearch.append("{0}@protonmail.ch".format(uid))
        ksearch.append("{0}@pm.me".format(uid))
else:
    ksearch.append(keyterm)

```

```

for k in ksearch:
    payload = {"op": "get", "search": k}
    try:
        r = requests.get(url, verify=True, params=payload)
        if r.ok is True:
            result = c.key_import(r.content)
        elif r.ok is False:
            result = r.content
    except Exception as e:
        result = None

```

```

if result is not None and hasattr(result, "considered") is False:
    print("{0} for {1}".format(result.decode(), k))
elif result is not None and hasattr(result, "considered") is True:
    num_keys = len(result.imports)
    new_revs = result.new_revocations
    new_sigs = result.new_signatures
    new_subs = result.new_sub_keys
    new_uids = result.new_user_ids
    new_scert = result.secret_imported
    nochange = result.unchanged
    print("""

```

The total number of keys considered for import was: {0}

With UIDs wholly or partially matching the following string:

```
{1}
```

Number of keys revoked: {2}

Number of new signatures: {3}

Number of new subkeys: {4}  
Number of new user IDs: {5}  
Number of new secret keys: {6}  
Number of unchanged keys: {7}

The key IDs for all considered keys were:

```
"".format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_sctr,
         nochange))
for i in range(num_keys):
    print(result.imports[i].fpr)
print("")
elif result is None:
    print(e)
#+END_SRC
```

Both the above example, [[./examples/howto/pmkey-import.py][pmkey-import.py]], and a version which prompts for an alternative GnuPG home directory, [[./examples/howto/pmkey-import-alt.py][pmkey-import-alt.py]], are available with the other examples and are executable scripts.

Note that while the ProtonMail servers are based on the SKS servers, their server is related more to their API and is not feature complete by comparison to the servers in the SKS pool. One notable difference being that the ProtonMail server does not permit non ProtonMail users to update their own keys, which could be a vector for attacking ProtonMail users who may not receive a key's revocation if it had been compromised.

```
*** Importing with HKP for Python
:PROPERTIES:
:CUSTOM_ID: import-hkp4py
:END:
```

Performing the same tasks with the [[https://github.com/Selfnet/hkp4py][hkp4py module]] (available via PyPI) is not too much different, but does provide a number of options of benefit to end users. Not least of which being the ability to perform some checks on a key before importing it or not. For instance it may be the policy of a site or project to only import keys which have not been revoked. The hkp4py module permits such checks prior to the importing of the keys found.

```
#+BEGIN_SRC python -i
import gpg
import hkp4py
import sys
```

```
c = gpg.Context()
server = hkp4py.KeyServer("hkps://hkps.pool.sks-keyservers.net")
```

```

results = []
keys = []

if len(sys.argv) > 2:
    pattern = " ".join(sys.argv[1:])
elif len(sys.argv) == 2:
    pattern = sys.argv[1]
else:
    pattern = input("Enter the pattern to search for keys or user IDs: ")

if pattern is not None:
    try:
        key = server.search(hex(int(pattern, 16)))
        keyed = True
    except ValueError as ve:
        key = server.search(pattern)
        keyed = False

    if key is not None:
        keys.append(key[0])
        if keyed is True:
            try:
                fob = server.search(pattern)
            except:
                fob = None
            if fob is not None:
                keys.append(fob[0])
        else:
            pass
    else:
        pass

for logrus in pattern.split():
    try:
        key = server.search(hex(int(logrus, 16)))
        hexed = True
    except ValueError as ve:
        key = server.search(logrus)
        hexed = False

    if key is not None:
        keys.append(key[0])
        if hexed is True:
            try:
                fob = server.search(logrus)
            except:
                fob = None

```

```

        if fob is not None:
            keys.append(fob[0])
        else:
            pass
    else:
        pass

if len(keys) > 0:
    for key in keys:
        import_result = c.key_import(key.key_blob)
        results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print(result)
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_scert = result.secret_imported
        nochange = result.unchanged
        print("""
The total number of keys considered for import was: {0}

Number of keys revoked: {1}
Number of new signatures: {2}
Number of new subkeys: {3}
Number of new user IDs: {4}
Number of new secret keys: {5}
Number of unchanged keys: {6}

The key IDs for all considered keys were:
""".format(num_keys, new_revs, new_sigs, new_subs, new_uids, new_scert,
           nochange))
        for i in range(num_keys):
            print(result.imports[i].fpr)
        print("")
    else:
        pass
#+END_SRC

```

Since the hkp4py module handles multiple keys just as effectively as one (=keys= is a list of responses per matching key), the example above is able to do a little bit more with the returned data before anything is actually imported.

```
*** Importing from ProtonMail with HKP for Python
:PROPERTIES:
:CUSTOM_ID: import-protonmail-hkp4py
:END:
```

Though this can provide certain benefits even when working with ProtonMail, the scope is somewhat constrained there due to the limitations of the ProtonMail keyserver.

For instance, searching the SKS keyserver pool for the term "gnupg" produces hundreds of results from any time the word appears in any part of a user ID. Performing the same search on the ProtonMail keyserver returns zero results, even though there are at least two test accounts which include it as part of the username.

The cause of this discrepancy is the deliberate configuration of that server by ProtonMail to require an exact match of the full email address of the ProtonMail user whose key is being requested. Presumably this is intended to reduce breaches of privacy of their users as an email address must already be known before a key for that address can be obtained.

```
**** Import from ProtonMail via HKP for Python Example no. 1
:PROPERTIES:
:CUSTOM_ID: import-hkp4py-pm1
:END:
```

The following script is available with the rest of the examples under the somewhat less than original name, =pmkey-import-hkp.py=.

```
#+BEGIN_SRC python -i
import gpg
import hkp4py
import os.path
import sys

print("""
This script searches the ProtonMail key server for the specified key and
imports it.

Usage: pmkey-import-hkp.py [search strings]
""")

c = gpg.Context(armor=True)
server = hkp4py.KeyServer("hkps://api.protonmail.ch")
```



```

keyterms = []
ksearch = []
allkeys = []
results = []
paradox = []
homeless = None

if len(sys.argv) > 2:
    keyterms = sys.argv[1:]
elif len(sys.argv) == 2:
    keyterm = sys.argv[1]
    keyterms.append(keyterm)
else:
    key_term = input("Enter the key ID, UID or search string: ")
    keyterms = key_term.split()

for keyterm in keyterms:
    if keyterm.count("@") == 2 and keyterm.startswith("@") is True:
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
    elif keyterm.count("@") == 1 and keyterm.startswith("@") is True:
        ksearch.append("{}@protonmail.com".format(keyterm[1:]))
        ksearch.append("{}@protonmail.ch".format(keyterm[1:]))
        ksearch.append("{}@pm.me".format(keyterm[1:]))
    elif keyterm.count("@") == 0:
        ksearch.append("{}@protonmail.com".format(keyterm))
        ksearch.append("{}@protonmail.ch".format(keyterm))
        ksearch.append("{}@pm.me".format(keyterm))
    elif keyterm.count("@") == 2 and keyterm.startswith("@") is False:
        uidlist = keyterm.split("@")
        for uid in uidlist:
            ksearch.append("{}@protonmail.com".format(uid))
            ksearch.append("{}@protonmail.ch".format(uid))
            ksearch.append("{}@pm.me".format(uid))
    elif keyterm.count("@") > 2:
        uidlist = keyterm.split("@")
        for uid in uidlist:
            ksearch.append("{}@protonmail.com".format(uid))
            ksearch.append("{}@protonmail.ch".format(uid))
            ksearch.append("{}@pm.me".format(uid))
    else:
        ksearch.append(keyterm)

for k in ksearch:
    print("Checking for key for: {}".format(k))
    try:
        keys = server.search(k)

```

```

if isinstance(keys, list) is True:
    for key in keys:
        allkeys.append(key)
    try:
        import_result = c.key_import(key.key_blob)
    except Exception as e:
        import_result = c.key_import(key.key)
else:
    paradox.append(keys)
    import_result = None
except Exception as e:
    import_result = None
results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print("{0} for {1}".format(result.decode(), k))
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_scert = result.secret_imported
        nochange = result.unchanged
        print("""
The total number of keys considered for import was: {0}

```

With UIDs wholly or partially matching the following string:

```
{1}
```

```

Number of keys revoked: {2}
Number of new signatures: {3}
Number of new subkeys: {4}
Number of new user IDs: {5}
Number of new secret keys: {6}
Number of unchanged keys: {7}

```

The key IDs for all considered keys were:

```

"".format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,
nochange))
for i in range(num_keys):
    print(result.imports[i].fpr)
print("")
elif result is None:
    pass
#+END_SRC

```

```
**** Import from ProtonMail via HKP for Python Example no. 2
:PROPERTIES:
:CUSTOM_ID: import-hkp4py-pm2
:END:
```

Like its counterpart above, this script can also be found with the rest of the examples, by the name `pmkey-import-hkp-alt.py`.

With this script a modicum of effort has been made to treat anything passed as a `=homedir=` which either does not exist or which is not a directory, as also being a possible user ID to check for. It's not guaranteed to pick up on all such cases, but it should cover most of them.

```
#+BEGIN_SRC python -i
import gpg
import hkp4py
import os.path
import sys

print("""
This script searches the ProtonMail key server for the specified key and
imports it. Optionally enables specifying a different GnuPG home directory.

Usage: pmkey-import-hkp.py [homedir] [search string]
or: pmkey-import-hkp.py [search string]
""")

c = gpg.Context(armor=True)
server = hkp4py.KeyServer("hkps://api.protonmail.ch")
keyterms = []
ksearch = []
allkeys = []
results = []
paradox = []
homeless = None

if len(sys.argv) > 3:
    homedir = sys.argv[1]
    keyterms = sys.argv[2:]
elif len(sys.argv) == 3:
    homedir = sys.argv[1]
    keyterm = sys.argv[2]
    keyterms.append(keyterm)
elif len(sys.argv) == 2:
    homedir = ""
```

```

keyterm = sys.argv[1]
keyterms.append(keyterm)
else:
keyterm = input("Enter the key ID, UID or search string: ")
homedir = input("Enter the GPG configuration directory path (optional): ")
keyterms.append(keyterm)

if len(homedir) == 0:
homedir = None
homeless = False

if homedir is not None:
if homedir.startswith("~"):
if os.path.exists(os.path.expanduser(homedir)) is True:
if os.path.isdir(os.path.expanduser(homedir)) is True:
c.home_dir = os.path.realpath(os.path.expanduser(homedir))
else:
homeless = True
else:
homeless = True
elif os.path.exists(os.path.realpath(homedir)) is True:
if os.path.isdir(os.path.realpath(homedir)) is True:
c.home_dir = os.path.realpath(homedir)
else:
homeless = True
else:
homeless = True

# First check to see if the homedir really is a homedir and if not, treat it as
# a search string.
if homeless is True:
keyterms.append(homedir)
c.home_dir = None
else:
pass

for keyterm in keyterms:
if keyterm.count("@") == 2 and keyterm.startswith("@") is True:
ksearch.append(keyterm[1:])
ksearch.append(keyterm[1:])
ksearch.append(keyterm[1:])
elif keyterm.count("@") == 1 and keyterm.startswith("@") is True:
ksearch.append("{0}@protonmail.com".format(keyterm[1:]))
ksearch.append("{0}@protonmail.ch".format(keyterm[1:]))
ksearch.append("{0}@pm.me".format(keyterm[1:]))
elif keyterm.count("@") == 0:
ksearch.append("{0}@protonmail.com".format(keyterm))
ksearch.append("{0}@protonmail.ch".format(keyterm))

```

```

    ksearch.append("{0}@pm.me".format(keyterm))
elif keyterm.count("@") == 2 and keyterm.startswith("@") is False:
    uidlist = keyterm.split("@")
    for uid in uidlist:
        ksearch.append("{0}@protonmail.com".format(uid))
        ksearch.append("{0}@protonmail.ch".format(uid))
        ksearch.append("{0}@pm.me".format(uid))
elif keyterm.count("@") > 2:
    uidlist = keyterm.split("@")
    for uid in uidlist:
        ksearch.append("{0}@protonmail.com".format(uid))
        ksearch.append("{0}@protonmail.ch".format(uid))
        ksearch.append("{0}@pm.me".format(uid))
else:
    ksearch.append(keyterm)

for k in ksearch:
    print("Checking for key for: {0}".format(k))
    try:
        keys = server.search(k)
        if isinstance(keys, list) is True:
            for key in keys:
                allkeys.append(key)
            try:
                import_result = c.key_import(key.key_blob)
            except Exception as e:
                import_result = c.key_import(key.key)
        else:
            paradox.append(keys)
            import_result = None
    except Exception as e:
        import_result = None
    results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print("{0} for {1}".format(result.decode(), k))
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_scert = result.secret_imported
        nochange = result.unchanged
        print("""
The total number of keys considered for import was: {0}

```

With UIDs wholly or partially matching the following string:

```
{1}
```

```
Number of keys revoked: {2}
```

```
Number of new signatures: {3}
```

```
Number of new subkeys: {4}
```

```
Number of new user IDs: {5}
```

```
Number of new secret keys: {6}
```

```
Number of unchanged keys: {7}
```

The key IDs for all considered keys were:

```
"".format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,
          nochange))
for i in range(num_keys):
    print(result.imports[i].fpr)
print("")
elif result is None:
    pass
#+END_SRC
```

```
** Exporting keys
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: howto-export-key
```

```
:END:
```

Exporting keys remains a reasonably simple task, but has been separated into three different functions for the OpenPGP cryptographic engine. Two of those functions are for exporting public keys and the third is for exporting secret keys.

```
*** Exporting public keys
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: howto-export-public-key
```

```
:END:
```

There are two methods of exporting public keys, both of which are very similar to the other. The default method, `=key_export()`, will export a public key or keys matching a specified pattern as normal. The alternative, the `=key_export_minimal()` method, will do the same thing except producing a minimised output with extra signatures and third party signatures or certifications removed.

```
#+BEGIN_SRC python -i
```

```
import gpg
```

```
import os.path
```

```

import sys

print("""
This script exports one or more public keys.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if homedir.startswith("~"):
    if os.path.exists(os.path.expanduser(homedir)) is True:
        c.home_dir = os.path.expanduser(homedir)
    else:
        pass
elif os.path.exists(homedir) is True:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export(pattern=logrus)
except:
    result = c.key_export(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
else:
    pass
#+END_SRC

```

It should be noted that the result will only return =None= when a

search pattern has been entered, but has not matched any keys. When the search pattern itself is set to =None= this triggers the exporting of the entire public keybox.

```
#+BEGIN_SRC python -i
import gpg
import os.path
import sys

print("""
This script exports one or more public keys in minimised form.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if homedir.startswith("~"):
    if os.path.exists(os.path.expanduser(homedir)) is True:
        c.home_dir = os.path.expanduser(homedir)
    else:
        pass
elif os.path.exists(homedir) is True:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export_minimal(pattern=logrus)
except:
    result = c.key_export_minimal(pattern=None)

if result is not None:
```



```

with open(keyfile, "wb") as f:
    f.write(result)
else:
    pass
#+END_SRC

```

```

*** Exporting secret keys
:PROPERTIES:
:CUSTOM_ID: howto-export-secret-key
:END:

```

Exporting secret keys is, functionally, very similar to exporting public keys; save for the invocation of `=pinentry=` via `=gpg-agent=` in order to securely enter the key's passphrase and authorise the export.

The following example exports the secret key to a file which is then set with the same permissions as the output files created by the command line secret key export options.

```

#+BEGIN_SRC python -i
import gpg
import os
import os.path
import sys

print("""
This script exports one or more secret keys.

The gpg-agent and pinentry are invoked to authorise the export.
""")

```

```

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")

```

```

logrus = input("Enter the UID matching the secret key(s) to export: ")
homedir = input("Enter the GPG configuration directory path (optional): ")

if len(homedir) == 0:
    homedir = None
elif homedir.startswith("~"):
    userdir = os.path.expanduser(homedir)
    if os.path.exists(userdir) is True:
        homedir = os.path.realpath(userdir)
    else:
        homedir = None
else:
    homedir = os.path.realpath(homedir)

if os.path.exists(homedir) is False:
    homedir = None
else:
    if os.path.isdir(homedir) is False:
        homedir = None
    else:
        pass

if homedir is not None:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export_secret(pattern=logrus)
except:
    result = c.key_export_secret(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
    os.chmod(keyfile, 0o600)
else:
    pass
#+END_SRC

```

Alternatively the approach of the following script can be used. This longer example saves the exported secret key(s) in files in the GnuPG home directory, in addition to setting the file permissions as only readable and writable by the user. It also exports the secret key(s) twice in order to output both GPG binary (=gpg=) and ASCII armoured (=asc=) files.

```
#+BEGIN_SRC python -i
```

```

import gpg
import os
import os.path
import subprocess
import sys

print("""
This script exports one or more secret keys as both ASCII armored and binary
file formats, saved in files within the user's GPG home directory.

The gpg-agent and pinentry are invoked to authorise the export.
""")

if sys.platform == "win32":
    gpgconfcmd = "gpgconf.exe --list-dirs homedir"
else:
    gpgconfcmd = "gpgconf --list-dirs homedir"

a = gpg.Context(armor=True)
b = gpg.Context()
c = gpg.Context()

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the filename to save the secret key to: ")
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if len(homedir) == 0:
    homedir = None
elif homedir.startswith("~"):
    userdir = os.path.expanduser(homedir)
    if os.path.exists(userdir) is True:
        homedir = os.path.realpath(userdir)
    else:
        homedir = None
else:

```

```

homedir = os.path.realpath(homedir)

if os.path.exists(homedir) is False:
    homedir = None
else:
    if os.path.isdir(homedir) is False:
        homedir = None
    else:
        pass

if homedir is not None:
    c.home_dir = homedir
else:
    pass

if c.home_dir is not None:
    if c.home_dir.endswith("/"):
        gpgfile = "{0}{1}.gpg".format(c.home_dir, keyfile)
        ascfile = "{0}{1}.asc".format(c.home_dir, keyfile)
    else:
        gpgfile = "{0}/{1}.gpg".format(c.home_dir, keyfile)
        ascfile = "{0}/{1}.asc".format(c.home_dir, keyfile)
    else:
        if os.path.exists(os.environ["GNUPGHOME"]) is True:
            hd = os.environ["GNUPGHOME"]
        else:
            try:
                hd = subprocess.getoutput(gpgconfcmd)
            except:
                process = subprocess.Popen(gpgconfcmd.split(),
                    stdout=subprocess.PIPE)
                procom = process.communicate()
                if sys.version_info[0] == 2:
                    hd = procom[0].strip()
                else:
                    hd = procom[0].decode().strip()
            gpgfile = "{0}/{1}.gpg".format(hd, keyfile)
            ascfile = "{0}/{1}.asc".format(hd, keyfile)

        try:
            a_result = a.key_export_secret(pattern=logrus)
            b_result = b.key_export_secret(pattern=logrus)
        except:
            a_result = a.key_export_secret(pattern=None)
            b_result = b.key_export_secret(pattern=None)

        if a_result is not None:
            with open(ascfile, "wb") as f:

```

```

        f.write(a_result)
    os.chmod(ascfile, 0o600)
else:
    pass

if b_result is not None:
    with open(gpgfile, "wb") as f:
        f.write(b_result)
    os.chmod(gpgfile, 0o600)
else:
    pass
#+END_SRC

```

```

*** Sending public keys to the SKS Keyservers
:PROPERTIES:
:CUSTOM_ID: howto-send-public-key
:END:

```

As with the previous section on importing keys, the `hkp4py` module adds another option with exporting keys in order to send them to the public key servers.

The following example demonstrates how this may be done.

```

#+BEGIN_SRC python -i
import gpg
import hkp4py
import os.path
import sys

print("""
This script sends one or more public keys to the SKS key servers and is
essentially a slight variation on the export-key.py script.
""")

c = gpg.Context(armor=True)
server = hkp4py.KeyServer("hkps://hkps.pool.sks-keyservers.net")

if len(sys.argv) > 2:
    logrus = " ".join(sys.argv[1:])
elif len(sys.argv) == 2:
    logrus = sys.argv[1]
else:
    logrus = input("Enter the UID matching the key(s) to send: ")

if len(logrus) > 0:
    try:

```

```

        export_result = c.key_export(pattern=logrus)
    except Exception as e:
        print(e)
        export_result = None
else:
    export_result = c.key_export(pattern=None)

if export_result is not None:
    try:
        try:
            send_result = server.add(export_result)
        except:
            send_result = server.add(export_result.decode())
        if send_result is not None:
            print(send_result)
        else:
            pass
    except Exception as e:
        print(e)
else:
    pass
#+END_SRC

```

An expanded version of this script with additional functions for specifying an alternative homedir location is in the examples directory as =send-key-to-keyserver.py=.

The =hkp4py= module appears to handle both string and byte literal text data equally well, but the GPGME bindings deal primarily with byte literal data only and so this script sends in that format first, then tries the string literal form.

```

* Basic Functions
:PROPERTIES:
:CUSTOM_ID: howto-the-basics
:END:

```

The most frequently called features of any cryptographic library will be the most fundamental tasks for encryption software. In this section we will look at how to programmatically encrypt data, decrypt it, sign it and verify signatures.

```

** Encryption
:PROPERTIES:
:CUSTOM_ID: howto-basic-encryption
:END:

```

Encrypting is very straight forward. In the first example below the message, =text=, is encrypted to a single recipient's key. In the second example the message will be encrypted to multiple recipients.

\*\*\* Encrypting to one key

```
:PROPERTIES:  
:CUSTOM_ID: howto-basic-encryption-single  
:END:
```

Once the the Context is set the main issues with encrypting data is essentially reduced to key selection and the keyword arguments specified in the =gpg.Context().encrypt()= method.

Those keyword arguments are: =recipients=, a list of keys encrypted to (covered in greater detail in the following section); =sign=, whether or not to sign the plaintext data, see subsequent sections on signing and verifying signatures below (defaults to =True=); =sink=, to write results or partial results to a secure sink instead of returning it (defaults to =None=); =passphrase=, only used when utilising symmetric encryption (defaults to =None=); =always\_trust=, used to override the trust model settings for recipient keys (defaults to =False=); =add\_encrypt\_to=, utilises any preconfigured =encrypt-to= or =default-key= settings in the user's =gpg.conf= file (defaults to =False=); =prepare=, prepare for encryption (defaults to =False=); =expect\_sign=, prepare for signing (defaults to =False=); =compress=, compresses the plaintext prior to encryption (defaults to =True=).

```
#+BEGIN_SRC python -i  
import gpg
```

```
a_key = "0x12345678DEADBEEF"  
text = b"""Some text to test with.
```

Since the text in this case must be bytes, it is most likely that the input form will be a separate file which is opened with "rb" as this is the simplest method of obtaining the correct data format.  
"""

```
c = gpg.Context(armor=True)  
rkey = list(c.keylist(pattern=a_key, secret=False))  
ciphertext, result, sign_result = c.encrypt(text, recipients=rkey, sign=False)
```

```
with open("secret_plans.txt.asc", "wb") as afile:  
    afile.write(ciphertext)  
#+END_SRC
```

Though this is even more likely to be used like this; with the plaintext input read from a file, the recipient keys used for encryption regardless of key trust status and the encrypted output also encrypted to any preconfigured keys set in the `=gpg.conf=` file:

```
#+BEGIN_SRC python -i
import gpg

a_key = "0x12345678DEADBEEF"

with open("secret_plans.txt", "rb") as afile:
    text = afile.read()

c = gpg.Context(armor=True)
rkey = list(c.keylist(pattern=a_key, secret=False))
ciphertext, result, sign_result = c.encrypt(text, recipients=rkey, sign=True,
                                             always_trust=True,
                                             add_encrypt_to=True)

with open("secret_plans.txt.asc", "wb") as afile:
    afile.write(ciphertext)
#+END_SRC
```

If the `=recipients=` parameter is empty then the plaintext is encrypted symmetrically. If no `=passphrase=` is supplied as a parameter or via a callback registered with the `=Context()=` then an out-of-band prompt for the passphrase via `pinentry` will be invoked.

```
*** Encrypting to multiple keys
:PROPERTIES:
:CUSTOM_ID: howto-basic-encryption-multiple
:END:
```

Encrypting to multiple keys essentially just expands upon the key selection process and the recipients from the previous examples.

The following example encrypts a message (`=text=`) to everyone with an email address on the `=gnupg.org=` domain, `[fn:4]` but does `/not/` encrypt to a default key or other key which is configured to normally encrypt to.

```
#+BEGIN_SRC python -i
import gpg

text = b"""Oh look, another test message.
```

The same rules apply as with the previous example and more likely



than not, the message will actually be drawn from reading the contents of a file or, maybe, from entering data at an input() prompt.

Since the text in this case must be bytes, it is most likely that the input form will be a separate file which is opened with "rb" as this is the simplest method of obtaining the correct data format.

```
"""
```

```
c = gpg.Context(armor=True)
rpattern = list(c.keylist(pattern="@gnupg.org", secret=False))
logrus = []

for i in range(len(rpattern)):
    if rpattern[i].can_encrypt == 1:
        logrus.append(rpattern[i])

ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                             sign=False, always_trust=True)

with open("secret_plans.txt.asc", "wb") as afile:
    afile.write(ciphertext)
#+END_SRC
```

All it would take to change the above example to sign the message and also encrypt the message to any configured default keys would be to change the `=c.encrypt=` line to this:

```
#+BEGIN_SRC python -i
ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                             always_trust=True,
                                             add_encrypt_to=True)
#+END_SRC
```

The only keyword arguments requiring modification are those for which the default values are changing. The default value of `=sign=` is `=True=`, the default of `=always_trust=` is `=False=`, the default of `=add_encrypt_to=` is `=False=`.

If `=always_trust=` is not set to `=True=` and any of the recipient keys are not trusted (e.g. not signed or locally signed) then the encryption will raise an error. It is possible to mitigate this somewhat with something more like this:

```
#+BEGIN_SRC python -i
import gpg
```

```

with open("secret_plans.txt.asc", "rb") as afile:
    text = afile.read()

c = gpg.Context(armor=True)
rpattern = list(c.keylist(pattern="@gnupg.org", secret=False))
logrus = []

for i in range(len(rpattern)):
    if rpattern[i].can_encrypt == 1:
        logrus.append(rpattern[i])

    try:
        ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                                    add_encrypt_to=True)
    except gpg.errors.InvalidRecipients as e:
        for i in range(len(e.recipients)):
            for n in range(len(logrus)):
                if logrus[n].fpr == e.recipients[i].fpr:
                    logrus.remove(logrus[n])
            else:
                pass
        try:
            ciphertext, result, sign_result = c.encrypt(text,
                                                        recipients=logrus,
                                                        add_encrypt_to=True)
        with open("secret_plans.txt.asc", "wb") as afile:
            afile.write(ciphertext)
    except:
        pass
#+END_SRC

```

This will attempt to encrypt to all the keys searched for, then remove invalid recipients if it fails and try again.

```

** Decryption
:PROPERTIES:
:CUSTOM_ID: howto-basic-decryption
:END:

```

Decrypting something encrypted to a key in one's secret keyring is fairly straight forward.

In this example code, however, preconfiguring either `=gpg.Context()` or `=gpg.core.Context()` as `=c=` is unnecessary because there is no need to modify the Context prior to conducting the decryption and since the Context is only used once, setting it to `=c=` simply adds lines for no gain.

```

#+BEGIN_SRC python -i
import gpg

ciphertext = input("Enter path and filename of encrypted file: ")
newfile = input("Enter path and filename of file to save decrypted data to: ")

with open(ciphertext, "rb") as cfile:
    try:
        plaintext, result, verify_result = gpg.Context().decrypt(cfile)
    except gpg.errors.GPGMEError as e:
        plaintext = None
        print(e)

if plaintext is not None:
    with open(newfile, "wb") as nfile:
        nfile.write(plaintext)
    else:
        pass
#+END_SRC

```

The data available in `plaintext` in this example is the decrypted content as a byte object, the recipient key IDs and algorithms in `result` and the results of verifying any signatures of the data in `verify_result`.

If `gpg.Context().decrypt(cfile, verify=False)` is called instead, then `verify_result` will be returned as `None` and the rest remains as described here.

```

** Signing text and files
:PROPERTIES:
:CUSTOM_ID: howto-basic-signing
:END:

```

The following sections demonstrate how to specify keys to sign with.

```

*** Signing key selection
:PROPERTIES:
:CUSTOM_ID: howto-basic-signing-signers
:END:

```

By default GPGME and the Python bindings will use the default key configured for the user invoking the GPGME API. If there is no default key specified and there is more than one secret key available it may be necessary to specify the key or keys with which to sign

messages and files.

```
#+BEGIN_SRC python -i
import gpg

logrus = input("Enter the email address or string to match signing keys to: ")
hancock = gpg.Context().keylist(pattern=logrus, secret=True)
sig_src = list(hancock)
#+END_SRC
```

The signing examples in the following sections include the explicitly designated `=signers=` parameter in two of the five examples; once where the resulting signature would be ASCII armoured and once where it would not be armoured.

While it would be possible to enter a key ID or fingerprint here to match a specific key, it is not possible to enter two fingerprints and match two keys since the `patten` expects a string, bytes or None and not a list. A string with two fingerprints won't match any single key.

```
*** Normal or default signing messages or files
:PROPERTIES:
:CUSTOM_ID: howto-basic-signing-normal
:END:
```

The normal or default signing process is essentially the same as is most often invoked when also encrypting a message or file. So when the encryption component is not utilised, the result is to produce an encoded and signed output which may or may not be ASCII armoured and which may or may not also be compressed.

By default compression will be used unless GnuPG detects that the plaintext is already compressed. ASCII armouring will be determined according to the value of `=gpg.Context().armor=`.

The compression algorithm is selected in much the same way as the symmetric encryption algorithm or the hash digest algorithm is when multiple keys are involved; from the preferences saved into the key itself or by comparison with the preferences with all other keys involved.

```
#+BEGIN_SRC python -i
import gpg

text0 = ""Declaration of ... something.
```

```

"""
text = text0.encode()

c = gpg.Context(armor=True, signers=sig_src)
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.NORMAL)

with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())
#+END_SRC

```

Though everything in this example is accurate, it is more likely that reading the input data from another file and writing the result to a new file will be performed more like the way it is done in the next example. Even if the output format is ASCII armoured.

```

#+BEGIN_SRC python -i
import gpg

with open("/path/to/statement.txt", "rb") as tfile:
    text = tfile.read()

c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.NORMAL)

with open("/path/to/statement.txt.sig", "wb") as afile:
    afile.write(signed_data)
#+END_SRC

```

```

*** Detached signing messages and files
:PROPERTIES:
:CUSTOM_ID: howto-basic-signing-detached
:END:

```

Detached signatures will often be needed in programmatic uses of GPGME, either for signing files (e.g. tarballs of code releases) or as a component of message signing (e.g. PGP/MIME encoded email).

```

#+BEGIN_SRC python -i
import gpg

text0 = """Declaration of ... something.

"""
text = text0.encode()

c = gpg.Context(armor=True)
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.DETACH)

```

```
with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())
#+END_SRC
```

As with normal signatures, detached signatures are best handled as byte literals, even when the output is ASCII armoured.

```
#+BEGIN_SRC python -i
import gpg
```

```
with open("/path/to/statement.txt", "rb") as tfile:
    text = tfile.read()
```

```
c = gpg.Context(signers=sig_src)
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.DETACH)
```

```
with open("/path/to/statement.txt.sig", "wb") as afile:
    afile.write(signed_data)
#+END_SRC
```

```
*** Clearsigning messages or text
:PROPERTIES:
:CUSTOM_ID: howto-basic-signing-clear
:END:
```

Though PGP/in-line messages are no longer encouraged in favour of PGP/MIME, there is still sometimes value in utilising in-line signatures. This is where clear-signed messages or text is of value.

```
#+BEGIN_SRC python -i
import gpg
```

```
text0 = """Declaration of ... something.
```

```
"""
```

```
text = text0.encode()
```

```
c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.CLEAR)
```

```
with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())
#+END_SRC
```

In spite of the appearance of a clear-signed message, the data handled by GPGME in signing it must still be byte literals.

```

#+BEGIN_SRC python -i
import gpg

with open("/path/to/statement.txt", "rb") as tfile:
    text = tfile.read()

c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.CLEAR)

with open("/path/to/statement.txt.asc", "wb") as afile:
    afile.write(signed_data)
#+END_SRC

```

```

** Signature verification
:PROPERTIES:
:CUSTOM_ID: howto-basic-verification
:END:

```

Essentially there are two principal methods of verification of a signature. The first of these is for use with the normal or default signing method and for clear-signed messages. The second is for use with files and data with detached signatures.

The following example is intended for use with the default signing method where the file was not ASCII armoured:

```

#+BEGIN_SRC python -i
import gpg
import time

filename = "statement.txt"
gpg_file = "statement.txt.gpg"

c = gpg.Context()

try:
    data, result = c.verify(open(gpg_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:

```

```

{0}
with key {1}
made at {2}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
           time.ctime(sign.timestamp)))
else:
    pass
#+END_SRC

```

Whereas this next example, which is almost identical would work with normal ASCII armoured files and with clear-signed files:

```

#+BEGIN_SRC python -i
import gpg
import time

filename = "statement.txt"
asc_file = "statement.txt.asc"

c = gpg.Context()

try:
    data, result = c.verify(open(asc_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
{0}
with key {1}
made at {2}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
           time.ctime(sign.timestamp)))
    else:
        pass
#+END_SRC

```

In both of the previous examples it is also possible to compare the original data that was signed against the signed data in =data= to see if it matches with something like this:

```

#+BEGIN_SRC python -i
with open(filename, "rb") as afile:
    text = afile.read()

```



```

if text == data:
    print("Good signature.")
else:
    pass
#+END_SRC

```

The following two examples, however, deal with detached signatures. With his method of verification the data that was signed does not get returned since it is already being explicitly referenced in the first argument of `c.verify`. So `=data=` is `=None=` and only the information in `=result=` is available.

```

#+BEGIN_SRC python -i
import gpg
import time

filename = "statement.txt"
sig_file = "statement.txt.sig"

c = gpg.Context()

try:
    data, result = c.verify(open(filename), open(sig_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
{0}
with key {1}
made at {2}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))
    else:
        pass
#+END_SRC

```

```

#+BEGIN_SRC python -i
import gpg
import time

filename = "statement.txt"
asc_file = "statement.txt.asc"

```

```

c = gpg.Context()

try:
    data, result = c.verify(open(filename), open(asc_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
{0}
with key {1}
made at {2}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))
    else:
        pass
#+END_SRC

```

```

* Creating keys and subkeys
:PROPERTIES:
:CUSTOM_ID: key-generation
:END:

```

The one thing, aside from GnuPG itself, that GPGME depends on, of course, is the keys themselves. So it is necessary to be able to generate them and modify them by adding subkeys, revoking or disabling them, sometimes deleting them and doing the same for user IDs.

In the following examples a key will be created for the world's greatest secret agent, Danger Mouse. Since Danger Mouse is a secret agent he needs to be able to protect information to =SECRET= level clearance, so his keys will be 3072-bit keys.

The pre-configured =gpg.conf= file which sets cipher, digest and other preferences contains the following configuration parameters:

```

#+BEGIN_SRC conf
expert
allow-freeform-uid
allow-secret-key-import
trust-model tofu+pgp
tofu-default-policy unknown

```

```

enable-large-rsa
enable-dsa2
cert-digest-algo SHA512
default-preference-list TWOFISH CAMELLIA256 AES256 CAMELLIA192 AES192 CAMELLIA128 AES
BLOWFISH IDEA CAST5 3DES SHA512 SHA384 SHA256 SHA224 RIPEMD160 SHA1 ZLIB BZIP2 ZIP
Uncompressed
personal-cipher-preferences TWOFISH CAMELLIA256 AES256 CAMELLIA192 AES192 CAMELLIA128 AES
BLOWFISH IDEA CAST5 3DES
personal-digest-preferences SHA512 SHA384 SHA256 SHA224 RIPEMD160 SHA1
personal-compress-preferences ZLIB BZIP2 ZIP Uncompressed
#+END_SRC

```

```

** Primary key
:PROPERTIES:
:CUSTOM_ID: keygen-primary
:END:

```

Generating a primary key uses the `create_key` method in a Context. It contains multiple arguments and keyword arguments, including: `userid`, `algorithm`, `expires_in`, `expires`, `sign`, `encrypt`, `certify`, `authenticate`, `passphrase` and `force`. The defaults for all of those except `userid`, `algorithm`, `expires_in`, `expires` and `passphrase` is `False`. The defaults for `algorithm` and `passphrase` is `None`. The default for `expires_in` is `0`. The default for `expires` is `True`. There is no default for `userid`.

If `passphrase` is left as `None` then the key will not be generated with a passphrase, if `passphrase` is set to a string then that will be the passphrase and if `passphrase` is set to `True` then `gpg-agent` will launch `pinentry` to prompt for a passphrase. For the sake of convenience, these examples will keep `passphrase` set to `None`.

```

#+BEGIN_SRC python -i
import gpg

c = gpg.Context()

c.home_dir = "~/gnupg-dm"
userid = "Danger Mouse <dm@secret.example.net>"

dmkey = c.create_key(userid, algorithm="rsa3072", expires_in=31536000,
                    sign=True, certify=True)
#+END_SRC

```

One thing to note here is the use of setting the `c.home_dir` parameter. This enables generating the key or keys in a different location. In this case to keep the new key data created for this

example in a separate location rather than adding it to existing and active key store data. As with the default directory, `~/.gnupg`, any temporary or separate directory needs the permissions set to only permit access by the directory owner. On posix systems this means setting the directory permissions to 700.

The `temp-homedir-config.py` script in the HOWTO examples directory will create an alternative homedir with these configuration options already set and the correct directory and file permissions.

The successful generation of the key can be confirmed via the returned `GenkeyResult` object, which includes the following data:

```
#+BEGIN_SRC python -i
print("""
Fingerprint: {0}
Primary Key: {1}
Public Key: {2}
Secret Key: {3}
Sub Key: {4}
User IDs: {5}
""".format(dmkey.fpr, dmkey.primary, dmkey.pubkey, dmkey.seckey, dmkey.sub,
           dmkey.uid))
#+END_SRC
```

Alternatively the information can be confirmed using the command line program:

```
#+BEGIN_SRC shell
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/.gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid      [ultimate] Danger Mouse <dm@secret.example.net>

bash-4.4$
#+END_SRC
```

As with generating keys manually, to preconfigure expanded preferences for the cipher, digest and compression algorithms, the `gpg.conf` file must contain those details in the home directory in which the new key is being generated. I used a cut down version of my own `gpg.conf` file in order to be able to generate this:

```
#+BEGIN_SRC shell
bash-4.4$ gpg --homedir ~/.gnupg-dm --edit-key 177B7C25DB99745EE2EE13ED026D2F19E99E63AA showpref
quit
```

Secret key is available.

```
sec rsa3072/026D2F19E99E63AA
  created: 2018-03-15 expires: 2019-03-15 usage: SC
  trust: ultimate validity: ultimate
[ultimate] (1). Danger Mouse <dm@secret.example.net>
```

```
[ultimate] (1). Danger Mouse <dm@secret.example.net>
  Cipher: TWOFISH, CAMELLIA256, AES256, CAMELLIA192, AES192, CAMELLIA128, AES, BLOWFISH,
  IDEA, CAST5, 3DES
  Digest: SHA512, SHA384, SHA256, SHA224, RIPEMD160, SHA1
  Compression: ZLIB, BZIP2, ZIP, Uncompressed
  Features: MDC, Keyserver no-modify
```

```
bash-4.4$
#+END_SRC
```

```
** Subkeys
:PROPERTIES:
:CUSTOM_ID: keygen-subkeys
:END:
```

Adding subkeys to a primary key is fairly similar to creating the primary key with the `=create_subkey=` method. Most of the arguments are the same, but not quite all. Instead of the `=userid=` argument there is now a `=key=` argument for selecting which primary key to add the subkey to.

In the following example an encryption subkey will be added to the primary key. Since Danger Mouse is a security conscious secret agent, this subkey will only be valid for about six months, half the length of the primary key.

```
#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
c.home_dir = "~/gnupg-dm"

key = c.get_key(dmkey.fpr, secret=True)
dmsub = c.create_subkey(key, algorithm="rsa3072", expires_in=15768000,
                        encrypt=True)
#+END_SRC
```

As with the primary key, the results here can be checked with:

```
#+BEGIN_SRC python -i
```

```

print("""
Fingerprint: {0}
Primary Key: {1}
Public Key: {2}
Secret Key: {3}
Sub Key: {4}
User IDs: {5}
""".format(dmsub.fpr, dmsub.primary, dmsub.pubkey, dmsub.seckey, dmsub.sub,
           dmsub.uid))
#+END_SRC

```

As well as on the command line with:

```

#+BEGIN_SRC shell
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/.gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid      [ultimate] Danger Mouse <dm@secret.example.net>
ssb  rsa3072 2018-03-15 [E] [expires: 2018-09-13]

bash-4.4$
#+END_SRC

```

```

** User IDs
:PROPERTIES:
:CUSTOM_ID: keygen-uids
:END:

```

```

*** Adding User IDs
:PROPERTIES:
:CUSTOM_ID: keygen-uids-add
:END:

```

By comparison to creating primary keys and subkeys, adding a new user ID to an existing key is much simpler. The method used to do this is `=key_add_uid=` and the only arguments it takes are for the `=key=` and the new `=uid=`.

```

#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
c.home_dir = "~/.gnupg-dm"

```

```
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"  
key = c.get_key(dmfpr, secret=True)  
uid = "Danger Mouse <danger.mouse@secret.example.net>"
```

```
c.key_add_uid(key, uid)  
#+END_SRC
```

Unsurprisingly the result of this is:

```
#+BEGIN_SRC shell  
bash-4.4$ gpg --homedir ~/.gnupg-dm -K  
~/.gnupg-dm/pubring.kbx  
-----  
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]  
177B7C25DB99745EE2EE13ED026D2F19E99E63AA  
uid    [ultimate] Danger Mouse <danger.mouse@secret.example.net>  
uid    [ultimate] Danger Mouse <dm@secret.example.net>  
ssb  rsa3072 2018-03-15 [E] [expires: 2018-09-13]  
  
bash-4.4$  
#+END_SRC
```

```
*** Revoking User IDs  
:PROPERTIES:  
:CUSTOM_ID: keygen-uids-revoke  
:END:
```

Revoking a user ID is a fairly similar process, except that it uses the `=key_revoke_uid=` method.

```
#+BEGIN_SRC python -i  
import gpg  
  
c = gpg.Context()  
c.home_dir = "~/.gnupg-dm"  
  
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"  
key = c.get_key(dmfpr, secret=True)  
uid = "Danger Mouse <danger.mouse@secret.example.net>"  
  
c.key_revoke_uid(key, uid)  
#+END_SRC
```

```
** Key certification  
:PROPERTIES:  
:CUSTOM_ID: key-sign
```

:END:

Since key certification is more frequently referred to as key signing, the method used to perform this function is `=key_sign=`.

The `=key_sign=` method takes four arguments: `=key=`, `=uids=`, `=expires_in=` and `=local=`. The default value of `=uids=` is `=None=` and which results in all user IDs being selected. The default value of both `=expires_in=` and `=local=` is `=False=`; which results in the signature never expiring and being able to be exported.

The `=key=` is the key being signed rather than the key doing the signing. To change the key doing the signing refer to the signing key selection above for signing messages and files.

If the `=uids=` value is not `=None=` then it must either be a string to match a single user ID or a list of strings to match multiple user IDs. In this case the matching of those strings must be precise and it is case sensitive.

To sign Danger Mouse's key for just the initial user ID with a signature which will last a little over a month, do this:

```
#+BEGIN_SRC python -i
import gpg

c = gpg.Context()
uid = "Danger Mouse <dm@secret.example.net>"

dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
key = c.get_key(dmfpr, secret=True)
c.key_sign(key, uids=uid, expires_in=2764800)
#+END_SRC
```

\*\*\* Verifying key certifications

```
:PROPERTIES:
:CUSTOM_ID: key-sign-verify
:END:
```

```
#+BEGIN_SRC python -i
import gpg
import time

c = gpg.Context()
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
keys = list(c.keylist(pattern=dmuid, mode=gpg.constants.keylist.mode.SIGS))
key = keys[0]
```



```

for user in key.uids:
    for sig in user.signatures:
        print("0x{0}".format(sig.keyid), "", time.ctime(sig.timestamp), "",
              sig.uid)
#+END_SRC

```

Which for Danger Mouse displays the following:

```

#+BEGIN_EXAMPLE
0x92E3F6115435C65A Thu Mar 15 13:17:44 2018 Danger Mouse <dm@secret.example.net>
0x321E4E2373590E5D Mon Nov 26 12:46:05 2018 Ben McGinnes <ben@adversary.org>
#+END_EXAMPLE

```

The two key signatures listed are for the self-certification of Danger Mouse's key made when the key was created in March, 2018; and the second is a signature made by the author and set to expire at the end of the year. Note that the second signature was made with the following code (including the preceding code to display the output of the certifications or key signatures):

```

#+BEGIN_SRC python -i
import gpg
import math
import pendulum
import time

hd = "/home/dm/.gnupg"
c = gpg.Context()
d = gpg.Context(home_dir=hd)
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
dmuid = "Danger Mouse <dm@secret.example.net>"
dkeys = list(c.keylist(pattern=dmuid))
dmkey = dkeys[0]

c.key_import(d.key_export(pattern=None))

tp = pendulum.period(pendulum.now(tz="local"), pendulum.datetime(2019, 1, 1))
ts = tp.total_seconds()
total_secs = math.ceil(ts)
c.key_sign(dmkey, uids=dmuid, expires_in=total_secs)

d.key_import(c.key_export(pattern=dmuid))
keys = list(c.keylist(pattern=dmuid, mode=gpg.constants.keylist.mode.SIGS))
key = keys[0]

for user in key.uids:
    for sig in user.signatures:

```

```
    print("0x{0}".format(sig.keyid), "", time.ctime(sig.timestamp), "",
          sig.uid)
#+END_SRC
```

Note that this final code block includes the use of a module which is /not/ part of Python's standard library, the [\[https://pendulum.eustace.io/\]](https://pendulum.eustace.io/)`[pendulum module]`. Unlike the standard datetime module, pendulum makes working with dates and times significantly easier in Python; just as the requests module makes working with HTTP and HTTPS easier than the builtin modules do.

Though neither requests nor pendulum are required modules for using the GPGME Python bindings, they are both highly recommended more generally.

```
* Advanced or Experimental Use Cases
:PROPERTIES:
:CUSTOM_ID: advanced-use
:END:
```

```
** C plus Python plus SWIG plus Cython
:PROPERTIES:
:CUSTOM_ID: cython
:END:
```

In spite of the apparent incongruence of using Python bindings to a C interface only to generate more C from the Python; it is in fact quite possible to use the GPGME bindings with [\[\[http://docs.cython.org/en/latest/index.html\]\]](http://docs.cython.org/en/latest/index.html)`[Cython]`. Though in many cases the benefits may not be obvious since the most computationally intensive work never leaves the level of the C code with which GPGME itself is interacting with.

Nevertheless, there are some situations where the benefits are demonstrable. One of the better and easier examples being the one of the early examples in this HOWTO, the [\[\[#howto-keys-counting\]\]](#)`[key counting]` code. Running that example as an executable Python script, `=keycount.py=` (available in the `=examples/howto/=` directory), will take a noticeable amount of time to run on most systems where the public keybox or keyring contains a few thousand public keys.

Earlier in the evening, prior to starting this section, I ran that script on my laptop; as I tend to do periodically and timed it using `=time=` utility, with the following results:

```
#+BEGIN_SRC shell
bash-4.4$ time keycount.py
```

Number of secret keys: 23  
Number of public keys: 12112

```
real 11m52.945s  
user 0m0.913s  
sys 0m0.752s
```

```
bash-4.4$  
#+END_SRC
```

Sometime after that I imported another key and followed it with a little test of Cython. This test was kept fairly basic, essentially lifting the material from the [\[\[http://docs.cython.org/en/latest/src/tutorial/cython\\_tutorial.html\]\]](http://docs.cython.org/en/latest/src/tutorial/cython_tutorial.html) [Cython Basic Tutorial] to demonstrate compiling Python code to C. The first step was to take the example key counting code quoted previously, essentially from the importing of the `=gpg=` module to the end of the script:

```
#+BEGIN_SRC python -i  
import gpg  
  
c = gpg.Context()  
seckeys = c.keylist(pattern=None, secret=True)  
pubkeys = c.keylist(pattern=None, secret=False)  
  
seclist = list(seckeys)  
secnum = len(seclist)  
  
publist = list(pubkeys)  
pubnum = len(publist)  
  
print("""  
    Number of secret keys: {0}  
    Number of public keys: {1}  
  
    """.format(secnum, pubnum))  
#+END_SRC
```

Save that into a file called `=keycount.pyx=` and then create a `=setup.py=` file which contains this:

```
#+BEGIN_SRC python -i  
from distutils.core import setup  
from Cython.Build import cythonize  
  
setup(  

```

```
    ext_modules = cythonize("keycount.pyx")
)
#+END_SRC
```

Compile it:

```
#+BEGIN_SRC shell
bash-4.4$ python setup.py build_ext --inplace
bash-4.4$
#+END_SRC
```

Then run it in a similar manner to =keycount.py=:

```
#+BEGIN_SRC shell
bash-4.4$ time python3.7 -c "import keycount"
```

```
Number of secret keys: 23
Number of public keys: 12113
```

```
real 6m47.905s
user 0m0.785s
sys 0m0.331s
```

```
bash-4.4$
#+END_SRC
```

Cython turned =keycount.pyx= into an 81KB =keycount.o= file in the =build/= directory, a 24KB =keycount.cpython-37m-darwin.so= file to be imported into Python 3.7 and a 113KB =keycount.c= generated C source code file of nearly three thousand lines. Quite a bit bigger than the 314 bytes of the =keycount.pyx= file or the full 1,452 bytes of the full executable =keycount.py= example script.

On the other hand it ran in nearly half the time; taking 6 minutes and 47.905 seconds to run. As opposed to the 11 minutes and 52.945 seconds which the CPython script alone took.

The =keycount.pyx= and =setup.py= files used to generate this example have been added to the =examples/howto/advanced/cython/= directory. The example versions include some additional options to annotate the existing code and to detect Cython's use. The latter comes from the [\[\[http://docs.cython.org/en/latest/src/tutorial/pure.html#magic-attributes-within-the-pxd\]\]](http://docs.cython.org/en/latest/src/tutorial/pure.html#magic-attributes-within-the-pxd) [Magic Attributes] section of the Cython documentation.

\* Miscellaneous extras and work-arounds  
:PROPERTIES:

```
:CUSTOM_ID: cheats-and-hacks
```

```
:END:
```

Most of the things in the following sections are here simply because there was no better place to put them, even though some are only peripherally related to the GPGME Python bindings. Some are also workarounds for functions not integrated with GPGME as yet. This is especially true of the first of these, dealing with `[[#group-lines][group lines]]`.

```
** Group lines
```

```
:PROPERTIES:
```

```
:CUSTOM_ID: group-lines
```

```
:END:
```

There is not yet an easy way to access groups configured in the `gpg.conf` file from within GPGME. As a consequence these central groupings of keys cannot be shared amongst multiple programs, such as MUAs readily.

The following code, however, provides a work-around for obtaining this information in Python.

```
#+BEGIN_SRC python -i
import subprocess
import sys

if sys.platform == "win32":
    gpgconfcmd = "gpgconf.exe --list-options gpg"
else:
    gpgconfcmd = "gpgconf --list-options gpg"

process = subprocess.Popen(gpgconfcmd.split(), stdout=subprocess.PIPE)
procom = process.communicate()

if sys.version_info[0] == 2:
    lines = procom[0].splitlines()
else:
    lines = procom[0].decode().splitlines()

for line in lines:
    if line.startswith("group") is True:
        break

groups = line.split(":-")[-1].replace("'", "").split(',')

group_lines = []
group_lists = []
```

```
for group in groups:
    group_lines.append(group.split("="))
    group_lists.append(group.split("="))
```

```
for glist in group_lists:
    glist[1] = glist[1].split()
#+END_SRC
```

The result of that code is that `group_lines` is a list of lists where `group_lines[i][0]` is the name of the group and `group_lines[i][1]` is the key IDs of the group as a string.

The `group_lists` result is very similar in that it is a list of lists. The first part, `group_lists[i][0]` matches `group_lines[i][0]` as the name of the group, but `group_lists[i][1]` is the key IDs of the group as a list.

A demonstration of using the `groups.py` module is also available in the form of the executable `mutt-groups.py` script. This second script reads all the group entries in a user's `gpg.conf` file and converts them into crypt-hooks suitable for use with the Mutt and Neomutt mail clients.

```
** Keyserver access for Python
:PROPERTIES:
:CUSTOM_ID: hkp4py
:END:
```

The [\[https://github.com/Selfnet/hkp4py\]](https://github.com/Selfnet/hkp4py) `hkp4py` module by Marcel Fest was originally a port of the old [\[https://github.com/dgladkov/python-hkp\]](https://github.com/dgladkov/python-hkp) `python-hkp` module from Python 2 to Python 3 and updated to use the [\[http://docs.python-requests.org/en/latest/index.html\]](http://docs.python-requests.org/en/latest/index.html) `requests` module instead. It has since been modified to provide support for Python 2.7 as well and is available via PyPI.

Since it rewrites the `hkp` protocol prefix as `http` and `hkps` as `https`, the module is able to be used even with servers which do not support the full scope of keyserver functions.<sup>[fn:5]</sup> It also works quite readily when incorporated into a `[#cython]` `Cython` generated and compiled version of any code.

```
*** Key import format
:PROPERTIES:
:CUSTOM_ID: hkp4py-strings
:END:
```

The `hkp4py` module returns key data via requests as string literals (`=r.text=`) instead of byte literals (`=r.content=`). This means that the returned key data must be encoded to UTF-8 when importing that key material using a `=gpg.Context().key_import(=` method.

For this reason an alternative method has been added to the `=search=` function of `=hkp4py.KeyServer(=` which returns the key in the correct format as expected by `=key_import=`. When importing using this module, it is now possible to import with this:

```
#+BEGIN_SRC python -i
for key in keys:
    if key.revoked is False:
        gpg.Context().key_import(key.key_blob)
    else:
        pass
#+END_SRC
```

Without that recent addition it would have been necessary to encode the contents of each `=hkp4py.KeyServer().search()[i].key=` in `=hkp4py.KeyServer().search(=` before trying to import it.

An example of this is included in the `[[#howto-import-key][Importing Keys]]` section of this HOWTO and the corresponding executable version of that example is available in the `=lang/python/examples/howto=` directory as normal; the executable version is the `=import-keys-hkp.py=` file.

```
** GPGME version checking
:PROPERTIES:
:CUSTOM_ID: gpgme-version-check
:END:
```

For various reasons it may be necessary to check which version of GPGME the bindings have been built against; including whether a minimum required version of GPGME is in use.

For the most part the `=gpg.version.versionstr=` and `=gpg.version.versionlist=` methods have been quite sufficient. The former returns the same string as `=gpgme-config --version=`, while the latter returns the major, minor and patch values in a list.

To check if the installed bindings have actually been built against the current installed `libgpgme` version, this check can be performed:

```
#+BEGIN_SRC python -i
import gpg
import subprocess
```

```

import sys

gpgme_version_call = subprocess.Popen(["gpgme-config", "--version"],
                                       stdout=subprocess.PIPE,
                                       stderr=subprocess.PIPE)
gpgme_version_str = gpgme_version_call.communicate()

if sys.version_info[0] == 2:
    gpgme_version = gpgme_version_str[0].strip()
elif sys.version_info[0] >= 3:
    gpgme_version = gpgme_version_str[0].decode().strip()
else:
    gpgme_version = None

if gpgme_version is not None:
    if gpgme_version == gpg.version.versionstr:
        print("The GPGME Python bindings match libgpgme.")
    else:
        print("The GPGME Python bindings do NOT match libgpgme.")
else:
    print("Upgrade Python and reinstall the GPGME Python bindings.")
#+END_SRC

```

For many developers, however, the preferred checking means checking for a minimum version or point release. This is now readily available via the `=gpg.version.versionintlist=` method (added in version `=1.12.1-beta79=`). It is also now possible to easily check whether the installed GPGME Python bindings were built from a development or beta branch of the GPGME source code.

The following code demonstrates how both of those methods may be used:

```

#+BEGIN_SRC python -i
import gpg

try:
    if gpg.version.is_beta is True:
        print("The installed GPGME Python bindings were built from beta code.")
    else:
        print("The installed GPGME Python bindings are a released version.")
except Exception as e:
    print(e)

try:
    if gpg.version.versionintlist[0] == 1:
        if gpg.version.versionintlist[1] == 12:
            if gpg.version.versionintlist[2] == 1:
                print("This is the minimum version for using versionintlist.")

```



```

elif gpg.version.versionintlist[2] > 1:
    print("The versionintlist method is available.")
else:
    pass
elif gpg.version.versionintlist[1] > 12:
    print("The versionintlist method is available.")
else:
    pass
elif gpg.version.versionintlist[0] > 1:
    print("The versionintlist method is available.")
else:
    pass
except Exception as e:
    print(e)
#+END_SRC

```

The points where `=pass=` is used in the above example will most likely also produce an `=Exception=` error since those results should only occur in versions which do not have the `=gpgme.version.is_beta=` and `=gpgme.version.versionintlist=` methods available.

\* Copyright and Licensing

```

:PROPERTIES:
:CUSTOM_ID: copyright-and-license
:END:

```

\*\* Copyright

```

:PROPERTIES:
:CUSTOM_ID: copyright
:END:

```

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\*\* Draft Editions of this HOWTO

```

:PROPERTIES:
:CUSTOM_ID: draft-editions
:END:

```

Draft editions of this HOWTO may be periodically available directly from the author at any of the following URLs:

- [[<https://files.au.adversary.org/crypto/gpgme-python-howto.html>][GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 SSL)]]
- [[<http://files.au.adversary.org/crypto/gpgme-python-howto.html>][GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 no SSL)]]

- <https://files.au.adversary.org/crypto/gpgme-python-howto-split/index.html> [GPGME Python Bindings HOWTO draft (HTML multiple files, AWS S3 SSL)]
- <http://files.au.adversary.org/crypto/gpgme-python-howto/index.html> [GPGME Python Bindings HOWTO draft (HTML multiple files, AWS S3 no SSL)]

These draft versions have been generated from this document via GNU Emacs <https://orgmode.org/> [Org mode] to `=.texi=` and <https://www.gnu.org/software/texinfo/> [GNU Texinfo] to HTML. Though it is likely that the specific <https://files.au.adversary.org/crypto/gpgme-python-howto/> [file] <http://files.au.adversary.org/crypto/gpgme-python-howto.org/> [version] used will be on the same server with the generated output formats. Occasionally I may include the Org mode generated XHTML versions:

- <https://files.au.adversary.org/crypto/gpgme-python-howto.xhtml> [GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 SSL)]
- <http://files.au.adversary.org/crypto/gpgme-python-howto.xhtml> [GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 no SSL)]

That XHTML version, however, is exported in a way which inherits a colour scheme from <https://github.com/holomorph/emacs-zenburn> [the author's Emacs theme] (which is a higher contrast version of <http://kippura.org/zenburnpage/> [Zenburn] ported by <https://github.com/holomorph> [Holomorph]). So it's fine for people who prefer dark themed web pages, but not so great for everyone else.

The GNU Texinfo and reStructured Text versions ship with the software, while the GNU Emacs Info version is generated from the Texinfo version using GNU Texinfo or GNU Makeinfo. The Texinfo format is generated from the original Org mode source file in Org mode itself either within GNU Emacs or via the command line by invoking Emacs in batch mode:

```
#+BEGIN_SRC shell
emacs gpgme-python-howto.org --batch -f org-texinfo-export-to-texinfo --kill
emacs gpgme-python-howto --batch -f org-texinfo-export-to-texinfo --kill
#+END_SRC
```

The reStructuredText format is also generated from the Org mode source file, except it is generated using <https://pandoc.org/> [Pandoc] with either of the following commands (depending on the filename):

```
#+BEGIN_SRC shell
pandoc -f org -t rst+smart -o gpgme-python-howto.rst gpgme-python-howto.org
pandoc -f org -t rst+smart -o gpgme-python-howto.rst gpgme-python-howto
#+END_SRC
```

Note that the Org mode source files are identified as such via a mode line at the top of each file and have had their `=.org=` file extensions

dropped in order to make scripted generation of output formats easier and not require renaming files post-conversion.

Due to a bug in Org mode's texinfo conversion method, the recommended steps for generating the Texinfo files for all the files in the =lang/python/doc/src/= directory are as follows:

```
#+BEGIN_SRC shell
for x in * ; do
  emacs $x --batch -f org-texinfo-export-to-texinfo --kill
  cat $x.texi | sed -e 's/@documentencoding UTF-8/@documentencoding utf-8/g' > ../texinfo/$x.texi
  pandoc -f org -t rst+smart -o ../rst/$x.rst $x
done ;
rm -fv *.texi
cd ../texinfo
mkdir info
mkdir html
for x in *.texi ; do
  makeinfo -v $x
  makeinfo --html --no-split $x
done ;
mv *.info info/
mv *.html html/
#+END_SRC
```

This code snippet includes the generation of the reStructuredText files and would be expected to be run from the =doc/src/= directory containing the Org mode source files. It also assumes that the commands are being run on POSIX compliant systems with basic tools like sed, the Bourne shell and GNU Emacs[fn:6] available. The code snippet also includes the steps for generating the Emacs Info files and HTML files from the Texinfo files. Using reStructuredText files with Sphinx is best left for the documentation of that project.

In addition to these there is a significantly less frequently updated version as a HTML [[https://files.au.adversary.org/crypto/gpgme-python/dita/webhelp/index.html][WebHelp site]] (AWS S3 SSL); generated from DITA XML source files, which can be found in [[https://dev.gnupg.org/source/gpgme/browse/ben%252Fhowto-dita/][an alternative branch]] of the GPGME git repository.

Various generated output formats may occasionally be found in subdirectories of the [[https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python][gpgme-python]] directory. In particular within the [[https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/dita][DITA]], [[https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/rst][reStructuredText]] and [[https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/texinfo][Texinfo]] subdirectories. The =rst=

directory contains output files generated with Sphinx and may include a considerable number of its possible output formats, but there are no guarantees as to how recent these are or even if they are present.

These draft editions are not official documents and the version of documentation in the master branch or which ships with released versions is the only official documentation. Nevertheless, these draft editions may occasionally be of use by providing more accessible web versions which are updated between releases. They are provided on the understanding that they may contain errors or may contain content subject to change prior to an official release.

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:CUSTOM\_ID: license

:END:

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\* Footnotes

[fn:1] =short-history= and/or =short-history.html=.

[fn:2] With no issues reported specific to Python 3.7, the release of Python 3.7.1 at around the same time as GPGME 1.12.0 and the testing with Python 3.7.1rc1, there is no reason to delay moving 3.7 ahead of 3.6 now. Production environments with more conservative requirements will always enforce their own policies anyway and installation to each supported minor release is quite possible too.

[fn:3] Yes, even if you use virtualenv with everything you do in Python. If you want to install this module as just your user account then you will need to manually configure, compile and install the /entire/ GnuPG stack as that user as well. This includes libraries which are not often installed that way. It can be done and there are circumstances under which it is worthwhile, but generally only on POSIX systems which utilise single user mode (some even require it).

[fn:4] You probably don't really want to do this. Searching the

keyservers for "gnupg.org" produces over 400 results, the majority of which aren't actually at the gnupg.org domain, but just included a comment regarding the project in their key somewhere.

[fn:5] Such as with ProtonMail servers. This also means that restricted servers which only advertise either HTTP or HTTPS end points and not HKP or HKPS end points must still be identified as HKP or HKPS within the Python Code. The `=hkp4py=` module will rewrite these appropriately when the connection is made to the server.

[fn:6] Okay, Emacs might not necessarily qualify as a basic tool, but it is common enough that having it installed on a system isn't too great an expectation, nor is it difficult to add to most POSIX systems, even if the users of those systems do not personally use it.

```
;;; -*- Mode: lisp -*-
```

```
;;; Copyright (C) 2006 g10 Code GmbH
```

```
;;;
```

```
;;; This file is part of GPGME.
```

```
;;;
```

```
;;; GPGME is free software; you can redistribute it and/or
```

```
;;; modify it under the terms of the GNU Lesser General Public License
```

```
;;; as published by the Free Software Foundation; either version 2.1 of
```

```
;;; the License, or (at your option) any later version.
```

```
;;;
```

```
;;; GPGME is distributed in the hope that it will be useful, but
```

```
;;; WITHOUT ANY WARRANTY; without even the implied warranty of
```

```
;;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
```

```
;;; Lesser General Public License for more details.
```

```
;;;
```

```
;;; You should have received a copy of the GNU Lesser General Public
```

```
;;; License along with GPGME; if not, write to the Free
```

```
;;; Software Foundation, Inc., 59 Temple Place - Suite 330, Boston, MA
```

```
;;; 02111-1307, USA.
```

```
(defpackage #:gpgme-system
```

```
  (:use #:common-lisp #:asdf))
```

```
(in-package #:gpgme-system)
```

```
(defsystem gpgme
```

```
  :description "GnuPG Made Easy."
```

```
  :author "g10 Code GmbH"
```

```
  :version "1.13.1"
```

```
  :licence "GPL"
```

```
  :defsystem-depends-on ("cffi-grovel")
```

```
  :depends-on ("cffi" "gpg-error" "trivial-garbage")
```

```
  :components ((:file "gpgme-package"))
```

```

    (:cffi-grovel-file "gpgme-grovel"
     :depends-on ("gpgme-package"))
    (:file "gpgme"
     :depends-on ("gpgme-package" "gpgme-grovel"))))
cython
(21:protected-private-key(3:dsa(1:p129:_d8|po3s@!WGUOAXRC$_[8SN:y|o?2[.pVxn(kOc\Bk0zu&FnK)(1:q21:
vBeOP\P)(1:g129:fU/e(2hp@hjc2uE=Sg GO;ZkIyFnGM!GsG@
= _SZkII)(1:y128:K:9tA]4SU1 }sG`nZpx/imV^>A;V%?5!|sS{!=-6@|
=d
)(9:protected25:openpgp-s2k3-sha1-aes-cbc((4:sha18:Li7:6452224)16:,kO{,}80:z7OCG/sB48(H9%*ojSO
OGSma`YUs1h<_)(12:protected-at15:20130812T105134)))
#+TITLE: GPGME Python Bindings HOWTO Examples
#+LATEX_COMPILER: xelatex
#+LATEX_CLASS: article
#+LATEX_CLASS_OPTIONS: [12pt]
#+LATEX_HEADER: \usepackage{xltextra}
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}
#+LATEX_HEADER: \author{Ben McGinnes <ben@gnupg.org>}

```

\* Examples

```

:PROPERTIES:
:CUSTOM_ID: gpgme-python3-examples
:END:

```

The contents of this directory are the examples included in the /GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO/ file. Each script is explicitly for Python 3 and specifically for Python 3.4 or later.

Some of these scripts may work with Python 2.7, but there are no guarantees. They will include the relevant imports from the `=_future_=` module to facilitate that if possible.

\* Copyright and Licensing

```

:PROPERTIES:
:CUSTOM_ID: copyright-and-license
:END:

```

Unless otherwise stated, all the examples in this directory are released under the same terms as GPGME itself; that is they are dual licensed under the terms of both the GNU General Public License version 2.0 (or any later version) \*and\* the GNU Lesser General Public License version 2.1 (or any later version).

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:PROPERTIES:

:CUSTOM\_ID: copyright

:END:

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:PROPERTIES:

:CUSTOM\_ID: license

:END:

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\input texinfo @c -\* texinfo -\*

@c %\*\*start of header

@setfilename index.info

@settitle GNU Privacy Guard (GnuPG) Made Easy Python Bindings

@documentencoding utf-8

@documentlanguage en

@c %\*\*end of header

@finalout

@titlepage

@title GNU Privacy Guard (GnuPG) Made Easy Python Bindings

@author Ben McGinnes

@end titlepage

@contents

@ifnottex

@node Top

@top GNU Privacy Guard (GnuPG) Made Easy Python Bindings

@end ifnottex

@menu

\* GPGME Python Bindings::

@detailmenu

--- The Detailed Node Listing ---

## GPGME Python Bindings

\* Contents::

@end detailmenu

@end menu

@node GPGME Python Bindings

@chapter GPGME Python Bindings

@menu

\* Contents::

@end menu

@node Contents

@section Contents

@itemize

@item

@uref{short-history, A short history of the project}

@item

@uref{what-is-new, What's New}

@itemize

@item

@uref{maintenance-mode, Maintenance Mode} (from January, 2019)

@end itemize

@item

@uref{what-was-new, What Was New}

@item

@uref{gpgme-python-howto, GPGME Python Bindings HOWTO}

@end itemize

@bye

;;; gpgme-package.lisp

;;; Copyright (C) 2006 g10 Code GmbH

;;;

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;;; Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA.

;;; Conventions:

;;;  
;;; gpg-error is used for error handling.  
;;;  
;;; Standard I/O streams are used for input and output.

```
(defpackage #:gpgme
  (:use #:common-lisp #:cffi #:gpg-error)
  (:import-from #:trivial-garbage
    #:finalize)
  (:export #:check-version
    #:*version*
    #:context
    #:protocol
    #:armorp
    #:textmodep
    #:+include-certs-default+
    #:include-certs
    #:keylist-mode
    #:signers
    #:sig-notations
    #:with-context
    #:key-data
    #:get-key
    #:op-encrypt
    #:op-decrypt
    #:op-sign
    #:op-verify
    #:op-import
    #:op-export))
```

2011-12-02 Werner Koch <wk@g10code.com>

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-05-12 Marcus Brinkmann <marcus@g10code.com>

\* gpgme.texi (I/O Callback Example): Fix example code.

\* gpgme.texi (Generating Keys): Fix OpenPGP parameters and reference GPG and GPGSM manual.

2010-01-05 Werner Koch <wk@g10code.com>

\* gpgme.texi (Changing Passphrases): New.

2009-07-21 Werner Koch <wk@g10code.com>

\* uiserver.texi (UI Server Encrypt): Add --expect-sign option to PREP\_ENCRYPT.

2009-06-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Result Management): New section.

2009-06-16 Werner Koch <wk@g10code.com>

\* gpgme.texi (Exporting Keys): Document gpgme\_op\_export\_keys.  
(Importing Keys): Document gpgme\_op\_import\_keys.  
(Data Buffer Meta-Data): Document URL encodings.

2009-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Library Version Check): Document selftest error.  
(Creating Contexts): Likewise.

2009-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Document  
GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO.

2009-05-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Engine Information): Replace path by file\_name.

2008-11-28 Werner Koch <wk@g10code.com>

\* gpgme.texi (Listing Keys): Change description of the return  
value to match the code. Spotted by Colin Leroy.

2008-10-15 Werner Koch <wk@g10code.com>

\* uiserver.texi (Miscellaneous UI Server Commands): Add option  
--protocol to the SENDER command.

2008-07-17 Werner Koch <wk@g10code.com>

\* module-overview.sk: New.

2008-07-04 Werner Koch <wk@g10code.com>

\* gpgme.texi (Algorithms): Add a hint on symmetric only encryption.

2008-06-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Cancellation): Document gpgme\_cancel\_async.

2008-06-25 Werner Koch <wk@g10code.com>

\* gpgme.texi (Listing Keys): Updated example to the current API.  
Noted by Nico Schottelius.

2008-06-05 Werner Koch <wk@g10code.com>

\* uiserver.texi (Miscellaneous UI Server Commands): Describe  
START\_CONFDialog.

2008-06-04 Werner Koch <wk@g10code.com>

\* gpgme.texi: Use @copying command. Change license to  
GPLv3. Include protocol specs from GpgOL and GPGEx. Minor  
cleanups.

2008-03-11 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (File Based Data Buffers): Document the need for  
blocking operations.  
(Callback Based Data Buffers): Likewise.

2008-03-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Library Version Check): Rename snippet function to  
init\_gpgme.  
(I/O Callback Example): Call it here.

2008-01-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Document that data encoding affects some output data  
objects now.

2007-09-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Protocols and Engines): Document GPGME\_PROTOCOL\_UNKNOWN.

2007-09-11 Werner Koch <wk@g10code.com>

\* gpgme.texi (I/O Callback Example): Typo fix.

2007-08-07 Werner Koch <wk@g10code.com>

\* gpgme.texi (Verify): Describe chain\_model.

2007-07-12 Werner Koch <wk@g10code.com>

\* gpgme.texi (Library Version Check): Add remark that the socket layer will get initialized.

2007-06-05 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Advanced Key Editing): New section.

2007-05-21 Werner Koch <wk@g10code.com>

\* Makefile.am (online): New target.

2007-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Error Strings): Fix documentation of gpgme\_strerror\_r.

2006-11-01 Moritz Schulte <moritz@g10code.com>

\* gpgme.texi (Data Buffer I/O Operations): Fixed entry for gpgme\_data\_seek: OFFSET is not a pointer; some s/whence/offset/.

2006-09-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Destroying Data Buffers): Clarify that gpgme\_data\_release\_and\_get\_mem destroys DH unconditionally.

2005-03-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Library Version Check): Make example code compatible to W32 systems.

2006-06-21 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Fix inverted condition in description.

2005-12-20 Werner Koch <wk@g10code.com>

\* gpgme.texi (Verify): Document pka\_trust.

2005-12-06 Werner Koch <wk@g10code.com>

\* gpgme.texi (Key Management): Updated to match the fixes for subkey fingerprints and the secret flag.

2005-10-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Destroying Data Buffers): Document gpgme\_free.

2005-10-02 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Add the new member notations of gpgme\_sig\_key\_t.

(Key Listing Mode): Document GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS.

2005-10-01 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Enclose all return parameters of dectypedefuns in curly brackets.

\* gpgme.texi (Signature Notation Data): New section.

(Verify): Added more about the notation data structure.

2005-09-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Data Buffer I/O Operations, Data Buffer Meta-Data): New subsections.

\* gpgme.texi: Replace plaintext\_filename with file\_name.

\* gpgme.texi (Key Management): Document is\_qualified.

2005-07-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Decrypt): Add plaintext\_filename to gpgme\_decrypt\_result\_t.

(Verify): Likewise for gpgme\_verify\_result\_t.

2005-06-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Add information about new fields in gpgme\_signature\_t.

\* gpgme.texi (Decrypt): Add gpgme\_recipient\_t.

2005-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Listing Mode): Fix return type of gpgme\_set\_keylist\_mode.

Reported by "Sergio" <ml\_sergico@virgilio.it>.

2005-04-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Included Certificates): Document  
GPGME\_INCLUDE\_CERTS\_DEFAULT.

2005-01-12 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Engine Configuration): New section.  
(Crypto Engine): New subsection.

2004-12-07 Marcus Brinkmann <marcus@g10code.de>

\* lesser.texi (Library Copying): Change from @appendixsec to  
@appendix.  
\* gpgme.texi (Features): Change reference to GPL to one to LGPL.  
  
\* Makefile.am: Change license to LGPL.  
(gpgme\_TEXINFOS): Replace gpl.texi with lesser.texi.

\* gpgme.texi: Change license to LGPL (also for documentation of  
GPGME's license).  
\* lesser.texi: New file.  
\* gpl.texi: File removed.

\* gpgme.texi (Creating Contexts): Fix cut&paste error. Reported  
by Noel Torres <envite@rolamasao.org>.

2004-09-30 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (gpgme\_TEXINFOS): Remove fdl.texi.  
\* gpgme.texi: Do not include fdl.texi. Change license to GPL.  
\* fdl.texi: File removed.

2004-09-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Change type of keylist\_mode in  
gpgme\_key\_t to gpgme\_keylist\_mode\_t.

2004-09-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Fix last change.

2004-09-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Document  
GPG\_ERR\_NOT\_IMPLEMENTED.

\* gpgme.texi: Update copyright year for tex version.

2004-07-29 Moritz Schulte <moritz@g10code.com>

\* gpgme.texi (Verify): Fix gpgme\_get\_key example (ancient force\_update argument was still there).

2004-06-08 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Listing Keys): Elaborate on the length restrictions on search patterns.

\* gpgme.texi (Decrypt and Verify): Document the NO\_DATA error code.

(Verify): Document the relationship between gpgme\_op\_verify\_result and the decrypt and verify operations.

2004-05-21 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Document GPG\_ERR\_CERT\_REVOKED status.

\* gpgme.texi (Decrypt): Add note about new field wrong\_key\_usage of gpgme\_decrypt\_result\_t.

\* gpgme.texi (Key Management): Add note about new field keylist\_mode of gpgme\_key\_t.

2004-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Correct type of member wrong\_key\_usage.

2004-03-29 Moritz Schulte <moritz@duesseldorf.ccc.de>

\* gpgme.texi (Verify): Fix type of gpgme\_op\_verify\_result.

\* gpgme.texi (Key Listing Mode): Typo fix.

2004-03-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Library Version Check): Fix the instruction when to set the locale.

2004-03-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (I/O Callback Example Qt): New section by Marc Mutz.

2004-02-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (cancellation): New section.

2004-02-17 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Key Listing Mode): Doc KEYLIST\_MODE\_VALIDATE.

2004-02-06 Moritz Schulte <mo@g10code.com>

\* gpgme.texi: A couple of small fixes regarding the Largefile Support section.

2004-02-01 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Largefile Support): New section.

2004-01-13 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Fix exportable field.

2003-12-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Rename member class in gpgme\_key\_sig\_t to sig\_class.  
(Creating a Signature): Likewise for gpgme\_signature\_t.

2003-12-23 Moritz Schulte <mo@g10code.com>

\* gpgme.texi (Listing Keys): Minor clarification for gpgme\_get\_key.

2003-10-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Signal Handling): New section.

2003-09-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Correct documentation on memory synchronization requirement.

\* gpgme.texi (Locale): New section.  
(Multi Threading): Set locale in example.

2003-09-13 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Error Strings): Add gpgme\_strerror\_r.

2003-09-13 Marcus Brinkmann <marcus@g10code.de>



\* gpgme.texi (Multi Threading): Update documentation.

2003-09-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Header): We don't use the assuan namespace anymore.  
Document new thread options.

2003-08-14 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Creating a Signature): Change type of member class  
to unsigned int.

2003-08-04 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Get error code from SIG->status in the code  
for gpgme\_get\_sig\_status.

2003-07-31 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Add can\_authenticate flag.

\* gpgme.texi (Listing Keys): Document GPG\_ERR\_AMBIGUOUS\_NAME for  
gpgme\_get\_key.

2003-07-29 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (EXTRA\_DIST): Remove variable.

\* gpgme.texi (Encrypting a Plaintext): Bad passphrase is only  
possible with symmetric encryption, change the wording to reflect  
that.

\* gpgme.texi (Creating a Signature): Document  
GPG\_ERR\_UNUSABLE\_SECKEY.

\* gpgme.texi (Encrypting a Plaintext): Mention encrypt and sign  
operations in result function.  
(Creating a Signature): Likewise.

2003-07-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Listing Mode): Remove word duplication.  
(Listing Keys): Remove mentioning of force argument.  
(Verify): Don't mention r\_stat. Fix some typos.  
(Decrypt and Verify): Correct info how to get the result. Don't  
mention r\_stat.  
(Manipulating Data Buffers): Fix documentation of return value.  
(Listing Keys): Update examples.

(Decrypt): Result might also be available when operation failed.

(Verify): Result might also be available when operation failed.

All spotted by Stphane Corthisy.

2003-07-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Error Sources): Fix cut and paste error.

2003-07-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Management): Clarify difference between can\_sign and can\_certify.

(Information About Keys): Likewise for GPGME\_ATTR\_CAN\_SIGN and GPGME\_ATTR\_CAN\_CERTIFY.

2003-07-08 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Progress Meter Callback): Change return type of gpgme\_progress\_cb\_t to void.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Add 2003 to copyright notice.

\* gpgme.texi (Header): Fix name space documentation on libgpg-error.

2003-06-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Remove reference to gpgme\_recipients\_t.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Crypto Operations): Rename gpgme\_invalid\_user\_id\_t to gpgme\_invalid\_key\_t.

2003-06-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Change error codes to GPG\_ERR\_\* variants.  
(Error Handling): Rewritten.

2003-05-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Exporting Keys): Change and document prototypes.  
Add new gpgme\_op\_export\_ext and gpgme\_op\_export\_ext\_start variants.

(Selecting Recipients): Section removed.

(Encrypting a Plaintext): Change prototypes and document the changes.

2003-05-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Exporting Keys): Change argument type from gpgme\_recipient\_t to gpgme\_user\_id\_t.  
(Encrypting a Plaintext): Likewise.  
(Selecting Recipients): Rewritten.

2003-05-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Protocol Selection): Do not use @acronym in @node because that breaks texi2dvi.  
  
\* gpgme.texi (Passphrase Callback): Document new prototype.

2003-05-18 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Header): Remove Gpgme as namespace prefix. Add \_GPGME to namespace prefix.  
\* gpgme.texi (Multi Threading): Add note about link order.

2003-05-04 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Listing Keys): Document what happens if key is not found.  
  
\* gpgme.texi (Importing Keys): Fix cut and paste error.

2003-04-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Remove reference to gpgme\_get\_op\_info.  
(Detailed Results): Subsection removed.  
  
\* gpgme.texi (Key Listing Mode): Add GPGME\_KEYLIST\_MODE\_SIGS.  
(Manipulating Keys): Add obsolescence note.  
(Key Signatures): Likewise.  
(Information About Keys): Likewise.  
(Key Management): Add new data types GpgmeSubkey, GpgmeKeySig, GpgmeUserID, and all the information about GpgmeKey.

2003-04-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Listing Keys): Remove force\_update argument from gpgme\_get\_key.

\* gpgme.texi (Trust Item Management): Add data members of GpgmeTrustItem type.  
(Information About Trust Items): Add note about obsolescence.  
(Manipulating Trust Items): Add gpgme\_trust\_item\_ref and gpgme\_trust\_item\_unref.

2003-04-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Rewritten to take into account new and deprecated functions and data types.

\* gpgme.texi (Decrypt): Descript gpgme\_op\_decrypt\_result and GpgmeDecryptResult.

2003-04-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Add info about GpgmeEncryptResult and gpgme\_op\_encrypt\_result.

\* gpgme.texi (Creating a Signature): Add info about GpgmeNewSignature, GpgmeSignResult and gpgme\_op\_sign\_result.  
(Crypto Operations): Add GpgmeInvalidUserID.  
(Algorithms): New chapter.

\* gpgme.texi (Deleting Keys): Document GPGME\_Ambiguous\_Specification.  
(Error Values): Remove GPGME\_Invalid\_Type and GPGME\_Invalid\_Mode.  
Add GPGME\_Unknown\_Reason, GPGME\_Not\_Found, GPGME\_Ambiguous\_Specification, GPGME\_Wrong\_Key\_Usage, GPGME\_Key\_Revoked, GPGME\_Key\_Expired, GPGME\_No\_CRL\_Known, GPGME\_CRL\_Too\_Old, GPGME\_Policy\_Mismatch, GPGME\_No\_Secret\_Key, GPGME\_Key\_Not\_Trusted, GPGME\_Issuer\_Missing, GPGME\_Chain\_Too\_Long, GPGME\_Unsupported\_Algorithm, GPGME\_Sig\_Expired, GPGME\_Bad\_Signature, GPGME\_No\_Public\_Key.

2003-04-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Importing Keys): Change GPGME\_IMPORT\_PRIVATE to GPGME\_IMPORT\_SECRET.

\* gpgme.texi (Importing Keys): Remove note about gpgme\_get\_op\_info.  
(Detailed Results): Remove note about import.

\* gpgme.texi (Importing Keys): Add documentation for GpgmeImportStatus, GpgmeImportResult and gpgme\_op\_import\_result.

\* gpgme.texi (Generating Keys): Fix documentation of public and secret arguments.

2003-04-24 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Generating Keys): Document changed gpgme\_op\_genkey and new gpgme\_op\_genkey\_result function. Document GpgmeGenKeyResult data type.

\* gpgme.texi (Error Values): Rename GPGME\_No\_Passphrase to GPGME\_Bad\_Passphrase.

\* gpgme.texi (Decrypt): Likewise.

(Decrypt and Verify): Likewise.

(Creating a Signature): Likewise.

(Encrypting a Plaintext): Likewise.

\* gpgme.texi (Error Values): Rename GPGME\_No\_Recipients to GPGME\_No\_UserID and GPGME\_Invalid\_Recipient to GPGME\_Invalid\_UserID.

(Encrypting a Plaintext): Likewise.

\* gpgme.texi (Error Values): Remove GPGME\_Busy and GPGME\_No\_Request.

(Listing Keys): Likewise.

(Listing Trust Items): Likewise.

2003-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Cancelling an Operation): Removed.

(Passphrase Callback): Document new type for GpgmePassphraseCb.

2003-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Engine Information): Rename member part to file\_name.

\* gpgme.texi (Protocols and Engines): Document gpgme\_get\_protocol\_name.

\* gpgme.texi (Engine Information): Rewritten.

2003-01-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (I/O Callback Interface): Document new even GPGME\_EVENT\_START.

(Waiting For Completion): Document new possible return values.

(I/O Callback Interface): Document return type of GpgmeIOCb.

2003-01-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Hooking Up Into Idle Time): Section removed.

2002-12-24 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Verify): Drop R\_STAT argument in gpgme\_op\_verify.
- \* gpgme.texi (Decrypt and Verify): Likewise for gpgme\_op\_decrypt\_verify.

2002-12-23 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Information About Keys): Document that GPGME\_ATTR\_IS\_SECRET is not representable as a string anymore.

2002-12-22 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Key Signatures): New section.
- (Listing Keys): Add gpgme\_get\_key.

2002-12-06 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Memory Based Data Buffers): New subsection.
- (File Based Data Buffers): Likewise.
- (Callback Based Data Buffers): Likewise.
- (Manipulating Data Buffers): Update interfaces. Add gpgme\_data\_seek.
- \* gpgme.texi (Engine Version Check): Remove gpgme\_check\_engine.

2002-11-21 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Verify): Document the new interface.

2002-11-19 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Generating Keys): Document new argument to gpgme\_op\_genkey.

2002-11-05 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Verify): Fix prototype of gpgme\_get\_sig\_key.
- Reported by Miguel Coca <e970095@zipi.fi.upm.es>.

2002-08-30 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Selecting Signers): Fix reference count.

2002-08-21 Marcus Brinkmann <marcus@g10code.de>

- \* gpgme.texi (Header): Document name space.

2002-08-20 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Importing Keys): Document gpgme\_op\_import\_ext.

\* gpgme.texi (Importing Keys): Undocument EOF.

2002-08-14 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Information About Keys): Changed GPGME\_ATTR\_TYPE.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Deleting Keys): Say that secret keys might not be deleted.

2002-07-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Information About Keys): Document (badly) the new key attributes.

\* gpgme.texi (Manipulating Data Buffers): Mention that backend tries to detect encoding automatically.

2002-07-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Run Control): Update this section.  
(Waiting For Completion): Likewise for this subsection.  
(Cancelling an Operation): Likewise for this subsection.  
(Using External Event Loops): New subsection with several subsubsections.

2002-06-28 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Remove item about the need to synchronize anything against gpgme\_wait (except gpgme\_wait itself).

2002-06-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Information About Keys): Fix documentation for IDX.  
(Information About Trust Items): Likewise.

2002-06-26 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Importing Keys): Document the return value -1 of gpgme\_op\_import.

2002-06-20 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Verify): Explain the new whatidx variable.

2002-06-10 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Verify): Document attribute GPGME\_ATTR\_ERRTOK.

2002-06-04 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Document new autodetection.

2002-06-04 Marcus Brinkmann <marcus@g10code.de>

\* Makefile.am (DISTCLEANFILES): New variable.

2002-05-26 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Some typographical corrections throughout.

2002-05-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Using Automake): New section.

2002-05-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Multi Threading): Escape { and }.

2002-05-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Overview): Replace note about thread-safeness.  
(Multi Threading): New section.

2002-05-03 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Manipulating Data Buffers): Changed some data types  
to void\*.

(Protocol Selection): Added gpgme\_get\_protocol.

(Verify): Updated to include the new attribute functions and  
status codes.

2002-04-27 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Manipulating Data Buffers): New type GpgmeDataEncoding.

2002-04-23 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Document that either return  
argument can be NULL.



(Progress Meter Callback): Likewise.

2002-04-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase Callback): Fix small typo. Document the new function `gpgme_get_passphrase_cb`.

(Progress Meter Callback): Document the new function `gpgme_get_progress_cb`.

2002-04-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Creating a Signature): Fix function name. Reported by Wichert Ackerman <wichert@debian.org>.

2002-03-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (direntry): End index entry with a full stop. Patch submitted by Jose Carlos Garcia Sogo <jsogo@debian.org>.

2002-03-17 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Detailed Results): Fix syntax error in last change.

2002-03-08 Werner Koch <wk@gnupg.org>

\* gpgme.texi (Detailed Results): Import does also return info.

2002-03-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Document symmetric encryption.

2002-03-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Error Strings): Add example.

\* gpgme.texi (Listing Keys): Likewise.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Information About Keys): Document `GPGME_ATTR_EXPIRE`.

2002-03-03 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Verify): Document verification of normal and cleartext signatures.

2002-02-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Listing Keys): Document gpgme\_op\_keylist\_ext\_start.

2002-02-27 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Document  
GPGME\_Invalid\_Recipients.  
(Error Values): Likewise.

2002-02-26 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Encrypting a Plaintext): Document  
gpgme\_op\_encrypt\_sign and gpgme\_op\_encrypt\_sign\_start.

2002-02-25 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Creating a Signature): Add a note about  
certificates to include.  
(Included Certificates): New section.

2002-02-09 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Detailed Results): Remove literal tags.  
(Generating Keys): Update documentation.

\* gpgme.texi (Generating Keys): Fix syntax error.

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Waiting For Completion): Adjust doc to changes in  
the code.

2002-02-06 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Key Listing Mode): Update documentation.

2002-01-31 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Generating Keys): Document error at creation  
failure.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Deleting Keys): Document new error values.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Importing Keys): Add reference to gpgme\_get\_op\_info.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Some spell checking.

2002-01-30 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: Add all the gpgme\_op\_\*\_start functions.  
Fill the concept index with many, many entries.

2002-01-29 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Run Control): New section.  
(Verify): Document gpgme\_get\_notation.  
(More Information): New section describing gpgme\_get\_op\_info.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Passphrase callback): Change GpgmePassphraseCb's  
R\_HD type from void\* to void\*\*.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Creating data buffers): Change  
gpgme\_data\_new\_from\_filepart's LENGTH type from off\_t to size\_t.

2002-01-22 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi (Generating keys): New subsection.  
(Exporting keys): Likewise.  
(Importing keys): Likewise.  
(Deleting keys): Likewise.

2002-01-16 Marcus Brinkmann <marcus@g10code.de>

\* gpgme.texi: g10Code -> g10 Code

\* gpgme.texi (Top): Complete detailmenu.

\* gpgme.texi: Convert embarrassing cruft to the real thing.

2002-01-16 Marcus Brinkmann <marcus@g10code.de>

\* ChangeLog: New file.  
\* gpgme.texi: Likewise.  
\* gpl.texi: Likewise.  
\* fdl.texi: Likewise.  
\* Makefile.am (info\_TEXINFOS): New variable.  
(gpgme\_TEXINFOS): Likewise.

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```
\input texinfo          @c -*- mode: texinfo; coding: utf-8; -*-
```

```
@documentencoding UTF-8
```

```
@setfilename gpgme.info
```

```
@include defs.inc
```

```
@settitle The `GnuPG Made Easy' Reference Manual
```

```
@dircategory GNU Libraries
```

```
@direntry
```

```
* @acronym{GPGME}: (gpgme).      Adding support for cryptography to your program.
```

```
@end direntry
```

```
@c Unify some of the indices.
```

```
@syncodeindex tp fn
```

```
@syncodeindex pg fn
```

```
@copying
```

```
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```

```
@quotation
```

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```
@end quotation
```

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```
@end copying
```

```
@c Macros used by the description of the UI server protocol
```

```
@macro clnt{string}
```

```
  @sc{c} \string\
```

```
@end macro
```

```
@macro srvr{string}
```

@sc{s:} \string\  
@end macro

@c API version.  
@macro since{string}  
@sc{Since:} \string\  
@end macro

@c  
@c T I T L E P A G E  
@c  
@ifinfo

This file documents the @acronym{GPGME} library.

This is Edition @value{EDITION}, last updated @value{UPDATED}, of  
@cite{The `GnuPG Made Easy' Reference Manual}, for Version  
@value{VERSION}.

@c NOTE: Don't forget to update the year for the TeX version, too.  
@insertcopying

@end ifinfo

@c We do not want that bastard short titlepage.

@c @iftex  
@c @shorttitlepage The `GnuPG Made Easy' Reference Manual  
@c @end iftex

@titlepage  
@center @titlefont{The `GnuPG Made Easy'}

@sp 1

@center @titlefont{Reference Manual}

@sp 6

@center Edition @value{EDITION}

@sp 1

@center last updated @value{UPDATED}

@sp 1

@center for version @value{VERSION}

@page

@vskip 0pt plus 1filll

Published by The GnuPG Project@\* c/o g10 Code GmbH@\* Httenstr. 61@\* 40699 Erkrath, Germany

@insertcopying

@end titlepage

@page

@summarycontents

@contents

@ifnottex

@node Top

@top Main Menu

This is Edition @value{EDITION}, last updated @value{UPDATED}, of  
@cite{The `GnuPG Made Easy' Reference Manual}, for Version  
@value{VERSION} of the @acronym{GPGME} library.

@end ifnottex

@menu

- \* Introduction:: How to use this manual.
- \* Preparation:: What you should do before using the library.
- \* Protocols and Engines:: Supported crypto protocols.
- \* Algorithms:: Supported algorithms.
- \* Error Handling:: Error numbers and their meanings.
- \* Exchanging Data:: Passing data to and from @acronym{GPGME}.
- \* Contexts:: Handling @acronym{GPGME} contexts.

Appendices

- \* UI Server Protocol:: The GnuPG UI Server Protocol.
- \* Debugging:: How to solve problems.
- \* Deprecated Functions:: Documentation of deprecated functions.
  
- \* Library Copying:: The GNU Lesser General Public License says  
how you can copy and share `GnuPG Made Easy'.
- \* Copying:: The GNU General Public License says how you  
can copy and share this manual.

Indices

- \* Concept Index:: Index of concepts and programs.
- \* Function and Data Index:: Index of functions, variables and data types.

@detailmenu

--- The Detailed Node Listing ---

Introduction

- \* Getting Started:: Purpose of the manual, and how to use it.
- \* Features:: Reasons to install and use @acronym{GPGME}.
- \* Overview:: Basic architecture of the @acronym{GPGME} library.

Preparation

- \* Header:: What header file you need to include.
- \* Building the Source:: Compiler options to be used.
- \* Largefile Support (LFS):: How to use @acronym{GPGME} with LFS.

- \* Using Automake:: Compiler options to be used the easy way.
- \* Using Libtool:: Avoiding compiler options entirely.
- \* Library Version Check:: Getting and verifying the library version.
- \* Signal Handling:: How @acronym{GPGME} affects signal handling.
- \* Multi-Threading:: How @acronym{GPGME} can be used in an MT environment.

## Protocols and Engines

- \* Engine Version Check:: Verifying the engine version.
- \* Engine Information:: Obtaining more information about the engines.
- \* Engine Configuration:: Changing the engine configuration.
- \* OpenPGP:: Support for the OpenPGP protocol.
- \* Cryptographic Message Syntax:: Support for the CMS.

## Algorithms

- \* Public Key Algorithms:: A list of all public key algorithms.
- \* Hash Algorithms:: A list of all hash algorithms.

## Error Handling

- \* Error Values:: The error value and what it means.
- \* Error Codes:: A list of important error codes.
- \* Error Sources:: A list of important error sources.
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## Exchanging Data

- \* Creating Data Buffers:: Creating new data buffers.
- \* Destroying Data Buffers:: Releasing data buffers.
- \* Manipulating Data Buffers:: Operations on data buffers.

## Creating Data Buffers

- \* Memory Based Data Buffers:: Creating memory based data buffers.
- \* File Based Data Buffers:: Creating file based data buffers.
- \* Callback Based Data Buffers:: Creating callback based data buffers.

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- \* Data Buffer I/O Operations:: I/O operations on data buffers.
- \* Data Buffer Meta-Data:: Meta-data manipulation of data buffers.
- \* Data Buffer Convenience:: Convenience function for data buffers.

## Contexts

- \* Creating Contexts:: Creating new @acronym{GPGME} contexts.
- \* Destroying Contexts:: Releasing @acronym{GPGME} contexts.

- \* Result Management:: Managing the result of crypto operations.
- \* Context Attributes:: Setting properties of a context.
- \* Key Management:: Managing keys with @acronym{GPGME}.
- \* Trust Item Management:: Managing trust items with @acronym{GPGME}.
- \* Crypto Operations:: Using a context for cryptography.
- \* Miscellaneous:: Miscellaneous operations.
- \* Run Control:: Controlling how operations are run.

#### Context Attributes

- \* Protocol Selection:: Selecting the protocol used by a context.
- \* Crypto Engine:: Configuring the crypto engine.
- \* Setting the Sender:: How to tell the engine the sender.
- \* ASCII Armor:: Requesting @acronym{ASCII} armored output.
- \* Text Mode:: Choosing canonical text mode.
- \* Offline Mode:: Choosing offline mode.
- \* Included Certificates:: Including a number of certificates.
- \* Key Listing Mode:: Selecting key listing mode.
- \* Passphrase Callback:: Getting the passphrase from the user.
- \* Progress Meter Callback:: Being informed about the progress.
- \* Status Message Callback:: Status messages received from gpg.
- \* Locale:: Setting the locale of a context.

#### Key Management

- \* Key objects:: Description of the key structures.
- \* Listing Keys:: Browsing the list of available keys.
- \* Information About Keys:: Requesting detailed information about keys.
- \* Manipulating Keys:: Operations on keys.
- \* Generating Keys:: Creating new key pairs.
- \* Signing Keys:: Adding key signatures to public keys.
- \* Exporting Keys:: Retrieving key data from the key ring.
- \* Importing Keys:: Adding keys to the key ring.
- \* Deleting Keys:: Removing keys from the key ring.
- \* Changing Passphrases:: Change the passphrase of a key.
- \* Changing TOFU Data:: Changing data pertaining to TOFU.
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- \* Sign::                   Creating a signature.
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- \* Selecting Signers::       How to choose the keys to sign with.
- \* Creating a Signature::    How to create a signature.
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## Encrypt

- \* Encrypting a Plaintext::   How to encrypt a plaintext.

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- \* Running other Programs::   Running other Programs.
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## Run Control

- \* Waiting For Completion::    Waiting until an operation is completed.
- \* Using External Event Loops:: Advanced control over what happens when.
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- \* I/O Callback Interface::     How I/O callbacks are registered.
- \* Registering I/O Callbacks::  How to use I/O callbacks for a context.
- \* I/O Callback Example::       An example how to use I/O callbacks.
- \* I/O Callback Example GTK+::  How to integrate @acronym{GPGME} in GTK+.
- \* I/O Callback Example GDK::   How to integrate @acronym{GPGME} in GDK.
- \* I/O Callback Example Qt::    How to integrate @acronym{GPGME} in Qt.

@end detailmenu

@end menu

@node Introduction

@chapter Introduction

`GnuPG Made Easy' (@acronym{GPGME}) is a C language library that allows to add support for cryptography to a program. It is designed to make access to public key crypto engines like GnuPG or GpgSM easier for applications. @acronym{GPGME} provides a high-level crypto API for encryption, decryption, signing, signature verification and key management.

@acronym{GPGME} uses GnuPG and GpgSM as its backends to support

OpenPGP and the Cryptographic Message Syntax (CMS).

@menu

- \* Getting Started:: Purpose of the manual, and how to use it.
- \* Features:: Reasons to install and use @acronym{GPGME}.
- \* Overview:: Basic architecture of the @acronym{GPGME} library.

@end menu

@node Getting Started

@section Getting Started

This manual documents the @acronym{GPGME} library programming interface. All functions and data types provided by the library are explained.

The reader is assumed to possess basic knowledge about cryptography in general, and public key cryptography in particular. The underlying cryptographic engines that are used by the library are not explained, but where necessary, special features or requirements by an engine are mentioned as far as they are relevant to @acronym{GPGME} or its users.

This manual can be used in several ways. If read from the beginning to the end, it gives a good introduction into the library and how it can be used in an application. Forward references are included where necessary. Later on, the manual can be used as a reference manual to get just the information needed about any particular interface of the library. Experienced programmers might want to start looking at the examples at the end of the manual, and then only read up those parts of the interface which are unclear.

The documentation for the language bindings is currently not included in this manual. Those language bindings follow the general programming model of @acronym{GPGME} but may provide some extra high level abstraction on top of the @acronym{GPGME} style API. For now please see the README files in the @file{lang/} directory of the source distribution.

@node Features

@section Features

@acronym{GPGME} has a couple of advantages over other libraries doing a similar job, and over implementing support for GnuPG or other crypto engines into your application directly.

@table @asis

@item it's free software

Anybody can use, modify, and redistribute it under the terms of the GNU Lesser General Public License ([@pxref{Library Copying}](#)).

**@item it's flexible**

**@acronym{GPGME}** provides transparent support for several cryptographic protocols by different engines. Currently, **@acronym{GPGME}** supports the OpenPGP protocol using GnuPG as the backend, and the Cryptographic Message Syntax using GpgSM as the backend.

**@item it's easy**

**@acronym{GPGME}** hides the differences between the protocols and engines from the programmer behind an easy-to-use interface. This way the programmer can focus on the other parts of the program, and still integrate strong cryptography in his application. Once support for **@acronym{GPGME}** has been added to a program, it is easy to add support for other crypto protocols once **@acronym{GPGME}** backends provide them.

**@item it's language friendly**

**@acronym{GPGME}** comes with languages bindings for several common programming languages: Common Lisp, C++, Python 2, and Python 3.

**@end table**

**@node Overview**

**@section Overview**

**@acronym{GPGME}** provides a data abstraction that is used to pass data to the crypto engine, and receive returned data from it. Data can be read from memory or from files, but it can also be provided by a callback function.

The actual cryptographic operations are always set within a context. A context provides configuration parameters that define the behaviour of all operations performed within it. Only one operation per context is allowed at any time, but when one operation is finished, you can run the next operation in the same context. There can be more than one context, and all can run different operations at the same time.

Furthermore, **@acronym{GPGME}** has rich key management facilities including listing keys, querying their attributes, generating, importing, exporting and deleting keys, and acquiring information about the trust path.

With some precautions, **@acronym{GPGME}** can be used in a multi-threaded environment, although it is not completely thread safe and thus needs the support of the application.

**@node Preparation**

## @chapter Preparation

To use @acronym{GPGME}, you have to perform some changes to your sources and the build system. The necessary changes are small and explained in the following sections. At the end of this chapter, it is described how the library is initialized, and how the requirements of the library are verified.

### @menu

- \* Header::                   What header file you need to include.
- \* Building the Source::       Compiler options to be used.
- \* Largefile Support (LFS)::   How to use @acronym{GPGME} with LFS.
- \* Using Automake::           Compiler options to be used the easy way.
- \* Using Libtool::            Avoiding compiler options entirely.
- \* Library Version Check::     Getting and verifying the library version.
- \* Signal Handling::          How @acronym{GPGME} affects signal handling.
- \* Multi-Threading::         How @acronym{GPGME} can be used in an MT environment.

### @end menu

### @node Header

#### @section Header

#### @cindex header file

#### @cindex include file

All interfaces (data types and functions) of the library are defined in the header file ``gpgme.h'`. You must include this in all programs using the library, either directly or through some other header file, like this:

### @example

```
#include <gpgme.h>
```

### @end example

The name space of @acronym{GPGME} is @code{gpgme\_\*} for function names and data types and @code{GPGME\_\*} for other symbols. Symbols internal to @acronym{GPGME} take the form @code{\_gpgme\_\*} and @code{\_GPGME\_\*}.

Because @acronym{GPGME} makes use of the GPG Error library, using @acronym{GPGME} will also use the @code{GPG\_ERR\_\*} name space directly, and the @code{gpg\_err\*}, @code{gpg\_str\*}, and @code{gpgrt\_\*} name space indirectly.

### @node Building the Source

#### @section Building the Source

#### @cindex compiler options

#### @cindex compiler flags

If you want to compile a source file including the `gpgme.h` header file, you must make sure that the compiler can find it in the directory hierarchy. This is accomplished by adding the path to the directory in which the header file is located to the compilers include file search path (via the `@option{-I}` option).

However, the path to the include file is determined at the time the source is configured. To solve this problem, `gpgme` ships with a small helper program `@command{gpgme-config}` that knows about the path to the include file and other configuration options. The options that need to be added to the compiler invocation at compile time are output by the `@option{--cflags}` option to `@command{gpgme-config}`. The following example shows how it can be used at the command line:

```
@example
gcc -c foo.c `gpgme-config --cflags`
@end example
```

Adding the output of `@samp{gpgme-config --cflags}` to the compiler command line will ensure that the compiler can find the `@acronym{GPGME}` header file.

A similar problem occurs when linking the program with the library. Again, the compiler has to find the library files. For this to work, the path to the library files has to be added to the library search path (via the `@option{-L}` option). For this, the option `@option{--libs}` to `@command{gpgme-config}` can be used. For convenience, this option also outputs all other options that are required to link the program with `@acronym{GPGME}` (in particular, the `@samp{-lgpgme}` option). The example shows how to link `@file{foo.o}` with the `@acronym{GPGME}` library to a program `@command{foo}`.

```
@example
gcc -o foo foo.o `gpgme-config --libs`
@end example
```

Of course you can also combine both examples to a single command by specifying both options to `@command{gpgme-config}`:

```
@example
gcc -o foo foo.c `gpgme-config --cflags --libs`
@end example
```

If you need to detect the installed language bindings you can use `list` them using:

```
@example
```

```
gpgme-config --print-lang
```

```
@end example
```

or test for the availability using

```
@example
```

```
gpgme-config --have-lang=python && echo 'Bindings for Pythons available'
```

```
@end example
```

```
@node Largefile Support (LFS)
```

```
@section Largefile Support (LFS)
```

```
@cindex largefile support
```

```
@cindex LFS
```

@acronym{GPGME} is compiled with largefile support by default, if it is available on the system. This means that GPGME supports files larger than two gigabyte in size, if the underlying operating system can. On some systems, largefile support is already the default. On such systems, nothing special is required. However, some systems provide only support for files up to two gigabyte in size by default. Support for larger file sizes has to be specifically enabled.

To make a difficult situation even more complex, such systems provide two different types of largefile support. You can either get all relevant functions replaced with alternatives that are largefile capable, or you can get new functions and data types for largefile support added. Those new functions have the same name as their smallfile counterparts, but with a suffix of 64.

An example: The data type @code{off\_t} is 32 bit wide on GNU/Linux PC systems. To address offsets in large files, you can either enable largefile support add-on. Then a new data type @code{off64\_t} is provided, which is 64 bit wide. Or you can replace the existing @code{off\_t} data type with its 64 bit wide counterpart. All occurrences of @code{off\_t} are then automagically replaced.

As if matters were not complex enough, there are also two different types of file descriptors in such systems. This is important because if file descriptors are exchanged between programs that use a different maximum file size, certain errors must be produced on some file descriptors to prevent subtle overflow bugs from occurring.

As you can see, supporting two different maximum file sizes at the same time is not at all an easy task. However, the maximum file size does matter for @acronym{GPGME}, because some data types it uses in its interfaces are affected by that. For example, the @code{off\_t} data type is used in the @code{gpgme\_data\_seek} function, to match its

@acronym{POSIX} counterpart. This affects the call-frame of the function, and thus the ABI of the library. Furthermore, file descriptors can be exchanged between GPGME and the application.

For you as the user of the library, this means that your program must be compiled in the same file size mode as the library. Luckily, there is absolutely no valid reason for new programs to not enable largefile support by default and just use that. The compatibility modes (small file sizes or dual mode) can be considered an historic artefact, only useful to allow for a transitional period.

On POSIX platforms @acronym{GPGME} is compiled using largefile support by default. This means that your application must do the same, at least as far as it is relevant for using the @file{gpgme.h} header file. All types in this header files refer to their largefile counterparts, if they are different from any default types on the system.

On 32 and 64 bit Windows platforms @code{off\_t} is declared as 32 bit signed integer. There is no specific support for LFS in the C library. The recommendation from Microsoft is to use the native interface (@code{CreateFile} et al.) for large files. Released binary versions of @acronym{GPGME} (libgpgme-11.dll) have always been build with a 32 bit @code{off\_t}. To avoid an ABI break we stick to this convention for 32 bit Windows by using @code{long} there. @acronym{GPGME} versions for 64 bit Windows have never been released and thus we are able to use @code{int64\_t} instead of @code{off\_t} there. For easier migration the typedef @code{gpgme\_off\_t} has been defined. The reason we cannot use @code{off\_t} directly is that some toolchains (e.g. mingw64) introduce a POSIX compatible hack for @code{off\_t}. Some widely used toolkits make use of this hack and in turn @acronym{GPGME} would need to use it also. However, this would introduce an ABI break and existing software making use of libgpgme might suffer from a severe break. Thus with version 1.4.2 we redefined all functions using @code{off\_t} to use @code{gpgme\_off\_t} which is defined as explained above. This way we keep the ABI well defined and independent of any toolchain hacks. The bottom line is that LFS support in @acronym{GPGME} is only available on 64 bit versions of Windows.

On POSIX platforms you can enable largefile support, if it is different from the default on the system the application is compiled on, by using the Autoconf macro @code{AC\_SYS\_LARGEFILE}. If you do this, then you don't need to worry about anything else: It will just work. In this case you might also want to use @code{AC\_FUNC\_FSEEKO} to take advantage of some new interfaces, and @code{AC\_TYPE\_OFF\_T} (just in case).

If you do not use Autoconf, you can define the preprocessor symbol `_FILE_OFFSET_BITS` to 64 **before** including any header files, for example by specifying the option `-D_FILE_OFFSET_BITS=64` on the compiler command line. You will also want to define the preprocessor symbol `LARGEFILE_SOURCE` to 1 in this case, to take advantage of some new interfaces.

If you do not want to do either of the above, you probably know enough about the issue to invent your own solution. Just keep in mind that the `GPGME` header file expects that largefile support is enabled, if it is available. In particular, we do not support dual mode (`_LARGEFILE64_SOURCE`).

```
@node Using Automake
@section Using Automake
@cindex automake
@cindex autoconf
```

It is much easier if you use GNU Automake instead of writing your own Makefiles. If you do that you do not have to worry about finding and invoking the `gpgme-config` script at all. `GPGME` provides an extension to Automake that does all the work for you.

```
@c A simple macro for optional variables.
@macro ovar{varname}
@r{[]@var{\varname}\@r{[]}
@end macro
@defmac AM_PATH_GPGME (@ovar{minimum-version}, @ovar{action-if-found}, @ovar{action-if-not-found})
@defmacx AM_PATH_GPGME_PTH (@ovar{minimum-version}, @ovar{action-if-found}, @ovar{action-if-not-found})
@defmacx AM_PATH_GPGME_PTHREAD (@ovar{minimum-version}, @ovar{action-if-found}, @ovar{action-if-not-found})
Check whether GPGME (at least version @var{minimum-version}, if given) exists on the host system. If it is found, execute @var{action-if-found}, otherwise do @var{action-if-not-found}, if given.
```

Additionally, the function defines `GPGME_CFLAGS` to the flags needed for compilation of the program to find the `gpgme.h` header file, and `GPGME_LIBS` to the linker flags needed to link the program to the `GPGME` library. If the used helper script does not match the target type you are building for a warning is printed and the string `libgcrypt` is appended to the variable `gpg_config_script_warn`.

`AM_PATH_GPGME_PTH` checks for the version of `GPGME` that can be used with GNU Pth, and defines `GPGME_PTH_CFLAGS` and



`GPGME_PTH_LIBS`).

`AM_PATH_GPGME_PTHREAD` checks for the version of `GPGME` that can be used with the native pthread implementation, and defines `GPGME_PTHREAD_CFLAGS` and `GPGME_PTHREAD_LIBS`. Since version 1.8.0 this is no longer required to `GPGME_PTHREAD` as `GPGME` itself is thread safe.

This macro searches for `gpgme-config` along the PATH. If you are cross-compiling, it is useful to set the environment variable `SYSROOT` to the top directory of your target. The macro will then first look for the helper program in the `bin` directory below that top directory. An absolute directory name must be used for `SYSROOT`. Finally, if the configure command line option `--with-gpgme-prefix` is used, only its value is used for the top directory below which the helper script is expected.

`end defmac`

You can use the defined Autoconf variables like this in your `Makefile.am`:

```
@example
AM_CPPFLAGS = $(GPGME_CFLAGS)
LDADD = $(GPGME_LIBS)
@end example
```

`node Using Libtool`  
`section Using Libtool`  
`cindex libtool`

The easiest way is to just use GNU Libtool. If you use libtool, and link to `libgpgme.la`, `libgpgme-pth.la` or `libgpgme-pthread.la` respectively, everything will be done automatically by Libtool.

`node Library Version Check`  
`section Library Version Check`  
`cindex version check, of the library`

```
@deftypefun {const char *} gpgme_check_version (@w{const char *}@var{required_version})
```

The function `gpgme_check_version` has four purposes. It can be used to retrieve the version number of the library. In addition it can verify that the version number is higher than a certain required version number. In either case, the function initializes some sub-systems, and for this reason alone it must be invoked early in

your program, before you make use of the other functions in `@acronym{GPGME}`. The last purpose is to run selftests.

As a side effect for W32 based systems, the socket layer will get initialized.

If `@var{required_version}` is `@code{NULL}`, the function returns a pointer to a statically allocated string containing the version number of the library.

If `@var{required_version}` is not `@code{NULL}`, it should point to a string containing a version number, and the function checks that the version of the library is at least as high as the version number provided. In this case, the function returns a pointer to a statically allocated string containing the version number of the library. If `@var{REQUIRED_VERSION}` is not a valid version number, or if the version requirement is not met, the function returns `@code{NULL}`.

If you use a version of a library that is backwards compatible with older releases, but contains additional interfaces which your program uses, this function provides a run-time check if the necessary features are provided by the installed version of the library.

If a selftest fails, the function may still succeed. Selftest errors are returned later when invoking `@code{gpgme_new}` or `@code{gpgme-data_new}`, so that a detailed error code can be returned (historically, `@code{gpgme_check_version}` does not return a detailed error code).

`@end deftypefun`

```
@deftypefun {int} gpgme_set_global_flag @
  (@w{const char *@var{name}}, @
  @w{const char *@var{value}})
```

`@since{1.4.0}`

On some systems it is not easy to set environment variables and thus hard to use `@acronym{GPGME}`'s internal trace facility for debugging. This function has been introduced as an alternative way to enable debugging and for a couple of other rarely used tweaks. It is important to assure that only one thread accesses `@acronym{GPGME}` functions between a call to this function and after the return from the call to `@code{gpgme_check_version}`.

All currently supported features require that this function is called

as early as possible --- even before `gpgme_check_version`. The features are identified by the following values for `name`:

`table`

`item debug`

To enable debugging use the string `debug` for `name` and `value` identical to the value used with the environment variable `GPGME_DEBUG`.

`item disable-gpgconf`

Using this feature with any `value` disables the detection of the `gpgconf` program and thus forces GPGME to fallback into the simple OpenPGP only mode. It may be used to force the use of GnuPG-1 on systems which have both GPG versions installed. Note that in general the use of `gpgme_set_engine_info` is a better way to select a specific engine version.

`item gpgconf-name`

`itemx gpg-name`

Set the name of the `gpgconf` respective `gpg` binary. The defaults are `GNU/GnuPG/gpgconf` and `GNU/GnuPG/gpg`. Under Unix the leading directory part is ignored. Under Windows the leading directory part is used as the default installation directory; the `.exe` suffix is added by GPGME. Use forward slashed even under Windows.

`item require-gnupg`

Set the minimum version of the required GnuPG engine. If that version is not met, GPGME fails early instead of trying to use the existent version. The given version must be a string with major, minor, and micro number. Example: "2.1.0".

`item w32-inst-dir`

On Windows GPGME needs to know its installation directory to find its spawn helper. This is in general no problem because a DLL has this information. Some applications however link statically to GPGME and thus GPGME can only figure out the installation directory of this application which may be wrong in certain cases. By supplying an installation directory as value to this flag, GPGME will assume that that directory is the installation directory. This flag has no effect on non-Windows platforms.

`end table`

This function returns `0` on success. In contrast to other functions the non-zero return value on failure does not convey any error code. For setting `debug` the only possible error cause is an out of memory condition; which would exhibit itself later anyway.

Thus the return value may be ignored.

@end dectypedefun

After initializing @acronym{GPGME}, you should set the locale information to the locale required for your output terminal. This locale information is needed for example for the curses and Gtk pinentry. Here is an example of a complete initialization:

```
@example
#include <locale.h>
#include <gpgme.h>

void
init_gpgme (void)
@{
/* Initialize the locale environment. */
setlocale (LC_ALL, "");
gpgme_check_version (NULL);
gpgme_set_locale (NULL, LC_CTYPE, setlocale (LC_CTYPE, NULL));
#ifdef LC_MESSAGES
gpgme_set_locale (NULL, LC_MESSAGES, setlocale (LC_MESSAGES, NULL));
#endif
@}
@end example
```

Note that you are highly recommended to initialize the locale settings like this. @acronym{GPGME} can not do this for you because it would not be thread safe. The conditional on LC\_MESSAGES is only necessary for portability to W32 systems.

```
@node Signal Handling
@section Signal Handling
@cindex signals
@cindex signal handling
```

The @acronym{GPGME} library communicates with child processes (the crypto engines). If a child process dies unexpectedly, for example due to a bug, or system problem, a @code{SIGPIPE} signal will be delivered to the application. The default action is to abort the program. To protect against this, @code{gpgme\_check\_version} sets the @code{SIGPIPE} signal action to @code{SIG\_IGN}, which means that the signal will be ignored.

@acronym{GPGME} will only do that if the signal action for @code{SIGPIPE} is @code{SIG\_DEF} at the time @code{gpgme\_check\_version} is called. If it is something different,

`GPGME` will take no action.

This means that if your application does not install any signal handler for `SIGPIPE`, you don't need to take any precautions. If you do install a signal handler for `SIGPIPE`, you must be prepared to handle any `SIGPIPE` events that occur due to `GPGME` writing to a defunct pipe. Furthermore, if your application is multi-threaded, and you install a signal action for `SIGPIPE`, you must make sure you do this either before `gpgme_check_version` is called or afterwards.

`Multi-Threading`

`Multi-Threading`

`thread-safeness`

`multi-threading`

The `GPGME` library is mostly thread-safe, and can be used in a multi-threaded environment but there are some requirements for multi-threaded use:

`itemize` `bullet`

`item`

The function `gpgme_check_version` must be called before any other function in the library, because it initializes the thread support subsystem in `GPGME`. To achieve this in multi-threaded programs, you must synchronize the memory with respect to other threads that also want to use `GPGME`. For this, it is sufficient to call `gpgme_check_version` before creating the other threads using `GPGME` `At least this is true for POSIX threads, as pthread_create is a function that synchronizes memory with respects to other threads. There are many functions which have this property, a complete list can be found in POSIX, IEEE Std 1003.1-2003, Base Definitions, Issue 6, in the definition of the term "Memory Synchronization". For other thread packages other, more relaxed or more strict rules may apply.`

`item`

Any `gpgme_data_t` and `gpgme_ctx_t` object must only be accessed by one thread at a time. If multiple threads want to deal with the same object, the caller has to make sure that operations on that object are fully synchronized.

`item`

Only one thread at any time is allowed to call `gpgme_wait`. If multiple threads call this function, the caller must make sure that all invocations are fully synchronized. It is safe to start asynchronous operations while a thread is running in `gpgme_wait`.

@item

The function @code{gpgme\_strerror} is not thread safe. You have to use @code{gpgme\_strerror\_r} instead.

@end itemize

@node Protocols and Engines

@chapter Protocols and Engines

@cindex protocol

@cindex engine

@cindex crypto engine

@cindex backend

@cindex crypto backend

@acronym{GPGME} supports several cryptographic protocols, however, it does not implement them. Rather it uses backends (also called engines) which implement the protocol. @acronym{GPGME} uses inter-process communication to pass data back and forth between the application and the backend, but the details of the communication protocol and invocation of the backend is completely hidden by the interface. All complexity is handled by @acronym{GPGME}. Where an exchange of information between the application and the backend is necessary, @acronym{GPGME} provides the necessary callback function hooks and further interfaces.

@deftp {Data type} {enum gpgme\_protocol\_t}

@tindex gpgme\_protocol\_t

The @code{gpgme\_protocol\_t} type specifies the set of possible protocol values that are supported by @acronym{GPGME}. The following protocols are supported:

@table @code

@item GPGME\_PROTOCOL\_OpenPGP

@itemx GPGME\_PROTOCOL\_OPENPGP

This specifies the OpenPGP protocol.

@item GPGME\_PROTOCOL\_CMS

This specifies the Cryptographic Message Syntax.

@item GPGME\_PROTOCOL\_GPGCONF

Under development. Please ask on @email{gnupg-devel@@gnupg.org} for help.

@item GPGME\_PROTOCOL\_ASSUAN

@since{1.2.0}

This specifies the raw Assuan protocol.

@item GPGME\_PROTOCOL\_G13

@since{1.3.0}

Under development. Please ask on @email{gnupg-devel@@gnupg.org} for help.

@item GPGME\_PROTOCOL\_UISERVER

Under development. Please ask on @email{gnupg-devel@@gnupg.org} for help.

@item GPGME\_PROTOCOL\_SPAWN

@since{1.5.0}

Special protocol for use with @code{gpgme\_op\_spawn}.

@item GPGME\_PROTOCOL\_UNKNOWN

Reserved for future extension. You may use this to indicate that the

used protocol is not known to the application. Currently,

@acronym{GPGME} does not accept this value in any operation, though,

except for @code{gpgme\_get\_protocol\_name}.

@end table

@end deftp

@deftypefun {const char \*} gpgme\_get\_protocol\_name (@w{gpgme\_protocol\_t} @var{protocol})

The function @code{gpgme\_get\_protocol\_name} returns a statically

allocated string describing the protocol @var{protocol}, or

@code{NULL} if the protocol number is not valid.

@end deftypefun

@menu

\* Engine Version Check:: Verifying the engine version.

\* Engine Information:: Obtaining more information about the engines.

\* Engine Configuration:: Changing the engine configuration.

\* OpenPGP:: Support for the OpenPGP protocol.

\* Cryptographic Message Syntax:: Support for the CMS.

\* Assuan:: Support for the raw Assuan protocol.

@end menu

@node Engine Version Check

@section Engine Version Check

@cindex version check, of the engines

@deftypefun @w{const char \*} gpgme\_get\_dirinfo (@w{const char \*} @var{what})

@since{1.5.0}

The function @code{gpgme\_get\_dirinfo} returns a statically allocated

string with the value associated to @var{what}. The returned values

are the defaults and won't change even after

`gpgme_set_engine_info` has been used to configure a different engine. `NULL` is returned if no value is available. Commonly supported values for `what` are:

`homedir`

`homedir`

Return the default home directory.

`sysconfdir`

Return the name of the system configuration directory

`bindir`

Return the name of the directory with GnuPG program files.

`libdir`

Return the name of the directory with GnuPG related library files.

`libexecdir`

Return the name of the directory with GnuPG helper program files.

`datadir`

Return the name of the directory with GnuPG shared data.

`localedir`

Return the name of the directory with GnuPG locale data.

`agent-socket`

Return the name of the socket to connect to the `gpg-agent`.

`agent-ssh-socket`

Return the name of the socket to connect to the `ssh-agent` component of `gpg-agent`.

`dirmngr-socket`

Return the name of the socket to connect to the `dirmngr`.

`uiserver-socket`

Return the name of the socket to connect to the user interface server.

`gpgconf-name`

Return the file name of the engine configuration tool.

`gpg-name`

Return the file name of the OpenPGP engine.

`gpgsm-name`

Return the file name of the CMS engine.



@item g13-name

Return the name of the file container encryption engine.

@item gpg-wks-client-name

Return the name of the Web Key Service tool.

@end table

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_engine\_check\_version (@w{gpgme\_protocol\_t @var{protocol}})

The function @code{gpgme\_engine\_check\_version} verifies that the engine implementing the protocol @var{PROTOCOL} is installed in the expected path and meets the version requirement of @acronym{GPGME}.

This function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the engine is available and @code{GPG\_ERR\_INV\_ENGINE} if it is not.

@end deftypefun

@node Engine Information

@section Engine Information

@cindex engine, information about

@deftp {Data type} {gpgme\_engine\_info\_t}

@tindex gpgme\_protocol\_t

The @code{gpgme\_engine\_info\_t} type specifies a pointer to a structure describing a crypto engine. The structure contains the following elements:

@table @code

@item gpgme\_engine\_info\_t next

This is a pointer to the next engine info structure in the linked list, or @code{NULL} if this is the last element.

@item gpgme\_protocol\_t protocol

This is the protocol for which the crypto engine is used. You can convert this to a string with @code{gpgme\_get\_protocol\_name} for printing.

@item const char \*file\_name

This is a string holding the file name of the executable of the crypto engine. Currently, it is never @code{NULL}, but using @code{NULL} is reserved for future use, so always check before you use it.

@item const char \*home\_dir

This is a string holding the directory name of the crypto engine's

configuration directory. If it is `{NULL}`, then the default directory is used. See `{gpgme_get_dirinfo}` on how to get the default directory.

`@item const char *version`

This is a string containing the version number of the crypto engine. It might be `{NULL}` if the version number can not be determined, for example because the executable doesn't exist or is invalid.

`@item const char *req_version`

This is a string containing the minimum required version number of the crypto engine for `{GPGME}` to work correctly. This is the version number that `{gpgme_engine_check_version}` verifies against. Currently, it is never `{NULL}`, but using `{NULL}` is reserved for future use, so always check before you use it.

`@end table`

`@end deftp`

`@deftypefun gpgme_error_t gpgme_get_engine_info (@w{gpgme_engine_info_t *}{info})`

The function `{gpgme_get_engine_info}` returns a linked list of engine info structures in `{info}`. Each info structure describes the defaults of one configured backend.

The memory for the info structures is allocated the first time this function is invoked, and must not be freed by the caller.

This function returns the error code `{GPG_ERR_NO_ERROR}` if successful, and a system error if the memory could not be allocated.

`@end deftypefun`

Here is an example how you can provide more diagnostics if you receive an error message which indicates that the crypto engine is invalid.

`@example`

```
gpgme_ctx_t ctx;  
gpgme_error_t err;
```

[...]

```
if (gpgme_err_code (err) == GPG_ERR_INV_ENGINE)  
@{  
    gpgme_engine_info_t info;  
    err = gpgme_get_engine_info (&info);  
    if (!err)  
        @{  
            while (info && info->protocol != gpgme_get_protocol (ctx))  
                info = info->next;  
            if (!info)
```

```

    fprintf(stderr, "GPGME compiled without support for protocol %s",
            gpgme_get_protocol_name (info->protocol));
else if (info->file_name && !info->version)
    fprintf (stderr, "Engine %s not installed properly",
            info->file_name);
else if (info->file_name && info->version && info->req_version)
    fprintf (stderr, "Engine %s version %s installed, "
            "but at least version %s required", info->file_name,
            info->version, info->req_version);
else
    fprintf (stderr, "Unknown problem with engine for protocol %s",
            gpgme_get_protocol_name (info->protocol));
@}
@}
@end example

```

```

@node Engine Configuration
@section Engine Configuration
@cindex engine, configuration of
@cindex configuration of crypto backend

```

You can change the configuration of a backend engine, and thus change the executable program and configuration directory to be used. You can make these changes the default or set them for some contexts individually.

```

@deftypefun gpgme_error_t gpgme_set_engine_info (@w{gpgme_protocol_t @var{proto}}, @w{const char
*@var{file_name}}, @w{const char *@var{home_dir}})
@since{1.1.0}

```

The function `gpgme_set_engine_info` changes the default configuration of the crypto engine implementing the protocol `@var{proto}`.

`@var{file_name}` is the file name of the executable program implementing this protocol, and `@var{home_dir}` is the directory name of the configuration directory for this crypto engine. If `@var{home_dir}` is `NULL`, the engine's default will be used.

The new defaults are not applied to already created GPGME contexts.

This function returns the error code `GPG_ERR_NO_ERROR` if successful, or an error code on failure.

```

@end deftypefun

```

The functions `gpgme_ctx_get_engine_info` and `gpgme_ctx_set_engine_info` can be used to change the engine

configuration per context. @xref{Crypto Engine}.

@node OpenPGP  
@section OpenPGP  
@cindex OpenPGP  
@cindex GnuPG  
@cindex protocol, GnuPG  
@cindex engine, GnuPG

OpenPGP is implemented by GnuPG, the @acronym{GNU} Privacy Guard.  
This is the first protocol that was supported by @acronym{GPGME}.

The OpenPGP protocol is specified by @code{GPGME\_PROTOCOL\_OpenPGP}.

@node Cryptographic Message Syntax  
@section Cryptographic Message Syntax  
@cindex CMS  
@cindex cryptographic message syntax  
@cindex GpgSM  
@cindex protocol, CMS  
@cindex engine, GpgSM  
@cindex S/MIME  
@cindex protocol, S/MIME

@acronym{CMS} is implemented by GpgSM, the S/MIME implementation for GnuPG.

The @acronym{CMS} protocol is specified by @code{GPGME\_PROTOCOL\_CMS}.

@node Assuan  
@section Assuan  
@cindex ASSUAN  
@cindex protocol, ASSUAN  
@cindex engine, ASSUAN

Assuan is the RPC library used by the various @acronym{GnuPG} components. The Assuan protocol allows one to talk to arbitrary Assuan servers using @acronym{GPGME}. @xref{Using the Assuan protocol}.

The ASSUAN protocol is specified by @code{GPGME\_PROTOCOL\_ASSUAN}.

@node Algorithms  
@chapter Algorithms

@cindex algorithms

The crypto backends support a variety of algorithms used in public key cryptography. @footnote{Some engines also provide symmetric only encryption; see the description of the encryption function on how to use this.} The following sections list the identifiers used to denote such an algorithm.

@menu

\* Public Key Algorithms:: A list of all public key algorithms.

\* Hash Algorithms:: A list of all hash algorithms.

@end menu

@node Public Key Algorithms

@section Public Key Algorithms

@cindex algorithms, public key

@cindex public key algorithms

Public key algorithms are used for encryption, decryption, signing and verification of signatures.

@deftp {Data type} {enum gpgme\_pubkey\_algo\_t}

@tindex gpgme\_pubkey\_algo\_t

The @code{gpgme\_pubkey\_algo\_t} type specifies the set of all public key algorithms that are supported by @acronym{GPGME}. Possible values are:

@table @code

@item GPGME\_PK\_RSA

This value indicates the RSA (Rivest, Shamir, Adleman) algorithm.

@item GPGME\_PK\_RSA\_E

Deprecated. This value indicates the RSA (Rivest, Shamir, Adleman) algorithm for encryption and decryption only.

@item GPGME\_PK\_RSA\_S

Deprecated. This value indicates the RSA (Rivest, Shamir, Adleman) algorithm for signing and verification only.

@item GPGME\_PK\_DSA

This value indicates DSA, the Digital Signature Algorithm.

@item GPGME\_PK\_ELG

This value indicates ElGamal.

@item GPGME\_PK\_ELG\_E

This value also indicates ElGamal and is used specifically in GnuPG.

@item GPGME\_PK\_ECC

@since{1.5.0}

This value is a generic indicator for elliptic curve algorithms.

@item GPGME\_PK\_ECDSA

@since{1.3.0}

This value indicates ECDSA, the Elliptic Curve Digital Signature Algorithm as defined by FIPS 186-2 and RFC-6637.

@item GPGME\_PK\_ECDH

@since{1.3.0}

This value indicates ECDH, the Elliptic Curve Diffie-Hellmann encryption algorithm as defined by RFC-6637.

@item GPGME\_PK\_EDDSA

@since{1.7.0}

This value indicates the EdDSA algorithm.

@end table

@end deftp

@deftypefun {const char \*} gpgme\_pubkey\_algo\_name (@w{gpgme\_pubkey\_algo\_t @var{algo}})

The function @code{gpgme\_pubkey\_algo\_name} returns a pointer to a statically allocated string containing a description of the public key algorithm @var{algo}. This string can be used to output the name of the public key algorithm to the user.

If @var{algo} is not a valid public key algorithm, @code{NULL} is returned.

@end deftypefun

@deftypefun {char \*} gpgme\_pubkey\_algo\_string (@w{gpgme\_subkey\_t @var{key}})

@since{1.7.0}

The function @code{gpgme\_pubkey\_algo\_string} is a convenience function to build and return an algorithm string in the same way GnuPG does (e.g. ``rsa2048" or ``ed25519"). The caller must free the result using @code{gpgme\_free}. On error (e.g. invalid argument or memory exhausted), the function returns NULL and sets @code{ERRNO}.

@end deftypefun

@node Hash Algorithms

@section Hash Algorithms  
@cindex algorithms, hash  
@cindex algorithms, message digest  
@cindex hash algorithms  
@cindex message digest algorithms

Hash (message digest) algorithms are used to compress a long message to make it suitable for public key cryptography.

@deftp {Data type} {enum gpgme\_hash\_algo\_t}  
@tindex gpgme\_hash\_algo\_t  
The @code{gpgme\_hash\_algo\_t} type specifies the set of all hash algorithms that are supported by @acronym{GPGME}. Possible values are:

@table @code  
@item GPGME\_MD\_MD5  
@item GPGME\_MD\_SHA1  
@item GPGME\_MD\_RMD160  
@item GPGME\_MD\_MD2  
@item GPGME\_MD\_TIGER  
@item GPGME\_MD\_HAVAL  
@item GPGME\_MD\_SHA256  
@item GPGME\_MD\_SHA384  
@item GPGME\_MD\_SHA512  
@item GPGME\_MD\_SHA224  
@since{1.5.0}  
  
@item GPGME\_MD\_MD4  
@item GPGME\_MD\_CRC32  
@item GPGME\_MD\_CRC32\_RFC1510  
@item GPGME\_MD\_CRC24\_RFC2440  
@end table  
@end deftp

@deftypedefun {const char \*} gpgme\_hash\_algo\_name (@w{gpgme\_hash\_algo\_t @var{algo}})  
The function @code{gpgme\_hash\_algo\_name} returns a pointer to a statically allocated string containing a description of the hash algorithm @var{algo}. This string can be used to output the name of the hash algorithm to the user.

If @var{algo} is not a valid hash algorithm, @code{NULL} is returned.  
@end deftypedefun

@node Error Handling  
@chapter Error Handling  
@cindex error handling

Many functions in @acronym{GPGME} can return an error if they fail. For this reason, the application should always catch the error condition and take appropriate measures, for example by releasing the resources and passing the error up to the caller, or by displaying a descriptive message to the user and cancelling the operation.

Some error values do not indicate a system error or an error in the operation, but the result of an operation that failed properly. For example, if you try to decrypt a tempered message, the decryption will fail. Another error value actually means that the end of a data buffer or list has been reached. The following descriptions explain for many error codes what they mean usually. Some error values have specific meanings if returned by a certain functions. Such cases are described in the documentation of those functions.

@acronym{GPGME} uses the @code{libpgp-error} library. This allows to share the error codes with other components of the GnuPG system, and thus pass error values transparently from the crypto engine, or some helper application of the crypto engine, to the user. This way no information is lost. As a consequence, @acronym{GPGME} does not use its own identifiers for error codes, but uses those provided by @code{libpgp-error}. They usually start with @code{GPG\_ERR\_}.

However, @acronym{GPGME} does provide aliases for the functions defined in libpgp-error, which might be preferred for name space consistency.

@menu

- \* Error Values::           The error value and what it means.
- \* Error Sources::         A list of important error sources.
- \* Error Codes::           A list of important error codes.
- \* Error Strings::         How to get a descriptive string from a value.

@end menu

@node Error Values

@section Error Values

@cindex error values

@cindex error codes

@cindex error sources

@deftp {Data type} {gpgme\_err\_code\_t}

The @code{gpgme\_err\_code\_t} type is an alias for the @code{libpgp-error} type @code{gpg\_err\_code\_t}. The error code indicates the type of an error, or the reason why an operation failed.

A list of important error codes can be found in the next section.

@end deftp



```
@deftp {Data type} {gpgme_err_source_t}
```

The `gpgme_err_source_t` type is an alias for the `libgpg-error` type `gpg_err_source_t`. The error source has not a precisely defined meaning. Sometimes it is the place where the error happened, sometimes it is the place where an error was encoded into an error value. Usually the error source will give an indication to where to look for the problem. This is not always true, but it is attempted to achieve this goal.

A list of important error sources can be found in the next section.

```
@end deftp
```

```
@deftp {Data type} {gpgme_error_t}
```

The `gpgme_error_t` type is an alias for the `libgpg-error` type `gpg_error_t`. An error value like this has always two components, an error code and an error source. Both together form the error value.

Thus, the error value can not be directly compared against an error code, but the accessor functions described below must be used.

However, it is guaranteed that only 0 is used to indicate success (`GPG_ERR_NO_ERROR`), and that in this case all other parts of the error value are set to 0, too.

Note that in `GPGME`, the error source is used purely for diagnostical purposes. Only the error code should be checked to test for a certain outcome of a function. The manual only documents the error code part of an error value. The error source is left unspecified and might be anything.

```
@end deftp
```

```
@deftypefun {static inline gpgme_err_code_t} gpgme_err_code (@w{gpgme_error_t @var{err}})
```

The static inline function `gpgme_err_code` returns the `gpgme_err_code_t` component of the error value `@var{err}`. This function must be used to extract the error code from an error value in order to compare it with the `GPG_ERR_*` error code macros.

```
@end deftypefun
```

```
@deftypefun {static inline gpgme_err_source_t} gpgme_err_source (@w{gpgme_error_t @var{err}})
```

The static inline function `gpgme_err_source` returns the `gpgme_err_source_t` component of the error value `@var{err}`. This function must be used to extract the error source from an error value in order to compare it with the `GPG_ERR_SOURCE_*` error source macros.

```
@end deftypefun
```

```
@deftypefun {static inline gpgme_error_t} gpgme_err_make (@w{gpgme_err_source_t @var{source}},
```

```
@w{gpgme_err_code_t @var{code}})
```

The static inline function `gpgme_err_make` returns the error value consisting of the error source `source` and the error code `code`.

This function can be used in callback functions to construct an error value to return it to the library.

`@end deftypefun`

```
@deftypefun {static inline gpgme_error_t} gpgme_error (@w{gpgme_err_code_t} code)
```

The static inline function `gpgme_error` returns the error value consisting of the default error source and the error code `code`.

For `GPGME` applications, the default error source is

`GPG_ERR_SOURCE_USER_1`. You can define

`GPGME_ERR_SOURCE_DEFAULT` before including `gpgme.h` to change this default.

This function can be used in callback functions to construct an error value to return it to the library.

`@end deftypefun`

The `libgpg-error` library provides error codes for all system error numbers it knows about. If `err` is an unknown error number, the error code `GPG_ERR_UNKNOWN_ERRNO` is used. The following functions can be used to construct error values from system error numbers.

```
@deftypefun {gpgme_error_t} gpgme_err_make_from_errno (@w{gpgme_err_source_t} source, @w{int} err)
```

The function `gpgme_err_make_from_errno` is like

`gpgme_err_make`, but it takes a system error like `errno` instead of a `gpgme_err_code_t` error code.

`@end deftypefun`

```
@deftypefun {gpgme_error_t} gpgme_error_from_errno (@w{int} err)
```

The function `gpgme_error_from_errno` is like `gpgme_error`, but it takes a system error like `errno` instead of a

`gpgme_err_code_t` error code.

`@end deftypefun`

Sometimes you might want to map system error numbers to error codes directly, or map an error code representing a system error back to the system error number. The following functions can be used to do that.

```
@deftypefun {gpgme_err_code_t} gpgme_err_code_from_errno (@w{int} err)
```

The function `gpgme_err_code_from_errno` returns the error code for the system error `err`. If `err` is not a known system error, the function returns `GPG_ERR_UNKNOWN_ERRNO`.

@end deftypefun

@deftypefun {int} gpgme\_err\_code\_to\_errno (@w{gpgme\_err\_code\_t @var{err}})

The function @code{gpgme\_err\_code\_to\_errno} returns the system error for the error code @var{err}. If @var{err} is not an error code representing a system error, or if this system error is not defined on this system, the function returns @code{0}.

@end deftypefun

@node Error Sources

@section Error Sources

@cindex error codes, list of

The library @code{libgpg-error} defines an error source for every component of the GnuPG system. The error source part of an error value is not well defined. As such it is mainly useful to improve the diagnostic error message for the user.

If the error code part of an error value is @code{0}, the whole error value will be @code{0}. In this case the error source part is of course @code{GPG\_ERR\_SOURCE\_UNKNOWN}.

The list of error sources that might occur in applications using @acronym{GPGME} is:

@table @code

@item GPG\_ERR\_SOURCE\_UNKNOWN

The error source is not known. The value of this error source is @code{0}.

@item GPG\_ERR\_SOURCE\_GPGME

The error source is @acronym{GPGME} itself. This is the default for errors that occur in the @acronym{GPGME} library.

@item GPG\_ERR\_SOURCE\_GPG

The error source is GnuPG, which is the crypto engine used for the OpenPGP protocol.

@item GPG\_ERR\_SOURCE\_GPGSM

The error source is GPGSM, which is the crypto engine used for the CMS protocol.

@item GPG\_ERR\_SOURCE\_GCRYPT

The error source is @code{libgcrypt}, which is used by crypto engines to perform cryptographic operations.

@item GPG\_ERR\_SOURCE\_GPGAGENT

The error source is `@command{gpg-agent}`, which is used by crypto engines to perform operations with the secret key.

`@item GPG_ERR_SOURCE_PINENTRY`

The error source is `@command{pinentry}`, which is used by `@command{gpg-agent}` to query the passphrase to unlock a secret key.

`@item GPG_ERR_SOURCE_SCD`

The error source is the SmartCard Daemon, which is used by `@command{gpg-agent}` to delegate operations with the secret key to a SmartCard.

`@item GPG_ERR_SOURCE_KEYBOX`

The error source is `@code{libkbx}`, a library used by the crypto engines to manage local keyrings.

`@item GPG_ERR_SOURCE_USER_1`

`@item GPG_ERR_SOURCE_USER_2`

`@item GPG_ERR_SOURCE_USER_3`

`@item GPG_ERR_SOURCE_USER_4`

These error sources are not used by any GnuPG component and can be used by other software. For example, applications using

`@acronym{GPGME}` can use them to mark error values coming from callback handlers. Thus `@code{GPG_ERR_SOURCE_USER_1}` is the default for errors created with `@code{gpgme_error}` and `@code{gpgme_error_from_errno}`, unless you define `@code{GPGME_ERR_SOURCE_DEFAULT}` before including `@file{gpgme.h}`.

`@end table`

`@node Error Codes`

`@section Error Codes`

`@cindex error codes, list of`

The library `@code{libgpg-error}` defines many error values. Most of them are not used by `@code{GPGME}` directly, but might be returned by `@acronym{GPGME}` because it received them from the crypto engine. The below list only includes such error codes that have a specific meaning in `@code{GPGME}`, or which are so common that you should know about them.

`@table @code`

`@item GPG_ERR_EOF`

This value indicates the end of a list, buffer or file.

`@item GPG_ERR_NO_ERROR`

This value indicates success. The value of this error code is

`@code{0}`. Also, it is guaranteed that an error value made from the

error code `@code{0}` will be `@code{0}` itself (as a whole). This means that the error source information is lost for this error code, however, as this error code indicates that no error occurred, this is generally not a problem.

**@item GPG\_ERR\_GENERAL**

This value means that something went wrong, but either there is not enough information about the problem to return a more useful error value, or there is no separate error value for this type of problem.

**@item GPG\_ERR\_ENOMEM**

This value means that an out-of-memory condition occurred.

**@item GPG\_ERR\_E...**

System errors are mapped to `GPG_ERR_FOO` where FOO is the symbol for the system error.

**@item GPG\_ERR\_INV\_VALUE**

This value means that some user provided data was out of range. This can also refer to objects. For example, if an empty `@code{gpgme_data_t}` object was expected, but one containing data was provided, this error value is returned.

**@item GPG\_ERR\_UNUSABLE\_PUBKEY**

This value means that some recipients for a message were invalid.

**@item GPG\_ERR\_UNUSABLE\_SECKEY**

This value means that some signers were invalid.

**@item GPG\_ERR\_NO\_DATA**

This value means that a `@code{gpgme_data_t}` object which was expected to have content was found empty.

**@item GPG\_ERR\_CONFLICT**

This value means that a conflict of some sort occurred.

**@item GPG\_ERR\_NOT\_IMPLEMENTED**

This value indicates that the specific function (or operation) is not implemented. This error should never happen. It can only occur if you use certain values or configuration options which do not work, but for which we think that they should work at some later time.

**@item GPG\_ERR\_DECRYPT\_FAILED**

This value indicates that a decryption operation was unsuccessful.

**@item GPG\_ERR\_BAD\_PASSPHRASE**

This value means that the user did not provide a correct passphrase when requested.

**@item GPG\_ERR\_CANCELED**

This value means that the operation was canceled.

**@item GPG\_ERR\_INV\_ENGINE**

This value means that the engine that implements the desired protocol is currently not available. This can either be because the sources were configured to exclude support for this engine, or because the engine is not installed properly.

**@item GPG\_ERR\_AMBIGUOUS\_NAME**

This value indicates that a user ID or other specifier did not specify a unique key.

**@item GPG\_ERR\_WRONG\_KEY\_USAGE**

This value indicates that a key is not used appropriately.

**@item GPG\_ERR\_CERT\_REVOKED**

This value indicates that a key signature was revoked.

**@item GPG\_ERR\_CERT\_EXPIRED**

This value indicates that a key signature expired.

**@item GPG\_ERR\_NO\_CRL\_KNOWN**

This value indicates that no certificate revocation list is known for the certificate.

**@item GPG\_ERR\_NO\_POLICY\_MATCH**

This value indicates that a policy issue occurred.

**@item GPG\_ERR\_NO\_SECKEY**

This value indicates that no secret key for the user ID is available.

**@item GPG\_ERR\_MISSING\_CERT**

This value indicates that a key could not be imported because the issuer certificate is missing.

**@item GPG\_ERR\_BAD\_CERT\_CHAIN**

This value indicates that a key could not be imported because its certificate chain is not good, for example it could be too long.

**@item GPG\_ERR\_UNSUPPORTED\_ALGORITHM**

This value means a verification failed because the cryptographic algorithm is not supported by the crypto backend.

**@item GPG\_ERR\_BAD\_SIGNATURE**

This value means a verification failed because the signature is bad.

@item GPG\_ERR\_NO\_PUBKEY

This value means a verification failed because the public key is not available.

@item GPG\_ERR\_USER\_1

@item GPG\_ERR\_USER\_2

@item ...

@item GPG\_ERR\_USER\_16

These error codes are not used by any GnuPG component and can be freely used by other software. Applications using @acronym{GPGME} might use them to mark specific errors returned by callback handlers if no suitable error codes (including the system errors) for these errors exist already.

@end table

@node Error Strings

@section Error Strings

@cindex error values, printing of

@cindex error codes, printing of

@cindex error sources, printing of

@cindex error strings

@deftypefun {const char \*} gpgme\_strerror (@w{gpgme\_error\_t @var{err}})

The function @code{gpgme\_strerror} returns a pointer to a statically allocated string containing a description of the error code contained in the error value @var{err}. This string can be used to output a diagnostic message to the user.

This function is not thread safe. Use @code{gpgme\_strerror\_r} in multi-threaded programs.

@end deftypefun

@deftypefun {int} gpgme\_strerror\_r (@w{gpgme\_error\_t @var{err}}, @w{char \*@var{buf}}, @w{size\_t @var{buflen}})

The function @code{gpgme\_strerror\_r} returns the error string for @var{err} in the user-supplied buffer @var{buf} of size @var{buflen}.

This function is, in contrast to @code{gpgme\_strerror}, thread-safe if a thread-safe @code{strerror\_r} function is provided by the system.

If the function succeeds, 0 is returned and @var{buf} contains the string describing the error. If the buffer was not large enough, ERANGE is returned and @var{buf} contains as much of the beginning of the error string as fits into the buffer.

@end deftypefun

@deftypefun {const char \*} gpgme\_strsource (@w{gpgme\_error\_t @var{err}})

The function `gpgme_strerror` returns a pointer to a statically allocated string containing a description of the error source contained in the error value `err`. This string can be used to output a diagnostic message to the user.

```
@end deftypefun
```

The following example illustrates the use of `gpgme_strerror`:

```
@example
gpgme_ctx_t ctx;
gpgme_error_t err = gpgme_new (&ctx);
if (err)
@{
    fprintf (stderr, "%s: creating GpgME context failed: %s: %s\n",
            argv[0], gpgme_strerror (err), gpgme_strerror (err));
    exit (1);
@}
@end example
```

```
@node Exchanging Data
@chapter Exchanging Data
@cindex data, exchanging
```

A lot of data has to be exchanged between the user and the crypto engine, like plaintext messages, ciphertext, signatures and information about the keys. The technical details about exchanging the data information are completely abstracted by `GPGME`. The user provides and receives the data via `gpgme_data_t` objects, regardless of the communication protocol between `GPGME` and the crypto engine in use.

```
@deftp {Data type} {gpgme_data_t}
The gpgme_data_t type is a handle for a container for generic data, which is used by GPGME to exchange data with the user.
@end deftp
```

`gpgme_data_t` objects do not provide notifications on events. It is assumed that read and write operations are blocking until data is available. If this is undesirable, the application must ensure that all `GPGME` data operations always have data available, for example by using memory buffers or files rather than pipes or sockets. This might be relevant, for example, if the external event loop mechanism is used.

```
@deftp {Data type} {gpgme_off_t}
@since{1.4.1}
```



On POSIX platforms the `gpgme_off_t` type is an alias for `off_t`; it may be used interchangeably. On Windows platforms `gpgme_off_t` is defined as a long (i.e. 32 bit) for 32 bit Windows and as a 64 bit signed integer for 64 bit Windows.

The `gpgme_ssize_t` type is an alias for `ssize_t`. It has only been introduced to overcome portability problems pertaining to the declaration of `ssize_t` by different toolchains.

**Creating Data Buffers**

- \* Creating Data Buffers:: Creating new data buffers.
- \* Destroying Data Buffers:: Releasing data buffers.
- \* Manipulating Data Buffers:: Operations on data buffers.

**Creating Data Buffers**

**Creating Data Buffers**

data buffer, creation

Data objects can be based on memory, files, or callback functions provided by the user. Not all operations are supported by all objects.

**Memory Based Data Buffers**

- \* Memory Based Data Buffers:: Creating memory based data buffers.
- \* File Based Data Buffers:: Creating file based data buffers.
- \* Callback Based Data Buffers:: Creating callback based data buffers.

**Memory Based Data Buffers**

Memory Based Data Buffers

Memory based data objects store all data in allocated memory. This is convenient, but only practical for an amount of data that is a fraction of the available physical memory. The data has to be copied from its source and to its destination, which can often be avoided by using one of the other data object

The function `gpgme_data_new` creates a new `gpgme_data_t` object and returns a handle for it in `dh`. The data object is

memory based and initially empty.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `dh` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_data_new_from_mem (@w{gpgme_data_t *@var{dh}}, @w{const char *@var{buffer}}, @w{size_t @var{size}}, @w{int @var{copy}})
```

The function `gpgme_data_new_from_mem` creates a new `gpgme_data_t` object and fills it with `size` bytes starting from `buffer`.

If `copy` is not zero, a private copy of the data is made. If `copy` is zero, the data is taken from the specified buffer as needed, and the user has to ensure that the buffer remains valid for the whole life span of the data object.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `dh` or `buffer` is not a valid pointer, and `GPG_ERR_ENOMEM` if not enough memory is available.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_data_new_from_file (@w{gpgme_data_t *@var{dh}}, @w{const char *@var{filename}}, @w{int @var{copy}})
```

The function `gpgme_data_new_from_file` creates a new `gpgme_data_t` object and fills it with the content of the file `filename`.

If `copy` is not zero, the whole file is read in at initialization time and the file is not used anymore after that. This is the only mode supported currently. Later, a value of zero for `copy` might cause all reads to be delayed until the data is needed, but this is not yet implemented.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, `GPG_ERR_INV_VALUE` if `dh` or `filename` is not a valid pointer, `GPG_ERR_NOT_IMPLEMENTED` if `code` is zero, and `GPG_ERR_ENOMEM` if not enough memory is available.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_data_new_from_filepart (@w{gpgme_data_t *@var{dh}}, @w{const char *@var{filename}}, @w{FILE *@var{fp}}, @w{off_t @var{offset}}, @w{size_t @var{length}})
```

The function `gpgme_data_new_from_filepart` creates a new `gpgme_data_t` object and fills it with a part of the file specified

by `@var{filename}` or `@var{fp}`.

Exactly one of `@var{filename}` and `@var{fp}` must be non-zero, the other must be zero. The argument that is not zero specifies the file from which `@var{length}` bytes are read into the data object, starting from `@var{offset}`.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the data object was successfully created, `@code{GPG_ERR_INV_VALUE}` if `@var{dh}` and exactly one of `@var{filename}` and `@var{fp}` is not a valid pointer, and `@code{GPG_ERR_ENOMEM}` if not enough memory is available.

```
@end deftypefun
```

```
@node File Based Data Buffers
```

```
@subsection File Based Data Buffers
```

File based data objects operate directly on file descriptors or streams. Only a small amount of data is stored in core at any time, so the size of the data objects is not limited by `@acronym{GPGME}`.

```
@deftypefun gpgme_error_t gpgme_data_new_from_fd (@w{gpgme_data_t *@var{dh}}, @w{int @var{fd}})
```

The function `@code{gpgme_data_new_from_fd}` creates a new `@code{gpgme_data_t}` object and uses the file descriptor `@var{fd}` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the file descriptor than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the file descriptor is set to blocking mode. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the data object was successfully created, and `@code{GPG_ERR_ENOMEM}` if not enough memory is available.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_data_new_from_stream (@w{gpgme_data_t *@var{dh}}, @w{FILE *@var{stream}})
```

The function `@code{gpgme_data_new_from_stream}` creates a new `@code{gpgme_data_t}` object and uses the I/O stream `@var{stream}` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read

a bit more from the stream than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the stream is in blocking mode. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not enough memory is available.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_data_new_from_estream (@w{gpgme_data_t *}@var{dh}),  
@w{gpgmt_stream_t @var{stream}})
```

The function `gpgme_data_new_from_estream` creates a new `gpgme_data_t` object and uses the `gpgmt` stream `@var{stream}` to read from (if used as an input data object) and write to (if used as an output data object).

When using the data object as an input buffer, the function might read a bit more from the stream than is actually needed by the crypto engine in the desired operation because of internal buffering.

Note that GPGME assumes that the stream is in blocking mode. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function returns the error code `GPG_ERR_NO_ERROR` if the data object was successfully created, and `GPG_ERR_ENOMEM` if not enough memory is available.

@end deftypefun

@node Callback Based Data Buffers

@subsection Callback Based Data Buffers

If neither memory nor file based data objects are a good fit for your application, you can implement the functions a data object provides yourself and create a data object from these callback functions.

```
@deftp {Data type} {ssize_t (*gpgme_data_read_cb_t) (@w{void *}@var{handle}), @w{void @var{*buffer}},  
@w{size_t @var{size}})}
```

@tindex gpgme\_data\_read\_cb\_t

The `gpgme_data_read_cb_t` type is the type of functions which `GPGME` calls if it wants to read data from a user-implemented data object. The function should read up to `@var{size}` bytes from the current read position into the space starting at `@var{buffer}`. The `@var{handle}` is provided by the user at data object creation time.

Note that GPGME assumes that the read blocks until data is available. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function should return the number of bytes read, 0 on EOF, and -1 on error. If an error occurs, `@var{errno}` should be set to describe the type of the error.

@end deftp

```
@deftp {Data type} {ssize_t (*gpgme_data_write_cb_t) (@w{void *@var{handle}}, @w{const void @var{*buffer}}, @w{size_t @var{size}})}
```

```
@tindex gpgme_data_write_cb_t
```

The `@code{gpgme_data_write_cb_t}` type is the type of functions which `@acronym{GPGME}` calls if it wants to write data to a user-implemented data object. The function should write up to `@var{size}` bytes to the current write position from the space starting at `@var{buffer}`. The `@var{handle}` is provided by the user at data object creation time.

Note that GPGME assumes that the write blocks until data is available. Errors during I/O operations, except for EINTR, are usually fatal for crypto operations.

The function should return the number of bytes written, and -1 on error. If an error occurs, `@var{errno}` should be set to describe the type of the error.

@end deftp

```
@deftp {Data type} {off_t (*gpgme_data_seek_cb_t) (@w{void *@var{handle}}, @w{off_t @var{offset}}, @w{int @var{whence}})}
```

```
@tindex gpgme_data_seek_cb_t
```

The `@code{gpgme_data_seek_cb_t}` type is the type of functions which `@acronym{GPGME}` calls if it wants to change the current read/write position in a user-implemented data object, just like the `@code{lseek}` function.

The function should return the new read/write position, and -1 on error. If an error occurs, `@var{errno}` should be set to describe the type of the error.

@end deftp

```
@deftp {Data type} {void (*gpgme_data_release_cb_t) (@w{void *@var{handle}})}
```

```
@tindex gpgme_data_release_cb_t
```

The `@code{gpgme_data_release_cb_t}` type is the type of functions which `@acronym{GPGME}` calls if it wants to destroy a user-implemented data object. The `@var{handle}` is provided by the user at data object creation time.

@end deftp

@deftp {Data type} {struct gpgme\_data\_cbs}

This structure is used to store the data callback interface functions described above. It has the following members:

@table @code

@item gpgme\_data\_read\_cb\_t read

This is the function called by @acronym{GPGME} to read data from the data object. It is only required for input data object.

@item gpgme\_data\_write\_cb\_t write

This is the function called by @acronym{GPGME} to write data to the data object. It is only required for output data object.

@item gpgme\_data\_seek\_cb\_t seek

This is the function called by @acronym{GPGME} to change the current read/write pointer in the data object (if available). It is optional.

@item gpgme\_data\_release\_cb\_t release

This is the function called by @acronym{GPGME} to release a data object. It is optional.

@end table

@end deftp

@deftypefun gpgme\_error\_t gpgme\_data\_new\_from\_cbs (@w{gpgme\_data\_t \*}@var{dh}),  
@w{gpgme\_data\_cbs\_t @var{cbs}}, @w{void \*}@var{handle})

The function @code{gpgme\_data\_new\_from\_cbs} creates a new @code{gpgme\_data\_t} object and uses the user-provided callback functions to operate on the data object.

The handle @var{handle} is passed as first argument to the callback functions. This can be used to identify this data object.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the data object was successfully created, and @code{GPG\_ERR\_ENOMEM} if not enough memory is available.

@end deftypefun

@node Destroying Data Buffers

@section Destroying Data Buffers

@cindex data buffer, destruction

@deftypefun void gpgme\_data\_release (@w{gpgme\_data\_t @var{dh}})

The function @code{gpgme\_data\_release} destroys the data object with the handle @var{dh}. It releases all associated resources that were not provided by the user in the first place.

@end deftypefun

```
@deftypefun {char *} gpgme_data_release_and_get_mem (@w{gpgme_data_t @var{dh}}, @w{size_t
*@var{length}})
```

The function `gpgme_data_release_and_get_mem` is like `gpgme_data_release`, except that it returns the data buffer and its length that was provided by the object.

The user has to release the buffer with `gpgme_free`. In case the user provided the data buffer in non-copy mode, a copy will be made for this purpose.

In case an error returns, or there is no suitable data buffer that can be returned to the user, the function will return `NULL`. In any case, the data object `dh` is destroyed.

```
@end deftypefun
```

```
@deftypefun void gpgme_free (@w{void *@var{buffer}})
@since{1.1.1}
```

The function `gpgme_free` releases the memory returned by `gpgme_data_release_and_get_mem` and `gpgme_pubkey_algo_string`. It should be used instead of the system libraries `free` function in case different allocators are used by a program. This is often the case if `gpgme` is used under Windows as a DLL.

```
@end deftypefun
```

```
@node Manipulating Data Buffers
@section Manipulating Data Buffers
@cindex data buffer, manipulation
```

Data buffers contain data and meta-data. The following operations can be used to manipulate both.

```
@menu
* Data Buffer I/O Operations:: I/O operations on data buffers.
* Data Buffer Meta-Data:: Meta-data manipulation of data buffers.
* Data Buffer Convenience:: Convenience function for data buffers.
@end menu
```

```
@node Data Buffer I/O Operations
@subsection Data Buffer I/O Operations
@cindex data buffer, I/O operations
@cindex data buffer, read
```

@cindex data buffer, write

@cindex data buffer, seek

```
@deftypefun ssize_t gpgme_data_read (@w{gpgme_data_t @var{dh}}, @w{void *@var{buffer}}, @w{size_t @var{length}})
```

The function @code{gpgme\_data\_read} reads up to @var{length} bytes from the data object with the handle @var{dh} into the space starting at @var{buffer}.

If no error occurs, the actual amount read is returned. If the end of the data object is reached, the function returns 0.

In all other cases, the function returns -1 and sets @var{errno}.

@end deftypefun

```
@deftypefun ssize_t gpgme_data_write (@w{gpgme_data_t @var{dh}}, @w{const void *@var{buffer}}, @w{size_t @var{size}})
```

The function @code{gpgme\_data\_write} writes up to @var{size} bytes starting from @var{buffer} into the data object with the handle @var{dh} at the current write position.

The function returns the number of bytes actually written, or -1 if an error occurs. If an error occurs, @var{errno} is set.

@end deftypefun

```
@deftypefun off_t gpgme_data_seek (@w{gpgme_data_t @var{dh}}, @w{off_t @var{offset}}, @w{int @var{whence}})
```

The function @code{gpgme\_data\_seek} changes the current read/write position.

The @var{whence} argument specifies how the @var{offset} should be interpreted. It must be one of the following symbolic constants:

@table @code

@item SEEK\_SET

Specifies that @var{offset} is a count of characters from the beginning of the data object.

@item SEEK\_CUR

Specifies that @var{offset} is a count of characters from the current file position. This count may be positive or negative.

@item SEEK\_END

Specifies that @var{offset} is a count of characters from the end of the data object. A negative count specifies a position within the current extent of the data object; a positive count specifies a position past the current end. If you set the position past the current end, and actually write data, you will extend the data object



with zeros up to that position.

@end table

If successful, the function returns the resulting file position, measured in bytes from the beginning of the data object. You can use this feature together with @code{SEEK\_CUR} to read the current read/write position.

If the function fails, -1 is returned and @var{errno} is set.

@end deftypefun

@node Data Buffer Meta-Data

@subsection Data Buffer Meta-Data

@cindex data buffer, meta-data

@cindex data buffer, file name

@cindex data buffer, encoding

@deftypefun {char \*} gpgme\_data\_get\_file\_name (@w{gpgme\_data\_t @var{dh}})

@since{1.1.0}

The function @code{gpgme\_data\_get\_file\_name} returns a pointer to a string containing the file name associated with the data object. The file name will be stored in the output when encrypting or signing the data and will be returned to the user when decrypting or verifying the output data.

If no error occurs, the string containing the file name is returned.

Otherwise, @code{NULL} will be returned.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_data\_set\_file\_name (@w{gpgme\_data\_t @var{dh}}, @w{const char \*@var{file\_name}})

@since{1.1.0}

The function @code{gpgme\_data\_set\_file\_name} sets the file name associated with the data object. The file name will be stored in the output when encrypting or signing the data and will be returned to the user when decrypting or verifying the output data.

The function returns the error code @code{GPG\_ERR\_INV\_VALUE} if @var{dh} is not a valid pointer and @code{GPG\_ERR\_ENOMEM} if not enough memory is available.

@end deftypefun

@defftp {Data type} {enum gpgme\_data\_encoding\_t}

@tindex gpgme\_data\_encoding\_t

The @code{gpgme\_data\_encoding\_t} type specifies the encoding of a @code{gpgme\_data\_t} object. For input data objects, the encoding is useful to give the backend a hint on the type of data. For output data objects, the encoding can specify the output data format on certain operations. Please note that not all backends support all encodings on all operations. The following data types are available:

@table @code

@item GPGME\_DATA\_ENCODING\_NONE

This specifies that the encoding is not known. This is the default for a new data object. The backend will try its best to detect the encoding automatically.

@item GPGME\_DATA\_ENCODING\_BINARY

This specifies that the data is encoding in binary form; i.e. there is no special encoding.

@item GPGME\_DATA\_ENCODING\_BASE64

This specifies that the data is encoded using the Base-64 encoding scheme as used by @acronym{MIME} and other protocols.

@item GPGME\_DATA\_ENCODING\_ARMOR

This specifies that the data is encoded in an armored form as used by OpenPGP and PEM.

@item GPGME\_DATA\_ENCODING\_MIME

@since{1.7.0}

This specifies that the data is encoded as a MIME part.

@item GPGME\_DATA\_ENCODING\_URL

@since{1.2.0}

The data is a list of linefeed delimited URLs. This is only useful with @code{gpgme\_op\_import}.

@item GPGME\_DATA\_ENCODING\_URL0

@since{1.2.0}

The data is a list of binary zero delimited URLs. This is only useful with @code{gpgme\_op\_import}.

@item GPGME\_DATA\_ENCODING\_URLESC

@since{1.2.0}

The data is a list of linefeed delimited URLs with all control and space characters percent escaped. This mode is is not yet implemented.

@end table

@end deftp

@deftypefun gpgme\_data\_encoding\_t gpgme\_data\_get\_encoding (@w{gpgme\_data\_t @var{dh}})

The function @code{gpgme\_data\_get\_encoding} returns the encoding of the data object with the handle @var{dh}. If @var{dh} is not a valid pointer (e.g. @code{NULL}) @code{GPGME\_DATA\_ENCODING\_NONE} is returned.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_data\_set\_encoding (@w{gpgme\_data\_t @var{dh}}, gpgme\_data\_encoding\_t @var{enc})

The function @code{gpgme\_data\_set\_encoding} changes the encoding of the data object with the handle @var{dh} to @var{enc}.

@end deftypefun

@deftypefun {gpgme\_error\_t} gpgme\_data\_set\_flag @

(@w{gpgme\_data\_t @var{dh}}, @

@w{const char \*@var{name}}, @

@w{const char \*@var{value}})

@since{1.7.0}

Some minor properties of the data object can be controlled with flags set by this function. The properties are identified by the following values for @var{name}:

@table @code

@item size-hint

The value is a decimal number with the length gpgme shall assume for this data object. This is useful if the data is provided by callbacks or via file descriptors but the applications knows the total size of the data. If this is set the OpenPGP engine may use this to decide on buffer allocation strategies and to provide a total value for its progress information.

@end table

This function returns @code{0} on success.

@end deftypefun

@node Data Buffer Convenience

@subsection Data Buffer Convenience Functions

@cindex data buffer, convenience

@cindex type of data

@cindex identify

```
@def tp {Data type} {enum gpgme_data_type_t}
@tindex gpgme_data_type_t
@since{1.4.3}
```

The @code{gpgme\_data\_type\_t} type is used to return the detected type of the content of a data buffer.

```
@end def tp
```

```
@table @code
```

```
@item GPGME_DATA_TYPE_INVALID
```

This is returned by @code{gpgme\_data\_identify} if it was not possible to identify the data. Reasons for this might be a non-seekable stream or a memory problem. The value is 0.

```
@item GPGME_DATA_TYPE_UNKNOWN
```

The type of the data is not known.

```
@item GPGME_DATA_TYPE_PGP_SIGNED
```

The data is an OpenPGP signed message. This may be a binary signature, a detached one or a cleartext signature.

```
@item GPGME_DATA_TYPE_PGP_ENCRYPTED
```

```
@since{1.7.0}
```

The data is an OpenPGP encrypted message.

```
@item GPGME_DATA_TYPE_PGP_SIGNATURE
```

```
@since{1.7.0}
```

The data is an OpenPGP detached signature.

```
@item GPGME_DATA_TYPE_PGP_OTHER
```

This is a generic OpenPGP message. In most cases this will be encrypted data.

```
@item GPGME_DATA_TYPE_PGP_KEY
```

This is an OpenPGP key (private or public).

```
@item GPGME_DATA_TYPE_CMS_SIGNED
```

This is a CMS signed message.

```
@item GPGME_DATA_TYPE_CMS_ENCRYPTED
```

This is a CMS encrypted (enveloped data) message.

```
@item GPGME_DATA_TYPE_CMS_OTHER
```

This is used for other CMS message types.

```
@item GPGME_DATA_TYPE_X509_CERT
```

The data is a X.509 certificate

```
@item GPGME_DATA_TYPE_PKCS12
```

The data is a PKCS#12 message. This is commonly used to exchange private keys for X.509.

```
@end table
```

```
@def typefun gpgme_data_type_t gpgme_data_identify (@w{gpgme_data_t} @var{dh})
```

```
@since{1.4.3}
```

The function `gpgme_data_identify` returns the type of the data with the handle `dh`. If it is not possible to perform the identification, the function returns zero (`GPGME_DATA_TYPE_INVALID`). Note that depending on how the data object has been created the identification may not be possible or the data object may change its internal state (file pointer moved). For file or memory based data object, the state should not change.

`@c`  
`@c` Chapter Contexts  
`@c`  
`@node` Contexts  
`@chapter` Contexts  
`@cindex` context

All cryptographic operations in `GPGME` are performed within a context, which contains the internal state of the operation as well as configuration parameters. By using several contexts you can run several cryptographic operations in parallel, with different configuration.

`@def` {Data type} {`gpgme_ctx_t`}  
The `gpgme_ctx_t` type is a handle for a `GPGME` context, which is used to hold the configuration, status and result of cryptographic operations.

`@menu`

- \* Creating Contexts:: Creating new `GPGME` contexts.
- \* Destroying Contexts:: Releasing `GPGME` contexts.
- \* Result Management:: Managing the result of crypto operations.
- \* Context Attributes:: Setting properties of a context.
- \* Key Management:: Managing keys with `GPGME`.
- \* Trust Item Management:: Managing trust items with `GPGME`.
- \* Crypto Operations:: Using a context for cryptography.
- \* Miscellaneous:: Miscellaneous operations
- \* Run Control:: Controlling how operations are run.

`@end menu`

`@node` Creating Contexts  
`@section` Creating Contexts  
`@cindex` context, creation

`@def` `gpgme_error_t` `gpgme_new` (`w`{`gpgme_ctx_t` \*`ctx`})  
The function `gpgme_new` creates a new `gpgme_ctx_t` object

and returns a handle for it in `@var{ctx}`.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the context was successfully created, `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}` is not a valid pointer, and `@code{GPG_ERR_ENOMEM}` if not enough memory is available. Also, it returns `@code{GPG_ERR_NOT_OPERATIONAL}` if `@code{gpgme_check_version}` was not called to initialize GPGME, and `@code{GPG_ERR_SELFTEST_FAILED}` if a selftest failed. Currently, the only selftest is for Windows MingW32 targets to see if `@code{-mms-bitfields}` was used (as required).  
`@end deftypefun`

`@node Destroying Contexts`

`@section Destroying Contexts`

`@cindex context, destruction`

`@deftypefun void gpgme_release (@w{gpgme_ctx_t @var{ctx}})`

The function `@code{gpgme_release}` destroys the context with the handle `@var{ctx}` and releases all associated resources.

`@end deftypefun`

`@node Result Management`

`@section Result Management`

`@cindex context, result of operation`

The detailed result of an operation is returned in operation-specific structures such as `@code{gpgme_decrypt_result_t}`. The corresponding retrieval functions such as `@code{gpgme_op_decrypt_result}` provide static access to the results after an operation completes. Those structures shall be considered read-only and an application must not allocate such a structure on its own. The following interfaces make it possible to detach a result structure from its associated context and give it a lifetime beyond that of the current operation or context.

`@deftypefun void gpgme_result_ref (@w{void *@var{result}})`

`@since{1.2.0}`

The function `@code{gpgme_result_ref}` acquires an additional reference for the result `@var{result}`, which may be of any type

`@code{gpgme_*_result_t}`. As long as the user holds a reference, the result structure is guaranteed to be valid and unmodified.

`@end deftypefun`

`@deftypefun void gpgme_result_unref (@w{void *@var{result}})`

`@since{1.2.0}`

The function `gpgme_result_unref` releases a reference for the result `result`. If this was the last reference, the result structure will be destroyed and all resources associated to it will be released.

`@end deftypefun`

Note that a context may hold its own references to result structures, typically until the context is destroyed or the next operation is started. In fact, these references are accessed through the `gpgme_op_*_result` functions.

`@node Context Attributes`

`@section Context Attributes`

`@cindex context, attributes`

`@menu`

- \* Protocol Selection:: Selecting the protocol used by a context.
- \* Crypto Engine:: Configuring the crypto engine.
- \* Setting the Sender:: How to tell the engine the sender.
- \* ASCII Armor:: Requesting `ASCII` armored output.
- \* Text Mode:: Choosing canonical text mode.
- \* Offline Mode:: Choosing offline mode.
- \* Pinentry Mode:: Choosing the pinentry mode.
- \* Included Certificates:: Including a number of certificates.
- \* Key Listing Mode:: Selecting key listing mode.
- \* Passphrase Callback:: Getting the passphrase from the user.
- \* Progress Meter Callback:: Being informed about the progress.
- \* Status Message Callback:: Status messages received from `gpg`.
- \* Context Flags:: Additional flags for a context.
- \* Locale:: Setting the locale of a context.
- \* Additional Logs:: Additional logs of a context.

`@end menu`

`@node Protocol Selection`

`@subsection Protocol Selection`

`@cindex context, selecting protocol`

`@cindex protocol, selecting`

`@deftypefun gpgme_error_t gpgme_set_protocol (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_protocol_t @var{proto}})`

The function `gpgme_set_protocol` sets the protocol used within the context `ctx` to `proto`. All crypto operations will be performed by the crypto engine configured for that protocol.

`@xref{Protocols and Engines}`.

Setting the protocol with `gpgme_set_protocol` does intentionally not check if the crypto engine for that protocol is available and installed correctly. [Engine Version Check](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the protocol could be set successfully, and `GPG_ERR_INV_VALUE` if `protocol` is not a valid protocol.

```
@end deftypefun
```

```
@deftypefun gpgme_protocol_t gpgme_get_protocol (@w{gpgme_ctx_t @var{ctx}})
```

The function `gpgme_get_protocol` retrieves the protocol currently use with the context `ctx`.

```
@end deftypefun
```

```
@node Crypto Engine
@subsection Crypto Engine
@cindex context, configuring engine
@cindex engine, configuration per context
```

The following functions can be used to set and retrieve the configuration of the crypto engines of a specific context. The default can also be retrieved without any particular context. [Engine Information](#). The default can also be changed globally. [Engine Configuration](#).

```
@deftypefun gpgme_engine_info_t gpgme_ctx_get_engine_info (@w{gpgme_ctx_t @var{ctx}})
@since{1.1.0}
```

The function `gpgme_ctx_get_engine_info` returns a linked list of engine info structures. Each info structure describes the configuration of one configured backend, as used by the context `ctx`.

The result is valid until the next invocation of `gpgme_ctx_set_engine_info` for this particular context.

This function can not fail.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_ctx_set_engine_info (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_protocol_t @var{proto}}, @w{const char *@var{file_name}}, @w{const char *@var{home_dir}})
@since{1.1.0}
```

The function `gpgme_ctx_set_engine_info` changes the configuration of the crypto engine implementing the protocol `proto` for the context `ctx`.



@var{file\_name} is the file name of the executable program implementing this protocol, and @var{home\_dir} is the directory name of the configuration directory for this crypto engine. If @var{home\_dir} is @code{NULL}, the engine's default will be used.

Currently this function must be used before starting the first crypto operation. It is unspecified if and when the changes will take effect if the function is called after starting the first operation on the context @var{ctx}.

This function returns the error code @code{GPG\_ERR\_NO\_ERROR} if successful, or an error code on failure.

@end deftypefun

@node Setting the Sender

@subsection How to tell the engine the sender.

@cindex context, sender

@cindex sender

@cindex From:

Some engines can make use of the senders address, for example to figure out the best user id in certain trust models. For verification and signing of mails, it is thus suggested to let the engine know the sender ("From:") address. @acronym{GPGME} provides two functions to accomplish that. Note that the esoteric use of multiple "From:" addresses is not supported.

@deftypefun gpgme\_error\_t gpgme\_set\_sender @

(@w{gpgme\_ctx\_t @var{ctx}}, @

@w{int @var{address}})

@since{1.8.0}

The function @code{gpgme\_set\_sender} specifies the sender address for use in sign and verify operations. @var{address} is expected to be the ``addr-spec" part of an address but may also be a complete mailbox address, in which case this function extracts the ``addr-spec" from it. Using @code{NULL} for @var{address} clears the sender address.

The function returns 0 on success or an error code on failure. The most likely failure is that no valid ``addr-spec" was found in @var{address}.

@end deftypefun

@deftypefun @w{const char \*} gpgme\_get\_sender @

(@w{gpgme\_ctx\_t @var{ctx}})

@since{1.8.0}

The function @code{gpgme\_get\_sender} returns the current sender address from the context, or NULL if none was set. The returned value is valid as long as the @var{ctx} is valid and @code{gpgme\_set\_sender} has not been called again.

@end deftypefun

@c FIXME: Unfortunately, using @acronym here breaks texi2dvi.

@node ASCII Armor

@subsection @acronym{ASCII} Armor

@cindex context, armor mode

@cindex @acronym{ASCII} armor

@cindex armor mode

@deftypefun void gpgme\_set\_armor (@w{gpgme\_ctx\_t @var{ctx}}, @w{int @var{yes}})

The function @code{gpgme\_set\_armor} specifies if the output should be @acronym{ASCII} armored. By default, output is not @acronym{ASCII} armored.

@acronym{ASCII} armored output is disabled if @var{yes} is zero, and enabled otherwise.

@end deftypefun

@deftypefun int gpgme\_get\_armor (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_get\_armor} returns 1 if the output is @acronym{ASCII} armored, and @code{0} if it is not, or if @var{ctx} is not a valid pointer.

@end deftypefun

@node Text Mode

@subsection Text Mode

@cindex context, text mode

@cindex text mode

@cindex canonical text mode

@deftypefun void gpgme\_set\_textmode (@w{gpgme\_ctx\_t @var{ctx}}, @w{int @var{yes}})

The function @code{gpgme\_set\_textmode} specifies if canonical text mode should be used. By default, text mode is not used.

Text mode is for example used for the RFC2015 signatures; note that the updated RFC 3156 mandates that the mail user agent does some preparations so that text mode is not needed anymore.

This option is only relevant to the OpenPGP crypto engine, and ignored by all other engines.

Canonical text mode is disabled if `@var{yes}` is zero, and enabled otherwise.

`@end deftypefun`

`@deftypefun int gpgme_get_textmode (@w{gpgme_ctx_t @var{ctx}})`

The function `@code{gpgme_get_textmode}` returns 1 if canonical text mode is enabled, and `@code{0}` if it is not, or if `@var{ctx}` is not a valid pointer.

`@end deftypefun`

`@node Offline Mode`

`@subsection Offline Mode`

`@cindex context, offline mode`

`@cindex offline mode`

`@deftypefun void gpgme_set_offline (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{yes}})`

`@since{1.6.0}`

The function `@code{gpgme_set_offline}` specifies if offline mode should be used. Offline mode is disabled if `@var{yes}` is zero, and enabled otherwise. By default, offline mode is disabled.

The details of the offline mode depend on the used protocol and its backend engine. It may eventually be extended to be more stricter and for example completely disable the use of `Dirmngr` for any engine.

For the CMS protocol the offline mode specifies whether `Dirmngr` shall be used to do additional validation that might require connecting external services (e.g. CRL / OCSP checks). Here the offline mode only affects the keylist mode `@code{GPGME_KEYLIST_MODE_VALIDATE}`.

For the OpenPGP protocol offline mode entirely disables the use of the `Dirmngr` and will thus guarantee that no network connections are done as part of an operation on this context. It has only an effect with GnuPG versions 2.1.23 or later.

For all other protocols the offline mode is currently ignored.

`@end deftypefun`

`@deftypefun int gpgme_get_offline (@w{gpgme_ctx_t @var{ctx}})`

`@since{1.6.0}`

The function `gpgme_get_offline` returns 1 if offline mode is enabled, and `0` if it is not, or if `ctx` is not a valid pointer.

`Pinentry Mode`

`Pinentry Mode`

context, pinentry mode

pinentry mode

```
@deftypefun gpgme_error_t gpgme_set_pinentry_mode (@w{gpgme_ctx_t @var{ctx}},
@w{gpgme_pinentry_mode_t @var{mode}})
```

`1.4.0`

The function `gpgme_set_pinentry_mode` specifies the pinentry mode to be used.

For GnuPG  $\geq$  2.1 this option is required to be set to

`GPGME_PINENTRY_MODE_LOOPBACK` to enable the passphrase callback mechanism in GPGME through `gpgme_set_passphrase_cb`.

`Pinentry Mode`

```
@deftypefun gpgme_pinentry_mode_t gpgme_get_pinentry_mode (@w{gpgme_ctx_t @var{ctx}})
@since{1.4.0}
```

The function `gpgme_get_pinentry_mode` returns the mode set for the context.

`Pinentry Mode`

`{Data type} {enum gpgme_pinentry_mode_t}`

`gpgme_pinentry_mode_t`

`1.4.0`

The `gpgme_minentry_mode_t` type specifies the set of possible pinentry modes that are supported by `GPGME` if GnuPG  $\geq$  2.1 is used.

The following modes are supported:

`Pinentry Mode`

`GPGME_PINENTRY_MODE_DEFAULT`

`1.4.0`

Use the default of the agent, which is ask.

`GPGME_PINENTRY_MODE_ASK`

`1.4.0`

Force the use of the Pinentry.

```
@item GPGME_PINENTRY_MODE_CANCEL
@since{1.4.0}
```

Emulate use of Pinentry's cancel button.

```
@item GPGME_PINENTRY_MODE_ERROR
@since{1.4.0}
```

Return a Pinentry error @code{No Pinentry}.

```
@item GPGME_PINENTRY_MODE_LOOPBACK
@since{1.4.0}
```

Redirect Pinentry queries to the caller.

This enables the use of @code{gpgme\_set\_passphrase\_cb} because pinentry queries are redirected to gpgme.

Note: For 2.1.0 - 2.1.12 this mode requires @code{allow-loopback-pinentry} to be enabled in the @file{gpg-agent.conf} or an agent started with that option.

```
@end table
@end deftp
```

```
@node Included Certificates
@subsection Included Certificates
@cindex certificates, included
```

```
@deftypefun void gpgme_set_include_certs (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{nr_of_certs}})
The function @code{gpgme_set_include_certs} specifies how many
certificates should be included in an S/MIME signed message. By
default, only the sender's certificate is included. The possible
values of @var{nr_of_certs} are:
```

```
@table @code
@item GPGME_INCLUDE_CERTS_DEFAULT
@since{1.0.3}
```

Fall back to the default of the crypto backend. This is the default for GPGME.

```
@item -2
```

Include all certificates except the root certificate.

```
@item -1
```

Include all certificates.

```
@item 0
```

Include no certificates.

@item 1

Include the sender's certificate only.

@item n

Include the first n certificates of the certificates path, starting from the sender's certificate. The number @code{n} must be positive.

@end table

Values of @var{nr\_of\_certs} smaller than -2 are undefined.

This option is only relevant to the CMS crypto engine, and ignored by all other engines.

@end dectypedefun

@dectypedefun int gpgme\_get\_include\_certs (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_get\_include\_certs} returns the number of certificates to include into an S/MIME signed message.

@end dectypedefun

@node Key Listing Mode

@subsection Key Listing Mode

@cindex key listing mode

@cindex key listing, mode of

@dectypedefun gpgme\_error\_t gpgme\_set\_keylist\_mode (@w{gpgme\_ctx\_t @var{ctx}},  
@w{gpgme\_keylist\_mode\_t @var{mode}})

The function @code{gpgme\_set\_keylist\_mode} changes the default behaviour of the key listing functions. The value in @var{mode} is a bitwise-or combination of one or multiple of the following bit values:

@table @code

@item GPGME\_KEYLIST\_MODE\_LOCAL

The @code{GPGME\_KEYLIST\_MODE\_LOCAL} symbol specifies that the local keyring should be searched for keys in the keylisting operation. This is the default.

Using only this option results in a @code{--list-keys}.

@item GPGME\_KEYLIST\_MODE\_EXTERN

The @code{GPGME\_KEYLIST\_MODE\_EXTERN} symbol specifies that an external source should be searched for keys in the keylisting operation. The type of external source is dependent on the crypto engine used and whether it is combined with @code{GPGME\_KEYLIST\_MODE\_LOCAL}. For example, it can be a remote keyserver or LDAP certificate server.

Using only this option results in a @code{--search-keys} for

@code{GPGME\_PROTOCOL\_OpenPGP} and something similar to

@code{--list-external-keys} for @code{GPGME\_PROTOCOL\_CMS}.

@item GPGME\_KEYLIST\_MODE\_LOCATE

This is a shortcut for the combination of

@code{GPGME\_KEYLIST\_MODE\_LOCAL} and @code{GPGME\_KEYLIST\_MODE\_EXTERN}, which results in a @code{--locate-keys} for @code{GPGME\_PROTOCOL\_OpenPGP}.

@item GPGME\_KEYLIST\_MODE\_SIGS

The @code{GPGME\_KEYLIST\_MODE\_SIGS} symbol specifies that the key signatures should be included in the listed keys.

@item GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS

@since{1.1.1}

The @code{GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS} symbol specifies that the signature notations on key signatures should be included in the listed keys. This only works if @code{GPGME\_KEYLIST\_MODE\_SIGS} is also enabled.

@item GPGME\_KEYLIST\_MODE\_WITH\_TOFU

@since{1.7.0}

The @code{GPGME\_KEYLIST\_MODE\_WITH\_TOFU} symbol specifies that information pertaining to the TOFU trust model should be included in the listed keys.

@item GPGME\_KEYLIST\_MODE\_WITH\_SECRET

@since{1.5.1}

The @code{GPGME\_KEYLIST\_MODE\_WITH\_SECRET} returns information about the presence of a corresponding secret key in a public key listing. A public key listing with this mode is slower than a standard listing but can be used instead of a second run to list the secret keys. This is only supported for GnuPG versions  $\geq 2.1$ .

@item GPGME\_KEYLIST\_MODE\_EPHEMERAL

@since{1.2.0}

The @code{GPGME\_KEYLIST\_MODE\_EPHEMERAL} symbol specifies that keys flagged as ephemeral are included in the listing.

@item GPGME\_KEYLIST\_MODE\_VALIDATE

@since{0.4.5}

The @code{GPGME\_KEYLIST\_MODE\_VALIDATE} symbol specifies that the backend should do key or certificate validation and not just get the validity information from an internal cache. This might be an expensive operation and is in general not useful. Currently only implemented for the S/MIME backend and ignored for other backends.

@end table

At least one of @code{GPGME\_KEYLIST\_MODE\_LOCAL} and @code{GPGME\_KEYLIST\_MODE\_EXTERN} must be specified. For future binary compatibility, you should get the current mode with @code{gpgme\_get\_keylist\_mode} and modify it by setting or clearing the appropriate bits, and then using that calculated value in the @code{gpgme\_set\_keylisting\_mode} operation. This will leave all other bits in the mode value intact (in particular those that are not used in the current version of the library).

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the mode could be set correctly, and @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} is not a valid pointer or @var{mode} is not a valid mode.

@end deftypefun

@deftypefun gpgme\_keylist\_mode\_t gpgme\_get\_keylist\_mode (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_get\_keylist\_mode} returns the current key listing mode of the context @var{ctx}. This value can then be modified and used in a subsequent @code{gpgme\_set\_keylist\_mode} operation to only affect the desired bits (and leave all others intact).

The function returns 0 if @var{ctx} is not a valid pointer, and the current mode otherwise. Note that 0 is not a valid mode value.

@end deftypefun

@node Passphrase Callback

@subsection Passphrase Callback

@cindex callback, passphrase

@cindex passphrase callback

@defstp {Data type} {gpgme\_error\_t (\*gpgme\_passphrase\_cb\_t)(void \*@var{hook}, const char \*@var{uid\_hint}, const char \*@var{passphrase\_info}, @w{int @var{prev\_was\_bad}}, @w{int @var{fd}})}

@tindex gpgme\_passphrase\_cb\_t

The @code{gpgme\_passphrase\_cb\_t} type is the type of functions usable as passphrase callback function.

The argument @var{uid\_hint} might contain a string that gives an indication for which user ID the passphrase is required. If this is not available, or not applicable (in the case of symmetric encryption, for example), @var{uid\_hint} will be @code{NULL}.

The argument @var{passphrase\_info}, if not @code{NULL}, will give further information about the context in which the passphrase is



required. This information is engine and operation specific.

If this is the repeated attempt to get the passphrase, because previous attempts failed, then `@var{prev_was_bad}` is 1, otherwise it will be 0.

The user must write the passphrase, followed by a newline character, to the file descriptor `@var{fd}`. The function `@code{gpgme_io_writen}` should be used for the write operation. Note that if the user returns 0 to indicate success, the user must at least write a newline character before returning from the callback.

If an error occurs, return the corresponding `@code{gpgme_error_t}` value. You can use the error code `@code{GPG_ERR_CANCELED}` to abort the operation. Otherwise, return `@code{0}`.

Note: The `passphrase_cb` only works with GnuPG 1.x and 2.1.x and not with the 2.0.x series. See `@code{gpgme_set_pinentry_mode}` for more details on 2.1.x usage.

`@end deftp`

```
@deftypefun void gpgme_set_passphrase_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_passphrase_cb_t @var{passfunc}}, @w{void *@var{hook_value}})
```

The function `@code{gpgme_set_passphrase_cb}` sets the function that is used when a passphrase needs to be provided by the user to `@var{passfunc}`. The function `@var{passfunc}` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `@var{hook_value}`. By default, no passphrase callback function is set.

Not all crypto engines require this callback to retrieve the passphrase. It is better if the engine retrieves the passphrase from a trusted agent (a daemon process), rather than having each user to implement their own passphrase query. Some engines do not even support an external passphrase callback at all, in this case the error code `@code{GPG_ERR_NOT_SUPPORTED}` is returned.

For GnuPG  $\geq 2.1$  the pinentry mode has to be set to `@code{GPGME_PINENTRY_MODE_LOOPBACK}` to enable the passphrase callback. See `@code{gpgme_set_pinentry_mode}`.

The user can disable the use of a passphrase callback function by calling `@code{gpgme_set_passphrase_cb}` with `@var{passfunc}` being `@code{NULL}`.

`@end deftypefun`

```
@deftypefun void gpgme_get_passphrase_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_passphrase_cb_t **@var{passfunc}}, @w{void **@var{hook_value}})
```

The function `gpgme_get_passphrase_cb` returns the function that is used when a passphrase needs to be provided by the user in `*passfunc`, and the first argument for this function in `*hook_value`. If no passphrase callback is set, or `ctx` is not a valid pointer, `NULL` is returned in both variables.

`passfunc` or `hook_value` can be `NULL`. In this case, the corresponding value will not be returned.

`@end deftypefun`

`@node Progress Meter Callback`

`@subsection Progress Meter Callback`

`@cindex callback, progress meter`

`@cindex progress meter callback`

```
@deftp {Data type} {void (*gpgme_progress_cb_t)(void *@var{hook}, const char *@var{what}, int @var{type},
int @var{current}, int @var{total})}
```

```
@tindex gpgme_progress_cb_t
```

The `gpgme_progress_cb_t` type is the type of functions usable as progress callback function.

The arguments are specific to the crypto engine. More information about the progress information returned from the GnuPG engine can be found in the GnuPG source code in the file `doc/DETAILS` in the section `PROGRESS`.

`@end deftp`

```
@deftypefun void gpgme_set_progress_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_progress_cb_t
@var{profunc}}, @w{void *@var{hook_value}})
```

The function `gpgme_set_progress_cb` sets the function that is used when progress information about a cryptographic operation is available. The function `profunc` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `hook_value`. By default, no progress callback function is set.

Setting a callback function allows an interactive program to display progress information about a long operation to the user.

The user can disable the use of a progress callback function by calling `gpgme_set_progress_cb` with `profunc` being `NULL`.

`@end deftypefun`

```
@deftypefun void gpgme_get_progress_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_progress_cb_t
*@var{profunc}}, @w{void **@var{hook_value}})
```

The function `gpgme_get_progress_cb` returns the function that is

used to inform the user about the progress made in `@var{*progfunc}`, and the first argument for this function in `@var{*hook_value}`. If no progress callback is set, or `@var{ctx}` is not a valid pointer, `@code{NULL}` is returned in both variables.

`@var{progfunc}` or `@var{hook_value}` can be `@code{NULL}`. In this case, the corresponding value will not be returned.

`@end deftypefun`

`@node Status Message Callback`

`@subsection Status Message Callback`

`@cindex callback, status message`

`@cindex status message callback`

`@deftp {Data type} {gpgme_error_t (*gpgme_status_cb_t)(void *@var{hook}, const char *@var{keyword}, const char *@var{args})}`

`@tindex gpgme_status_cb_t`

The `@code{gpgme_status_cb_t}` type is the type of function usable as a status message callback function.

The argument `@var{keyword}` is the name of the status message while the `@var{args}` argument contains any arguments for the status message.

If an error occurs, return the corresponding `@code{gpgme_error_t}` value. Otherwise, return `@code{0}`.

`@end deftp`

`@deftypefun void gpgme_set_status_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_status_cb_t @var{statusfunc}}, @w{void *@var{hook_value}})`

`@since{1.6.0}`

The function `@code{gpgme_set_status_cb}` sets the function that is used when a status message is received from gpg to `@var{statusfunc}`. The function `@var{statusfunc}` needs to be implemented by the user, and whenever it is called, it is called with its first argument being `@var{hook_value}`. By default, no status message callback function is set.

The user can disable the use of a status message callback function by calling `@code{gpgme_set_status_cb}` with `@var{statusfunc}` being `@code{NULL}`.

`@end deftypefun`

`@deftypefun void gpgme_get_status_cb (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_status_cb_t *@var{statusfunc}}, @w{void **@var{hook_value}})`

`@since{1.6.0}`

The function `@code{gpgme_get_status_cb}` returns the function that is used to process status messages from gpg in `@var{*statusfunc}`, and the first argument

for this function in @var{\*hook\_value}. If no status message callback is set, or @var{ctx} is not a valid pointer, @code{NULL} is returned in both variables.

```
@end deftypefun
```

```
@node Context Flags
```

```
@subsection Context Flags
```

```
@cindex flags, of a context
```

```
@deftypefun {gpgme_error_t} gpgme_set_ctx_flag @  
  (@w{gpgme_ctx_t @var{ctx}}, @  
  @w{const char *@var{name}}, @  
  @w{const char *@var{value}})
```

```
@since{1.7.0}
```

Some minor properties of the context can be controlled with flags set by this function. The properties are identified by the following values for @var{name}:

```
@table @code
```

```
@item "redraw"
```

This flag is normally not changed by the caller because GPGME sets and clears it automatically: The flag is cleared before an operation and set if an operation noticed that the engine has launched a Pinentry. A Curses based application may use this information to redraw the screen; for example:

```
@example
```

```
err = gpgme_op_keylist_start (ctx, "foo@@example.org", 0);  
while (!err)  
  @ {  
    err = gpgme_op_keylist_next (ctx, &key);  
    if (err)  
      break;  
    show_key (key);  
    gpgme_key_release (key);  
  }  
if ((s = gpgme_get_ctx_flag (ctx, "redraw")) && *s)  
  redraw_screen ();  
gpgme_release (ctx);  
@end example
```

```
@item "full-status"
```

Using a @var{value} of "1" the status callback set by gpgme\_set\_status\_cb returns all status lines with the exception of PROGRESS lines. With the default of "0" the status callback is only

called in certain situations.

#### @item "raw-description"

Setting the @var{value} to "1" returns human readable strings in a raw format. For example the non breaking space characters ("~") will not be removed from the @code{description} field of the @code{gpgme\_tofu\_info\_t} object.

#### @item "export-session-key"

Using a @var{value} of "1" specifies that the context should try to export the symmetric session key when decrypting data. By default, or when using an empty string or "0" for @var{value}, session keys are not exported.

#### @item "override-session-key"

The string given in @var{value} is passed to the GnuPG engine to override the session key for decryption. The format of that session key is specific to GnuPG and can be retrieved during a decrypt operation when the context flag "export-session-key" is enabled. Please be aware that using this feature with GnuPG < 2.1.16 will leak the session key on many platforms via ps(1).

#### @item "auto-key-retrieve"

Setting the @var{value} to "1" asks the backend to automatically retrieve a key for signature verification if possible. Note that this option makes a "web bug" like behavior possible. Keyserver or Web Key Directory operators can see which keys you request, so by sending you a message signed by a brand new key (which you naturally will not have on your local keyring), the operator can tell both your IP address and the time when you verified the signature.

#### @item "request-origin"

The string given in @var{value} is passed to the GnuPG engines to request restrictions based on the origin of the request. Valid values are documented in the GnuPG manual and the gpg man page under the option @option{--request-origin}. Requires at least GnuPG 2.2.6 to have an effect.

#### @item "no-symkey-cache"

For OpenPGP disable the passphrase cache used for symmetrical en- and decryption. This cache is based on the message specific salt value. Requires at least GnuPG 2.2.7 to have an effect.

#### @item "ignore-mdc-error"

This flag passes the option @option{--ignore-mdc-error} to gpg. This can be used to force decryption of a message which failed due to a missing integrity check. This flag must be used with great caution and only if it is a known non-corrupted old message and the decryption

result of the former try had the decryption result flag `{legacy_cipher_nomdc}` set. For failsafe reasons this flag is reset after each operation.

@item "auto-key-locate"

The string given in `{value}` is passed to `gpg`. This can be used to change the behavior of a `{GPGME_KEYLIST_MODE_LOCATE}` keylisting. Valid values are documented in the GnuPG manual and the `gpg` man page under the option `{--auto-key-locate}`.

Requires at least GnuPG 2.1.18.

Note: Keys retrieved through `{auto-key-locate}` are automatically imported in the keyring.

@item trust-model

@since{1.11.2}

Change the trust-model for all GnuPG engine operations. An empty string sets the trust-model back to the users default. If the trust-model is not supported by GnuPG the behavior is undefined and will likely cause all operations to fail. Example: "tofu+pgp".

This options should be used carefully with a strict version requirement. In some versions of GnuPG setting the trust-model changes the default trust-model for future operations. A change in the trust-model also can have unintended side effects, like rebuilding the trust-db.

@end table

This function returns `{0}` on success.

@end deffun

```
@deffun {const char *} gpgme_get_ctx_flag @
    (@w{gpgme_ctx_t @var{ctx}}, @
    @w{const char *@var{name}})
```

@since{1.8.0}

The value of flags settable by `{gpgme_set_ctx_flag}` can be retrieved by this function. If `{name}` is unknown the function returns `{NULL}`. For boolean flags an empty string is returned for False and the string "1" is returned for True; either `atoi(3)` or a test for an empty string can be used to get the boolean value.

@end deffun

@node Locale  
@subsection Locale  
@cindex locale, default  
@cindex locale, of a context

A locale setting can be associated with a context. This locale is passed to the crypto engine, and used for applications like the PIN entry, which is displayed to the user when entering a passphrase is required.

The default locale is used to initialize the locale setting of all contexts created afterwards.

```
@deftypefun gpgme_error_t gpgme_set_locale (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{category}},  
@w{const char *@var{value}})  
@since{0.4.3}
```

The function `gpgme_set_locale` sets the locale of the context `@var{ctx}`, or the default locale if `@var{ctx}` is a null pointer.

The locale settings that should be changed are specified by `@var{category}`. Supported categories are `LC_CTYPE`, `LC_MESSAGES`, and `LC_ALL`, which is a wildcard you can use if you want to change all the categories at once.

The value to be used for the locale setting is `@var{value}`, which will be copied to `GPGME`'s internal data structures. `@var{value}` can be a null pointer, which disables setting the locale, and will make PIN entry and other applications use their default setting, which is usually not what you want.

Note that the settings are only used if the application runs on a text terminal, and that the settings should fit the configuration of the output terminal. Normally, it is sufficient to initialize the default value at startup.

The function returns an error if not enough memory is available.  
@end deftypefun

@node Additional Logs  
@subsection Additional Logs  
@cindex auditlog, of the engine  
@cindex auditlog

Additional logs can be associated with a context. These logs are engine specific and can be obtained with `gpgme_op_getauditlog`.

```
@deftypefun gpgme_error_t gpgme_op_getauditlog @
  (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{output}}, @
  @w{unsigned int @var{flags}})
@since{1.1.1}
```

The function `gpgme_op_getauditlog` is used to obtain additional logs as specified by `@var{flags}` into the `@var{output}` data. If

The function returns the error code `GPG_ERR_NO_ERROR` if a log could be queried from the engine, and `GPG_ERR_NOT_IMPLEMENTED` if the log specified in `@var{flags}` is not available for this engine. If no log is available `GPG_ERR_NO_DATA` is returned.

The value in `@var{flags}` is a bitwise-or combination of one or multiple of the following bit values:

```
@table @code
@item GPGME_AUDITLOG_DIAG
@since{1.11.2}
```

Obtain diagnostic output which would be written to `stderr` in interactive use of the engine. This can be used to provide additional diagnostic information in case of errors in other operations.

Note: If log-file has been set in the configuration the log will be empty and `GPG_ERR_NO_DATA` will be returned.

Implemented for: `GPGME_PROTOCOL_OpenPGP`

```
@item GPGME_AUDITLOG_DEFAULT
@since{1.11.2}
```

This flag has the value 0 for compatibility reasons. Obtains additional information from the engine by issuing the `GETAUDITLOG` command. For `GPGME_PROTOCOL_CMS` this provides additional information about the X509 certificate chain.

Implemented for: `GPGME_PROTOCOL_CMS`

```
@item GPGME_AUDITLOG_HTML
@since{1.1.1}
```

Same as `GPGME_AUDITLOG_DEFAULT` but in HTML.

Implemented for: `GPGME_PROTOCOL_CMS`

```
@end table
@end deftypefun
```



```
@deftypefun gpgme_error_t gpgme_op_getauditlog_start @
  (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{output}}, @
   @w{unsigned int @var{flags}})
@since{1.1.1}
```

This is the asynchronous variant of `gpgme_op_getauditlog`.

```
@end deftypefun
```

```
@node Key Management
@section Key Management
@cindex key management
```

Some of the cryptographic operations require that recipients or signers are specified. This is always done by specifying the respective keys that should be used for the operation. The following section describes how such keys can be selected and manipulated.

```
@menu
* Key objects::          Description of the key structures.
* Listing Keys::        Browsing the list of available keys.
* Information About Keys::  Requesting detailed information about keys.
* Manipulating Keys::     Operations on keys.
* Generating Keys::      Creating new key pairs.
* Signing Keys::         Adding key signatures to public keys.
* Exporting Keys::       Retrieving key data from the key ring.
* Importing Keys::       Adding keys to the key ring.
* Deleting Keys::        Removing keys from the key ring.
* Changing Passphrases::  Change the passphrase of a key.
* Changing TOFU Data::    Changing data pertaining to TOFU.
* Advanced Key Editing::  Advanced key edit operation.
@end menu
```

```
@node Key objects
@subsection Key objects
```

The keys are represented in GPGME by structures which may only be read by the application but never be allocated or changed. They are valid as long as the key object itself is valid.

```
@defftp {Data type} gpgme_key_t
```

The `gpgme_key_t` type is a pointer to a key object. It has the following members:

```
@table @code
@item gpgme_keylist_mode_t keylist_mode
```

@since{0.9.0}

The keylist mode that was active when the key was retrieved.

@item unsigned int revoked : 1

This is true if the key is revoked.

@item unsigned int expired : 1

This is true if the key is expired.

@item unsigned int disabled : 1

This is true if the key is disabled.

@item unsigned int invalid : 1

This is true if the key is invalid. This might have several reasons, for a example for the S/MIME backend, it will be set during key listings if the key could not be validated due to missing certificates or unmatched policies.

@item unsigned int can\_encrypt : 1

This is true if the key (ie one of its subkeys) can be used for encryption.

@item unsigned int can\_sign : 1

This is true if the key (ie one of its subkeys) can be used to create data signatures.

@item unsigned int can\_certify : 1

This is true if the key (ie one of its subkeys) can be used to create key certificates.

@item unsigned int can\_authenticate : 1

@since{0.4.5}

This is true if the key (ie one of its subkeys) can be used for authentication.

@item unsigned int is\_qualified : 1

@since{1.1.0}

This is true if the key can be used for qualified signatures according to local government regulations.

@item unsigned int secret : 1

This is true if the key is a secret key. Note, that this will always be true even if the corresponding subkey flag may be false (offline/stub keys). This is only set if a listing of secret keys has been requested or if @code{GPGME\_KEYLIST\_MODE\_WITH\_SECRET} is active.

@item unsigned int origin : 5

@since{1.8.0}

Reserved for the origin of this key.

@item gpgme\_protocol\_t protocol

This is the protocol supported by this key.

@item char \*issuer\_serial

If @code{protocol} is @code{GPGME\_PROTOCOL\_CMS}, then this is the issuer serial.

@item char \*issuer\_name

If @code{protocol} is @code{GPGME\_PROTOCOL\_CMS}, then this is the issuer name.

@item char \*chain\_id

If @code{protocol} is @code{GPGME\_PROTOCOL\_CMS}, then this is the chain ID, which can be used to built the certificate chain.

@item gpgme\_validity\_t owner\_trust

If @code{protocol} is @code{GPGME\_PROTOCOL\_OpenPGP}, then this is the owner trust.

@item gpgme\_subkey\_t subkeys

This is a linked list with the subkeys of the key. The first subkey in the list is the primary key and usually available.

@item gpgme\_user\_id\_t uids

This is a linked list with the user IDs of the key. The first user ID in the list is the main (or primary) user ID.

@item char \*fpr

@since{1.7.0}

This field gives the fingerprint of the primary key. Note that this is a copy of the fingerprint of the first subkey. For an incomplete key (for example from a verification result) a subkey may be missing but this field may be set nevertheless.

@item unsigned long last\_update

@since{1.8.0}

Reserved for the time of the last update of this key.

@end table

@end deftp

@deftp {Data type} gpgme\_subkey\_t  
@since{1.5.0}

The @code{gpgme\_subkey\_t} type is a pointer to a subkey structure. Subkeys are one component of a @code{gpgme\_key\_t} object. In fact, subkeys are those parts that contains the real information about the individual cryptographic keys that belong to the same key object. One @code{gpgme\_key\_t} can contain several subkeys. The first subkey in the linked list is also called the primary key.

The subkey structure has the following members:

@table @code

@item gpgme\_subkey\_t next

This is a pointer to the next subkey structure in the linked list, or @code{NULL} if this is the last element.

@item unsigned int revoked : 1

This is true if the subkey is revoked.

@item unsigned int expired : 1

This is true if the subkey is expired.

@item unsigned int disabled : 1

This is true if the subkey is disabled.

@item unsigned int invalid : 1

This is true if the subkey is invalid.

@item unsigned int can\_encrypt : 1

This is true if the subkey can be used for encryption.

@item unsigned int can\_sign : 1

This is true if the subkey can be used to create data signatures.

@item unsigned int can\_certify : 1

This is true if the subkey can be used to create key certificates.

@item unsigned int can\_authenticate : 1

@since{0.4.5}

This is true if the subkey can be used for authentication.

@item unsigned int is\_qualified : 1

@since{1.1.0}

This is true if the subkey can be used for qualified signatures according to local government regulations.

@item unsigned int is\_de\_vs : 1  
@since{1.8.0}

This is true if the subkey complies with the rules for classified information in Germany at the restricted level (VS-NfD). This are currently RSA keys of at least 2048 bits or ECDH/ECDSA keys using a Brainpool curve.

@item unsigned int secret : 1

This is true if the subkey is a secret key. Note that it will be false if the key is actually a stub key; i.e. a secret key operation is currently not possible (offline-key). This is only set if a listing of secret keys has been requested or if @code{GPGME\_KEYLIST\_MODE\_WITH\_SECRET} is active.

@item gpgme\_pubkey\_algo\_t pubkey\_algo

This is the public key algorithm supported by this subkey.

@item unsigned int length

This is the length of the subkey (in bits).

@item char \*keyid

This is the key ID of the subkey in hexadecimal digits.

@item char \*fpr

This is the fingerprint of the subkey in hexadecimal digits, if available.

@item char \*keygrip

@since{1.7.0}

The keygrip of the subkey in hex digit form or @code{NULL} if not available.

@item long int timestamp

This is the creation timestamp of the subkey. This is -1 if the timestamp is invalid, and 0 if it is not available.

@item long int expires

This is the expiration timestamp of the subkey, or 0 if the subkey does not expire.

@item unsigned int is\_cardkey : 1

@since{1.2.0}

True if the secret key is stored on a smart card.

@item char \*card\_number  
@since{1.2.0}

The serial number of a smart card holding this key or @code{NULL}.

@item char \*curve  
For ECC algorithms the name of the curve.

@end table  
@end deftp

@deftp {Data type} gpgme\_user\_id\_t

A user ID is a component of a @code{gpgme\_key\_t} object. One key can have many user IDs. The first one in the list is the main (or primary) user ID.

The user ID structure has the following members.

@table @code  
@item gpgme\_user\_id\_t next  
This is a pointer to the next user ID structure in the linked list, or @code{NULL} if this is the last element.

@item unsigned int revoked : 1  
This is true if the user ID is revoked.

@item unsigned int invalid : 1  
This is true if the user ID is invalid.

@item gpgme\_validity\_t validity  
This specifies the validity of the user ID.

@item char \*uid  
This is the user ID string.

@item char \*name  
This is the name component of @code{uid}, if available.

@item char \*comment  
This is the comment component of @code{uid}, if available.

@item char \*email  
This is the email component of @code{uid}, if available.

@item char \*address;

The mail address (addr-spec from RFC-5322) of the user ID string. This is general the same as the @code{email} part of this structure but might be slightly different. If no mail address is available @code{NULL} is stored.

```
@item gpgme_tofu_info_t tofu
@since{1.7.0}
```

If not @code{NULL} information from the TOFU database pertaining to this user id.

```
@item gpgme_key_sig_t signatures
This is a linked list with the signatures on this user ID.
```

```
@item unsigned int origin : 5
@since{1.8.0}
```

Reserved for the origin of this user ID.

```
@item unsigned long last_update
@since{1.8.0}
```

Reserved for the time of the last update of this user ID.

```
@end table
@end deftp
```

```
@deftp {Data type} gpgme_tofu_info_t
```

```
@since{1.7.0}
```

The @code{gpgme\_tofu\_info\_t} type is a pointer to a tofu info structure. Tofu info structures are one component of a @code{gpgme\_user\_id\_t} object, and provide information from the TOFU database pertaining to the user ID.

The tofu info structure has the following members:

```
@table @code
@item gpgme_key_sig_t next
This is a pointer to the next tofu info structure in the linked list, or @code{NULL} if this is the last element.
```

```
@item unsigned int validity : 3
This is the TOFU validity. It can have the following values:
```

```
@table @code
```

@item 0

The value @code{0} indicates a conflict.

@item 1

The value @code{1} indicates a key without history.

@item 2

The value @code{2} indicates a key with too little history.

@item 3

The value @code{3} indicates a key with enough history for basic trust.

@item 4

The value @code{4} indicates a key with a lot of history.

@end table

@item unsigned int policy : 4

This is the TOFU policy, see @code{gpgme\_tofu\_policy\_t}.

@item unsigned short signcount

This is the number of signatures seen for this binding (or @code{USHRT\_MAX} if there are more than that).

@item unsigned short encrcount

This is the number of encryptions done with this binding (or @code{USHRT\_MAX} if there are more than that).

@item unsigned long signfirst

Number of seconds since Epoch when the first signature was seen with this binding.

@item unsigned long signlast

Number of seconds since Epoch when the last signature was seen with this binding.

@item unsigned long encrfirst

Number of seconds since Epoch when the first encryption was done with this binding.

@item unsigned long enclast

Number of seconds since Epoch when the last encryption was done with this binding.

@item char \*description

A human-readable string summarizing the TOFU data (or NULL).

@end table



@end deftp

@deftp {Data type} gpgme\_key\_sig\_t

The @code{gpgme\_key\_sig\_t} type is a pointer to a key signature structure. Key signatures are one component of a @code{gpgme\_key\_t} object, and validate user IDs on the key in the OpenPGP protocol.

The signatures on a key are only available if the key was retrieved via a listing operation with the @code{GPGME\_KEYLIST\_MODE\_SIGS} mode enabled, because it can be expensive to retrieve all signatures of a key.

The signature notations on a key signature are only available if the key was retrieved via a listing operation with the @code{GPGME\_KEYLIST\_MODE\_SIG\_NOTATIONS} mode enabled, because it can be expensive to retrieve all signature notations.

The key signature structure has the following members:

@table @code

@item gpgme\_key\_sig\_t next

This is a pointer to the next key signature structure in the linked list, or @code{NULL} if this is the last element.

@item unsigned int revoked : 1

This is true if the key signature is a revocation signature.

@item unsigned int expired : 1

This is true if the key signature is expired.

@item unsigned int invalid : 1

This is true if the key signature is invalid.

@item unsigned int exportable : 1

This is true if the key signature is exportable.

@item gpgme\_pubkey\_algo\_t pubkey\_algo

This is the public key algorithm used to create the signature.

@item char \*keyid

This is the key ID of the key (in hexadecimal digits) used to create the signature.

@item long int timestamp

This is the creation timestamp of the key signature. This is -1 if the timestamp is invalid, and 0 if it is not available.

@item long int expires

This is the expiration timestamp of the key signature, or 0 if the key signature does not expire.

@item gpgme\_error\_t status

This is the status of the signature and has the same meaning as the member of the same name in a @code{gpgme\_signature\_t} object.

@item unsigned int sig\_class

This specifies the signature class of the key signature. The meaning is specific to the crypto engine.

@item char \*uid

This is the main user ID of the key used to create the signature.

@item char \*name

This is the name component of @code{uid}, if available.

@item char \*comment

This is the comment component of @code{uid}, if available.

@item char \*email

This is the email component of @code{uid}, if available.

@item gpgme\_sig\_notation\_t notations

This is a linked list with the notation data and policy URLs.

@end table

@end deftp

@node Listing Keys

@subsection Listing Keys

@cindex listing keys

@cindex key listing

@cindex key listing, start

@cindex key ring, list

@cindex key ring, search

@deftypefun gpgme\_error\_t gpgme\_op\_keylist\_start (@w{gpgme\_ctx\_t @var{ctx}}, @w{const char \*@var{pattern}}, @w{int @var{secret\_only}})

The function @code{gpgme\_op\_keylist\_start} initiates a key listing operation inside the context @var{ctx}. It sets everything up so that subsequent invocations of @code{gpgme\_op\_keylist\_next} return the keys in the list.

If `@var{pattern}` is `@code{NULL}`, all available keys are returned. Otherwise, `@var{pattern}` contains an engine specific expression that is used to limit the list to all keys matching the pattern. Note that the total length of the pattern is restricted to an engine-specific maximum (a couple of hundred characters are usually accepted). The pattern should be used to restrict the search to a certain common name or user, not to list many specific keys at once by listing their fingerprints or key IDs.

If `@var{secret_only}` is not `@code{0}`, the list is restricted to secret keys only.

The context will be busy until either all keys are received (and `@code{gpgme_op_keylist_next}` returns `@code{GPG_ERR_EOF}`), or `@code{gpgme_op_keylist_end}` is called to finish the operation.

The function returns the error code `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

`@end deftypefun`

```
@deftypefun gpgme_error_t gpgme_op_keylist_ext_start (@w{gpgme_ctx_t @var{ctx}}, @w{const char
*@var{pattern}}[], @w{int @var{secret_only}}, @w{int @var{reserved}})
```

The function `@code{gpgme_op_keylist_ext_start}` initiates an extended key listing operation inside the context `@var{ctx}`. It sets everything up so that subsequent invocations of `@code{gpgme_op_keylist_next}` return the keys in the list.

If `@var{pattern}` or `@var{*pattern}` is `@code{NULL}`, all available keys are returned. Otherwise, `@var{pattern}` is a `@code{NULL}` terminated array of strings that are used to limit the list to all keys matching at least one of the patterns verbatim. Note that the total length of all patterns is restricted to an engine-specific maximum (the exact limit also depends on the number of patterns and amount of quoting required, but a couple of hundred characters are usually accepted). Patterns should be used to restrict the search to a certain common name or user, not to list many specific keys at once by listing their fingerprints or key IDs.

If `@var{secret_only}` is not `@code{0}`, the list is restricted to secret keys only.

The value of `@var{reserved}` must be `@code{0}`.

The context will be busy until either all keys are received (and `@code{gpgme_op_keylist_next}` returns `@code{GPG_ERR_EOF}`), or `@code{gpgme_op_keylist_end}` is called to finish the operation.

The function returns the error code `GPG_ERR_INV_VALUE` if `@var{ctx}` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_keylist_from_data_start @  
  (@w{gpgme_ctx_t @var{ctx}}, @  
   @w{gpgme_data_t @var{data}}, @  
   @w{int @var{reserved}})
```

```
@since{1.8.0}
```

The function `gpgme_op_keylist_from_data_start` initiates a key listing operation inside the context `@var{ctx}`. In contrast to the other key listing operation the keys are read from the supplied `@var{data}` and not from the local key database. The keys are also not imported into the local key database. The function sets everything up so that subsequent invocations of `gpgme_op_keylist_next` return the keys from `@var{data}`.

The value of `@var{reserved}` must be `0`.

This function requires at least GnuPG version 2.1.14 and currently works only with OpenPGP keys.

The context will be busy until either all keys are received (and `gpgme_op_keylist_next` returns `GPG_ERR_EOF`), or `gpgme_op_keylist_end` is called to finish the operation. While the context is busy `@var{data}` may not be released.

The function returns the error code `GPG_ERR_INV_VALUE` if `@var{ctx}` is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_keylist_next (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t  
*@var{r_key}})
```

The function `gpgme_op_keylist_next` returns the next key in the list created by a previous `gpgme_op_keylist_start` operation in the context `@var{ctx}`. The key will have one reference for the user.

[Manipulating Keys](#).

This is the only way to get at `gpgme_key_t` objects in `GPGME`.

If the last key in the list has already been returned,

`gpgme_op_keylist_next` returns `GPG_ERR_EOF`.

The function returns the error code `GPG_ERR_INV_VALUE` if `ctx` or `r_key` is not a valid pointer, and `GPG_ERR_ENOMEM` if there is not enough memory for the operation.

```
@deftypefun gpgme_error_t gpgme_op_keylist_end (@w{gpgme_ctx_t @var{ctx}})
```

The function `gpgme_op_keylist_end` ends a pending key list operation in the context `ctx`.

After the operation completed successfully, the result of the key listing operation can be retrieved with `gpgme_op_keylist_result`.

The function returns the error code `GPG_ERR_INV_VALUE` if `ctx` is not a valid pointer, and `GPG_ERR_ENOMEM` if at some time during the operation there was not enough memory available.

The following example illustrates how all keys containing a certain string (`g10code`) can be listed with their key ID and the name and email address of the main user ID:

```
@example
gpgme_ctx_t ctx;
gpgme_key_t key;
gpgme_error_t err = gpgme_new (&ctx);

if (!err)
@{
    err = gpgme_op_keylist_start (ctx, "g10code", 0);
    while (!err)
        @{
            err = gpgme_op_keylist_next (ctx, &key);
            if (err)
                break;
            printf ("%s:", key->subkeys->keyid);
            if (key->uids && key->uids->name)
                printf (" %s", key->uids->name);
            if (key->uids && key->uids->email)
                printf (" <%s>", key->uids->email);
            putchar ('\n');
            gpgme_key_release (key);
        @}
    gpgme_release (ctx);
@}
```

```

if (gpg_err_code (err) != GPG_ERR_EOF)
@{
    fprintf (stderr, "can not list keys: %s\n", gpgme_strerror (err));
    exit (1);
@}
@end example

```

```

@defpt {Data type} {gpgme_keylist_result_t}

```

This is a pointer to a structure used to store the result of a `gpgme_op_keylist_*` operation. After successfully ending a key listing operation, you can retrieve the pointer to the result with `gpgme_op_keylist_result`. The structure contains the following member:

```

@table @code
@item unsigned int truncated : 1

```

This is true if the crypto backend had to truncate the result, and less than the desired keys could be listed.

```

@end table
@end defpt

```

```

@deftypefun gpgme_keylist_result_t gpgme_op_keylist_result (@w{gpgme_ctx_t @var{ctx}})

```

The function `gpgme_op_keylist_result` returns a `gpgme_keylist_result_t` pointer to a structure holding the result of a `gpgme_op_keylist_*` operation. The pointer is only valid if the last operation on the context was a key listing operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

```

@end deftypefun

```

In a simple program, for which a blocking operation is acceptable, the following function can be used to retrieve a single key.

```

@deftypefun gpgme_error_t gpgme_get_key (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{fpr}},
@w{gpgme_key_t *@var{r_key}}, @w{int @var{secret}})

```

The function `gpgme_get_key` gets the key with the fingerprint (or key ID) `@var{fpr}` from the crypto backend and return it in `@var{r_key}`. If `@var{secret}` is true, get the secret key. The currently active keylist mode is used to retrieve the key. The key will have one reference for the user.

If the key is not found in the keyring, `gpgme_get_key` returns the error code `GPG_ERR_EOF` and `@var{r_key}` will be set to `NULL`.

The function returns the error code `GPG_ERR_INV_VALUE` if `@var{ctx}` or `@var{r_key}` is not a valid pointer or `@var{fpr}` is not a

fingerprint or key ID, @code{GPG\_ERR\_AMBIGUOUS\_NAME} if the key ID was not a unique specifier for a key, and @code{GPG\_ERR\_ENOMEM} if at some time during the operation there was not enough memory available.

@end deftypefun

@node Information About Keys

@subsection Information About Keys

@cindex key, information about

@cindex key, attributes

@cindex attributes, of a key

Please see the beginning of this section for more information about

@code{gpgme\_key\_t} objects.

@deftp {Data type} gpgme\_validity\_t

The @code{gpgme\_validity\_t} type is used to specify the validity of a user ID in a key. The following validities are defined:

@table @code

@item GPGME\_VALIDITY\_UNKNOWN

The user ID is of unknown validity. The string representation of this validity is `?`.

@item GPGME\_VALIDITY\_UNDEFINED

The validity of the user ID is undefined. The string representation of this validity is `q`.

@item GPGME\_VALIDITY\_NEVER

The user ID is never valid. The string representation of this validity is `n`.

@item GPGME\_VALIDITY\_MARGINAL

The user ID is marginally valid. The string representation of this validity is `m`.

@item GPGME\_VALIDITY\_FULL

The user ID is fully valid. The string representation of this validity is `f`.

@item GPGME\_VALIDITY\_ULTIMATE

The user ID is ultimately valid. The string representation of this validity is `u`.

@end table

@end deftp

@node Manipulating Keys  
@subsection Manipulating Keys  
@cindex key, manipulation

```
@deftypefun void gpgme_key_ref (@w{gpgme_key_t @var{key}})
The function @code{gpgme_key_ref} acquires an additional reference for
the key @var{key}.
@end deftypefun
```

```
@deftypefun void gpgme_key_unref (@w{gpgme_key_t @var{key}})
The function @code{gpgme_key_unref} releases a reference for the key
@var{key}. If this was the last reference, the key will be destroyed
and all resources associated to it will be released.
@end deftypefun
```

@node Generating Keys  
@subsection Generating Keys  
@cindex key, creation  
@cindex key ring, add

GPGME provides a set of functions to create public key pairs. Most of these functions require the use of GnuPG 2.1 and later; for older GnuPG versions the @code{gpgme\_op\_genkey} function can be used. Existing code which wants to update to the new functions or new code which shall supports older GnuPG versions may try the new functions first and provide a fallback to the old function if the error code @code{GPG\_ERR\_NOT\_SUPPORTED} is received.

```
@c
@c gpgme_op_createkey
@c
@deftypefun gpgme_error_t gpgme_op_createkey @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{const char *@var{userid}}, @
   @w{const char *@var{algo}}, @
   @w{unsigned long @var{reserved}}, @
   @w{unsigned long @var{expires}}, @
   @w{gpgme_key_t @var{extrakey}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_createkey} generates a new key for the protocol active in the context @var{ctx}. As of now this function does only work for OpenPGP and requires at least version 2.1.13 of GnuPG.



@var{userid} is commonly the mail address associated with the key. GPGME does not require a specific syntax but if more than a mail address is given, RFC-822 style format is suggested. The value is expected to be in UTF-8 encoding (i.e. no IDN encoding for mail addresses). This is a required parameter.

@var{algo} specifies the algorithm for the new key (actually a keypair of public and private key). For a list of supported algorithms, see the GnuPG manual. If @var{algo} is @code{NULL} or the string "default", the key is generated using the default algorithm of the engine. If the string "future-default" is used the engine may use an algorithm which is planned to be the default in a future release of the engine; however existing implementation of the protocol may not be able to already handle such future algorithms. For the OpenPGP protocol, the specification of a default algorithm, without requesting a non-default usage via @var{flags}, triggers the creation of a primary key plus a secondary key (subkey).

@var{reserved} must be set to zero.

@var{expires} specifies the expiration time in seconds. If you supply 0, a reasonable expiration time is chosen. Use the flag @code{GPGME\_CREATE\_NOEXPIRE} to create keys that do not expire. Note that this parameter takes an unsigned long value and not a @code{time\_t} to avoid problems on systems which use a signed 32 bit @code{time\_t}. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

@var{extrakey} is currently not used and must be set to @code{NULL}. A future version of GPGME may use this parameter to create X.509 keys.

@var{flags} can be set to the bit-wise OR of the following flags:

```
@table @code
@item GPGME_CREATE_SIGN
@itemx GPGME_CREATE_ENCR
@itemx GPGME_CREATE_CERT
@itemx GPGME_CREATE_AUTH
@since{1.7.0}
```

Do not create the key with the default capabilities (key usage) of the requested algorithm but use those explicitly given by these flags: ``signing'', ``encryption'', ``certification'', or ``authentication''. The allowed combinations depend on the algorithm.

If any of these flags are set and a default algorithm has been

selected only one key is created in the case of the OpenPGP protocol.

@item GPGME\_CREATE\_NOPASSWD  
@since{1.7.0}

Request generation of the key without password protection.

@item GPGME\_CREATE\_SELFSIGNED  
@since{1.7.0}

For an X.509 key do not create a CSR but a self-signed certificate. This has not yet been implemented.

@item GPGME\_CREATE\_NOSTORE  
@since{1.7.0}

Do not store the created key in the local key database. This has not yet been implemented.

@item GPGME\_CREATE\_WANTPUB  
@itemx GPGME\_CREATE\_WANTSEC  
@since{1.7.0}

Return the public or secret key as part of the result structure. This has not yet been implemented.

@item GPGME\_CREATE\_FORCE  
@since{1.7.0}

The engine does not allow the creation of a key with a user ID already existing in the local key database. This flag can be used to override this check.

@item GPGME\_CREATE\_NOEXPIRE  
@since{1.8.0}

Request generation of keys that do not expire.

@end table

After the operation completed successfully, information about the created key can be retrieved with @code{gpgme\_op\_genkey\_result}.

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_createkey_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{const char *@var{userid}}, @
   @w{const char *@var{algo}}, @
   @w{unsigned long @var{reserved}}, @
   @w{unsigned long @var{expires}}, @
   @w{gpgme_key_t @var{extrakey}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_createkey\_start} initiates a @code{gpgme\_op\_createkey} operation; see there for details. It must be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

@end deftypefun

@c

@c gpgme\_op\_createsubkey

@c

```
@deftypefun gpgme_error_t gpgme_op_createsubkey @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{algo}}, @
   @w{unsigned long @var{reserved}}, @
   @w{unsigned long @var{expires}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_createsubkey} creates and adds a new subkey to the primary OpenPGP key given by @var{KEY}. The only allowed protocol in @var{ctx} is @code{GPGME\_PROTOCOL\_OPENPGP}. Subkeys (aka secondary keys) are a concept in the OpenPGP protocol to bind several keys to a primary key. As of now this function requires at least version 2.1.13 of GnuPG.

@var{key} specifies the key to operate on.

@var{algo} specifies the algorithm for the new subkey. For a list of supported algorithms, see the GnuPG manual. If @var{algo} is @code{NULL} or the string "default", the subkey is generated using the default algorithm for an encryption subkey of the engine. If the string "future-default" is used the engine may use an encryption

algorithm which is planned to be the default in a future release of the engine; however existing implementation of the protocol may not be able to already handle such future algorithms.

@var{reserved} must be set to zero.

@var{expires} specifies the expiration time in seconds. If you supply 0, a reasonable expiration time is chosen. Use the flag @code{GPGME\_CREATE\_NOEXPIRE} to create keys that do not expire. Note that this parameter takes an unsigned long value and not a @code{time\_t} to avoid problems on systems which use a signed 32 bit @code{time\_t}. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

@var{flags} takes the same values as described above for @code{gpgme\_op\_createkey}.

After the operation completed successfully, information about the created key can be retrieved with @code{gpgme\_op\_genkey\_result}.

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_createsubkey_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
  @w{gpgme_key_t @var{key}}, @
  @w{const char *@var{algo}}, @
  @w{unsigned long @var{reserved}}, @
  @w{unsigned long @var{expires}}, @
  @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_createsubkey\_start} initiates a @code{gpgme\_op\_createsubkey} operation; see there for details. It must be completed by calling @code{gpgme\_wait} on the context.

@xref{Waiting For Completion}.

@end deftypefun

@c

@c gpgme\_op\_adduid

```
@c
@deftypefun gpgme_error_t gpgme_op_adduid @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_adduid} adds a new user ID to the OpenPGP key given by @var{KEY}. Adding additional user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context @var{ctx} must be set to OpenPGP. As of now this function requires at least version 2.1.13 of GnuPG.

@var{key} specifies the key to operate on.

@var{userid} is the user ID to add to the key. A user ID is commonly the mail address to be associated with the key. GPGME does not require a specific syntax but if more than a mail address is given, RFC-822 style format is suggested. The value is expected to be in UTF-8 encoding (i.e. no IDN encoding for mail addresses). This is a required parameter.

@var{flags} are currently not used and must be set to zero.

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_adduid_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_adduid\_start} initiates a @code{gpgme\_op\_adduid} operation; see there for details. It must be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

```
@end deftypefun
```

```

@c
@c gpgme_op_revuid
@c
@deftypefun gpgme_error_t gpgme_op_revuid @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{unsigned int @var{flags}});

```

```
@since{1.7.0}
```

The function `gpgme_op_revuid` revokes a user ID from the OpenPGP key given by `KEY`. Revoking user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context `ctx` must be set to OpenPGP. As of now this function requires at least version 2.1.13 of GnuPG.

`key` specifies the key to operate on.

`userid` is the user ID to be revoked from the key. The user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the `uid` field from the user ID object (`gpgme_user_id_t`) is to be used. This is a required parameter.

`flags` are currently not used and must be set to zero.

Note that the engine won't allow to revoke the last valid user ID. To change a user ID is better to first add the new user ID, then revoke the old one, and finally publish the key.

The function returns zero on success, `GPG_ERR_NOT_SUPPORTED` if the engine does not support the command, or a bunch of other error codes.

```
@end deftypefun
```

```

@deftypefun gpgme_error_t gpgme_op_revuid_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{unsigned int @var{flags}});

```

```
@since{1.7.0}
```

The function `gpgme_op_revuid_start` initiates a `gpgme_op_revuid` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. [@xref{Waiting For Completion}](#).

@end deftypefun

@c

@c gpgme\_op\_set\_uid\_flag

@c

@deftypefun gpgme\_error\_t gpgme\_op\_set\_ui\_flag @

(@w{gpgme\_ctx\_t @var{ctx}}, @

@w{gpgme\_key\_t @var{key}}, @

@w{const char \*@var{userid}}, @

@w{cons char \* @var{name}}, @

@w{cons char \* @var{value}});

@since{1.8.0}

The function @code{gpgme\_op\_set\_uid\_flag} is used to set flags on a user ID from the OpenPGP key given by @var{KEY}. Setting flags on user IDs after key creation is a feature of the OpenPGP protocol and thus the protocol for the context @var{ctx} must be set to OpenPGP.

@var{key} specifies the key to operate on. This parameters is required.

@var{userid} is the user ID of the key to be manipulated. This user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the @code{uid} field from the user ID object (@code{gpgme\_user\_id\_t}) is to be used. This is a required parameter.

@var{name} names the flag which is to be changed. The only currently supported flag is:

@table @code

@item primary

This sets the primary key flag on the given user ID. All other primary key flag on other user IDs are removed. @var{value} must be given as NULL. For technical reasons this functions bumps the creation timestamp of all affected self-signatures up by one second. At least GnuPG version 2.1.20 is required.

@end table

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_set\_uid\_flag\_start @

```
(@w{gpgme_ctx_t @var{ctx}}, @
 @w{gpgme_key_t @var{key}}, @
 @w{const char *@var{userid}}, @
 @w{cons char * @var{name}}, @
 @w{cons char * @var{value}});
```

```
@since{1.8.0}
```

The function `gpgme_op_set_uid_flag_start` initiates a `gpgme_op_set_uid_flag` operation; see there for details. It must be completed by calling `gpgme_wait` on the context. [@xref{Waiting For Completion}](#).

```
@end deftypefun
```

```
@c
```

```
@c gpgme_op_genkey
```

```
@c
```

```
@deftypefun gpgme_error_t gpgme_op_genkey @
```

```
(@w{gpgme_ctx_t @var{ctx}}, @
 @w{const char *@var{parms}}, @
 @w{gpgme_data_t @var{public}}, @
 @w{gpgme_data_t @var{secret}})
```

The function `gpgme_op_genkey` generates a new key pair in the context `@var{ctx}`. The meaning of `@var{public}` and `@var{secret}` depends on the crypto backend.

GPG does not support `@var{public}` and `@var{secret}`, they should be `NULL`. GnuPG will generate a key pair and add it to the standard key ring. The fingerprint of the generated key is available with `gpgme_op_genkey_result`.

GpgSM requires `@var{public}` to be a writable data object. GpgSM will generate a secret key (which will be stored by `gpg-agent`), and return a certificate request in `@var{public}`, which then needs to be signed by the certification authority and imported before it can be used. GpgSM does not make the fingerprint available.

The argument `@var{parms}` specifies parameters for the key in an string that looks something like XML. The details about the format of `@var{parms}` are specific to the crypto engine used by `@var{ctx}`. The first line of the parameters must be `<GnupgKeyParams format="internal">` and the last line must be `</GnupgKeyParams>`. Every line in between the first and last lines is treated as a Header: Value pair. In particular, no XML escaping is necessary if you need to include the characters `<`, `>`, or `&`.



Here is an example for GnuPG as the crypto engine (all parameters of OpenPGP key generation are documented in the GPG manual):

```
@example
<GnupgKeyParms format="internal">
Key-Type: default
Subkey-Type: default
Name-Real: Joe Tester
Name-Comment: with stupid passphrase
Name-Email: joe@@foo.bar
Expire-Date: 0
Passphrase: abc
</GnupgKeyParms>
@end example
```

Here is an example for GpgSM as the crypto engine (all parameters of OpenPGP key generation are documented in the GPGSM manual):

```
@example
<GnupgKeyParms format="internal">
Key-Type: RSA
Key-Length: 1024
Name-DN: C=de,O=g10 code,OU=Testlab,CN=Joe 2 Tester
Name-Email: joe@@foo.bar
</GnupgKeyParms>
@end example
```

Strings should be given in UTF-8 encoding. The only format supported for now is `internal`. The content of the `GnupgKeyParms` container is passed verbatim to the crypto backend. Control statements are not allowed.

After the operation completed successfully, the result can be retrieved with `gpgme_op_genkey_result`.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `parms` is not a well-formed string (e.g. does not have the expected tag-like headers and footers), `GPG_ERR_NOT_SUPPORTED` if `public` or `secret` is not valid, and `GPG_ERR_GENERAL` if no key was created by the backend.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_genkey_start (@w{gpgme_ctx_t @var{ctx}}, @w{const char
*@var{parms}}, @w{gpgme_data_t @var{public}}, @w{gpgme_data_t @var{secret}})
```

The function `gpgme_op_genkey_start` initiates a

`gpgme_op_genkey` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `parms` is not a valid XML string, and `GPG_ERR_NOT_SUPPORTED` if `public` or `secret` is not `NULL`.

```
@end deftypefun
```

```
@c
@c gpgme_op_genkey_result
@c
@deftp {Data type} {gpgme_genkey_result_t}
```

This is a pointer to a structure used to store the result of a `gpgme_op_genkey` operation. After successfully generating a key, you can retrieve the pointer to the result with `gpgme_op_genkey_result`. The structure contains the following members:

```
@table @code
@item unsigned int primary : 1
This flag is set to 1 if a primary key was created and to 0 if not.
```

```
@item unsigned int sub : 1
This flag is set to 1 if a subkey was created and to 0 if not.
```

```
@item unsigned int uid : 1
This flag is set to 1 if a user ID was created and to 0 if not.
```

```
@item char *fpr
This is the fingerprint of the key that was created. If both a primary and a subkey were generated, the fingerprint of the primary key will be returned. If the crypto engine does not provide the fingerprint, fpr will be a null pointer.
```

```
@item gpgme_data_t pubkey
@since{1.7.0}
```

This will eventually be used to return the public key. It is currently not used.

```
@item gpgme_data_t seckey
@since{1.7.0}
```

This will eventually be used to return the secret key. It is currently not used.

```
@end table
@end deftp
```

```
@deftypefun gpgme_genkey_result_t gpgme_op_genkey_result (@w{gpgme_ctx_t @var{ctx}})
```

The function `gpgme_op_genkey_result` returns a `gpgme_genkey_result_t` pointer to a structure holding the result of a `gpgme_op_genkey` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_genkey` or `gpgme_op_genkey_start` operation, and if this operation finished successfully. The returned pointer is only valid until the next operation is started on the context.

```
@end deftypefun
```

```
@c
@c SIGNING KEYS
@c
@node Signing Keys
@subsection Signing Keys
@cindex key, signing
```

Key signatures are a unique concept of the OpenPGP protocol. They can be used to certify the validity of a key and are used to create the Web-of-Trust (WoT). Instead of using the `gpgme_op_interact` function along with a finite state machine, GPGME provides a convenient function to create key signatures when using modern GnuPG versions.

```
@c
@c gpgme_op_keysign
@c
@deftypefun gpgme_error_t gpgme_op_keysign @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{unsigned long @var{expires}}, @
   @w{unsigned int @var{flags}});
```

```
@since{1.7.0}
```

The function `gpgme_op_keysign` adds a new key signature to the public key `KEY`. This function requires at least version 2.1.12 of

GnuPG.

`@var{CTX}` is the usual context which describes the protocol to use (which must be OpenPGP) and has also the list of signer keys to be used for the signature. The common case is to use the default key for signing other keys. If another key or more than one key shall be used for a key signature, `@code{gpgme_signers_add}` can be used. [@xref{Selecting Signers}](#).

`@var{key}` specifies the key to operate on.

`@var{userid}` selects the user ID or user IDs to be signed. If `@var{userid}` is set to `@code{NULL}` all valid user IDs are signed. The user ID must be given verbatim because the engine does an exact and case sensitive match. Thus the `@code{uid}` field from the user ID object (`@code{gpgme_user_id_t}`) is to be used. To select more than one user ID put them all into one string separated by linefeed characters (`@code{\n}`) and set the flag `@code{GPGME_KEYSIGN_LFSEP}`.

`@var{expires}` specifies the expiration time of the new signature in seconds. The common case is to use 0 to not set an expiration date. However, if the configuration of the engine defines a default expiration for key signatures, that is still used unless the flag `@code{GPGME_KEYSIGN_NOEXPIRE}` is used. Note that this parameter takes an unsigned long value and not a `@code{time_t}` to avoid problems on systems which use a signed 32 bit `@code{time_t}`. Note further that the OpenPGP protocol uses 32 bit values for timestamps and thus can only encode dates up to the year 2106.

`@var{flags}` can be set to the bit-wise OR of the following flags:

`@table @code`  
`@item GPGME_KEYSIGN_LOCAL`  
`@since{1.7.0}`

Instead of creating an exportable key signature, create a key signature which is marked as non-exportable.

`@item GPGME_KEYSIGN_LFSEP`  
`@since{1.7.0}`

Although linefeeds are uncommon in user IDs this flag is required to explicitly declare that `@var{userid}` may contain several linefeed separated user IDs.

`@item GPGME_KEYSIGN_NOEXPIRE`  
Force the creation of a key signature without an expiration date. This overrides `@var{expire}` and any local configuration of the engine.

@end table

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

@end deffun

```
@deffun gpgme_error_t gpgme_op_keysign_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{key}}, @
   @w{const char *@var{userid}}, @
   @w{unsigned long @var{expires}}, @
   @w{unsigned int @var{flags}});
```

@since{1.7.0}

The function @code{gpgme\_op\_keysign\_start} initiates a @code{gpgme\_op\_keysign} operation; see there for details. It must be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

@end deffun

@c

@c EXPORTING KEYS

@c

@node Exporting Keys

@subsection Exporting Keys

@cindex key, export

@cindex key ring, export from

Exporting keys means the same as running @command{gpg} with the command @option{--export}. However, a mode flag can be used to change the way the export works. The available mode flags are described below, they may be or-ed together.

@table @code

@item GPGME\_EXPORT\_MODE\_EXTERN

If this bit is set, the output is send directly to the default keyserver. This is currently only allowed for OpenPGP keys. It is good practise to not send more than a few dozens key to a keyserver at one time. Using this flag requires that the @var{keydata} argument of the export function is set to @code{NULL}.

@item GPGME\_EXPORT\_MODE\_MINIMAL

@since{1.3.1}

If this bit is set, the smallest possible key is exported. For OpenPGP keys it removes all signatures except for the latest self-signatures. For X.509 keys it has no effect.

@item GPGME\_EXPORT\_MODE\_SECRET

@since{1.6.0}

Instead of exporting the public key, the secret key is exported. This may not be combined with @code{GPGME\_EXPORT\_MODE\_EXTERN}. For X.509 the export format is PKCS#8.

@item GPGME\_EXPORT\_MODE\_RAW

@since{1.6.0}

If this flag is used with @code{GPGME\_EXPORT\_MODE\_SECRET} for an X.509 key the export format will be changed to PKCS#1. This flag may not be used with OpenPGP.

@item GPGME\_EXPORT\_MODE\_PKCS12

@since{1.6.0}

If this flag is used with @code{GPGME\_EXPORT\_MODE\_SECRET} for an X.509 key the export format will be changed to PKCS#12 which also includes the certificate. This flag may not be used with OpenPGP.

@item GPGME\_EXPORT\_MODE\_NOUID

@since{1.12.0 - experimental}

Do not export user ids. Works only with certain gpg version.

@end table

```
@deftypefun gpgme_error_t gpgme_op_export (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{pattern}},  
@w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})
```

The function @code{gpgme\_op\_export} extracts public keys and returns them in the data buffer @var{keydata}. The output format of the key data returned is determined by the @acronym{ASCII} armor attribute set for the context @var{ctx}, or, if that is not set, by the encoding specified for @var{keydata}.

If @var{pattern} is @code{NULL}, all available keys are returned. Otherwise, @var{pattern} contains an engine specific expression that

is used to limit the list to all keys matching the pattern.

@var{mode} is usually 0; other values are described above.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the operation completed successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{keydata} is not a valid empty data buffer, and passes through any errors that are reported by the crypto engine support routines.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_export\_start (@w{gpgme\_ctx\_t @var{ctx}}, @w{const char \*@var{pattern}}, @w{gpgme\_export\_mode\_t @var{mode}}, @w{gpgme\_data\_t @var{keydata}})

The function @code{gpgme\_op\_export\_start} initiates a @code{gpgme\_op\_export} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the operation could be started successfully, and @code{GPG\_ERR\_INV\_VALUE} if @var{keydata} is not a valid empty data buffer.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_export\_ext (@w{gpgme\_ctx\_t @var{ctx}}, @w{const char \*@var{pattern}}[], @w{gpgme\_export\_mode\_t @var{mode}}, @w{gpgme\_data\_t @var{keydata}})

The function @code{gpgme\_op\_export} extracts public keys and returns them in the data buffer @var{keydata}. The output format of the key data returned is determined by the @acronym{ASCII} armor attribute set for the context @var{ctx}, or, if that is not set, by the encoding specified for @var{keydata}.

If @var{pattern} or @var{\*pattern} is @code{NULL}, all available keys are returned. Otherwise, @var{pattern} is a @code{NULL} terminated array of strings that are used to limit the list to all keys matching at least one of the patterns verbatim.

@var{mode} is usually 0; other values are described above.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the operation completed successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{keydata} is not a valid empty data buffer, and passes through any errors that are reported by the crypto engine support routines.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_export\_ext\_start (@w{gpgme\_ctx\_t @var{ctx}}, @w{const char \*@var{pattern}}[], @w{gpgme\_export\_mode\_t @var{mode}}, @w{gpgme\_data\_t @var{keydata}})

The function @code{gpgme\_op\_export\_ext\_start} initiates a @code{gpgme\_op\_export\_ext} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `@var{keydata}` is not a valid empty data buffer.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_export_keys (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t keys[]},  
@w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})  
@since{1.2.0}
```

The function `gpgme_op_export_keys` extracts public keys and returns them in the data buffer `@var{keydata}`. The output format of the key data returned is determined by the `ASCII` armor attribute set for the context `@var{ctx}`, or, if that is not set, by the encoding specified for `@var{keydata}`.

The keys to export are taken from the `NULL` terminated array `@var{keys}`. Only keys of the currently selected protocol of `@var{ctx}` which do have a fingerprint set are considered for export. Other keys specified by the `@var{keys}` are ignored. In particular OpenPGP keys retrieved via an external key listing are not included.

`@var{mode}` is usually 0; other values are described above.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation completed successfully, `GPG_ERR_INV_VALUE` if `@var{keydata}` is not a valid empty data buffer, `GPG_ERR_NO_DATA` if no useful keys are in `@var{keys}` and passes through any errors that are reported by the crypto engine support routines.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_export_keys_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t  
@var{keys}[]}, @w{gpgme_export_mode_t @var{mode}}, @w{gpgme_data_t @var{keydata}})  
@since{1.2.0}
```

The function `gpgme_op_export_keys_start` initiates a `gpgme_op_export_ext` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `@var{keydata}` is not a valid empty data buffer, `GPG_ERR_NO_DATA` if no useful keys are in `@var{keys}` and passes through any errors that are reported by the crypto engine support routines.

```
@end deftypefun
```

`@node Importing Keys`



@subsection Importing Keys

@cindex key, import

@cindex key ring, import to

Importing keys means the same as running @command{gpg} with the command @option{--import}.

```
@deftypefun gpgme_error_t gpgme_op_import (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{keydata}})
```

The function @code{gpgme\_op\_import} adds the keys in the data buffer @var{keydata} to the key ring of the crypto engine used by @var{ctx}.

The format of @var{keydata} can be @acronym{ASCII} armored, for example, but the details are specific to the crypto engine.

After the operation completed successfully, the result can be retrieved with @code{gpgme\_op\_import\_result}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the import was completed successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{keydata} if @var{ctx} or @var{keydata} is not a valid pointer, and @code{GPG\_ERR\_NO\_DATA} if @var{keydata} is an empty data buffer.  
@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_import_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{keydata}})
```

The function @code{gpgme\_op\_import\_start} initiates a @code{gpgme\_op\_import} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the import could be started successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} or @var{keydata} is not a valid pointer, and @code{GPG\_ERR\_NO\_DATA} if @var{keydata} is an empty data buffer.  
@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_import_keys (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t *@var{keys}})  
@since{1.2.0}
```

The function @code{gpgme\_op\_import\_keys} adds the keys described by the @code{NULL} terminated array @var{keys} to the key ring of the crypto engine used by @var{ctx}. It is used to actually import and make keys permanent which have been retrieved from an external source (i.e. using @code{GPGME\_KEYLIST\_MODE\_EXTERN}) earlier. The external keylisting must have been made with the same context configuration (in particular the same home directory). @footnote{Thus it is a replacement for the usual workaround of exporting and then importing a

key to make an X.509 key permanent.) Note that for OpenPGP this may require another access to the keyserver over the network.

Only keys of the currently selected protocol of @var{ctx} are considered for import. Other keys specified by the @var{keys} are ignored. As of now all considered keys must have been retrieved using the same method, i.e. the used key listing mode must be identical.

After the operation completed successfully, the result can be retrieved with @code{gpgme\_op\_import\_result}.

To move keys from one home directory to another, export and import the keydata using @code{gpgme\_op\_export} and @code{gpgme\_op\_import}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the import was completed successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} is not a valid pointer, @code{GPG\_ERR\_CONFLICT} if the key listing mode does not match, and @code{GPG\_ERR\_NO\_DATA} if no keys are considered for export.

@end dectypedefun

```
@deftypedefun gpgme_error_t gpgme_op_import_keys_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
*@var{keys}})
@since{1.2.0}
```

The function @code{gpgme\_op\_import\_keys\_start} initiates a @code{gpgme\_op\_import\_keys} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the import was completed successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{keydata} if @var{ctx} or @var{keydata} is not a valid pointer, @code{GPG\_ERR\_CONFLICT} if the key listing mode does not match, and @code{GPG\_ERR\_NO\_DATA} if no keys are considered for export.

@end dectypedefun

```
@deftp {Data type} {gpgme_import_status_t}
```

This is a pointer to a structure used to store a part of the result of a @code{gpgme\_op\_import} operation. For each considered key one status is added that contains information about the result of the import. The structure contains the following members:

```
@table @code
```

```
@item gpgme_import_status_t next
```

This is a pointer to the next status structure in the linked list, or

```
@code{NULL} if this is the last element.
```

```
@item char *fpr
```

This is the fingerprint of the key that was considered.

@item gpgme\_error\_t result

If the import was not successful, this is the error value that caused the import to fail. Otherwise the error code is

@code{GPG\_ERR\_NO\_ERROR}.

@item unsigned int status

This is a bit-wise OR of the following flags that give more information about what part of the key was imported. If the key was already known, this might be 0.

@table @code

@item GPGME\_IMPORT\_NEW

The key was new.

@item GPGME\_IMPORT\_UID

The key contained new user IDs.

@item GPGME\_IMPORT\_SIG

The key contained new signatures.

@item GPGME\_IMPORT\_SUBKEY

The key contained new sub keys.

@item GPGME\_IMPORT\_SECRET

The key contained a secret key.

@end table

@end table

@end deftp

@deftp {Data type} {gpgme\_import\_result\_t}

This is a pointer to a structure used to store the result of a

@code{gpgme\_op\_import} operation. After a successful import

operation, you can retrieve the pointer to the result with

@code{gpgme\_op\_import\_result}. The structure contains the following members:

@table @code

@item int considered

The total number of considered keys.

@item int no\_user\_id

The number of keys without user ID.

@item int imported

The total number of imported keys.

@item int imported\_rsa

The number of imported RSA keys.

@item int unchanged

The number of unchanged keys.

@item int new\_user\_ids

The number of new user IDs.

@item int new\_sub\_keys

The number of new sub keys.

@item int new\_signatures

The number of new signatures.

@item int new\_revocations

The number of new revocations.

@item int secret\_read

The total number of secret keys read.

@item int secret\_imported

The number of imported secret keys.

@item int secret\_unchanged

The number of unchanged secret keys.

@item int not\_imported

The number of keys not imported.

@item gpgme\_import\_status\_t imports

A list of gpgme\_import\_status\_t objects which contain more information about the keys for which an import was attempted.

@item int skipped\_v3\_keys

For security reasons modern versions of GnuPG do not anymore support v3 keys (created with PGP 2.x) and ignores them on import. This counter provides the number of such skipped v3 keys.

@end table

@end deftp

@deftypedefun gpgme\_import\_result\_t gpgme\_op\_import\_result (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_op\_import\_result} returns a

@code{gpgme\_import\_result\_t} pointer to a structure holding the result

of a @code{gpgme\_op\_import} operation. The pointer is only valid if

the last operation on the context was a @code{gpgme\_op\_import} or

@code{gpgme\_op\_import\_start} operation, and if this operation finished

successfully. The returned pointer is only valid until the next operation is started on the context.

@end deftypefun

@node Deleting Keys

@subsection Deleting Keys

@cindex key, delete

@cindex key ring, delete from

```
@deftypefun gpgme_error_t gpgme_op_delete_ext (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t
@var{key}}, @w{unsigned int @var{flags}})
@since{1.9.1}
```

The function @code{gpgme\_op\_delete\_ext} deletes the key @var{key} from the key ring of the crypto engine used by @var{ctx}.

@var{flags} can be set to the bit-wise OR of the following flags:

@table @code

@item GPGME\_DELETE\_ALLOW\_SECRET

@since{1.9.1}

If not set, only public keys are deleted. If set, secret keys are deleted as well, if that is supported.

@item GPGME\_DELETE\_FORCE

@since{1.9.1}

If set, the user is not asked to confirm the deletion.

@end table

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the key was deleted successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} or @var{key} is not a valid pointer, @code{GPG\_ERR\_NO\_PUBKEY} if @var{key} could not be found in the keyring, @code{GPG\_ERR\_AMBIGUOUS\_NAME} if the key was not specified unambiguously, and @code{GPG\_ERR\_CONFLICT} if the secret key for @var{key} is available, but @var{allow\_secret} is zero.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_delete_ext_start (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t
@var{key}}, @w{unsigned int @var{flags}})
@since{1.9.1}
```

The function @code{gpgme\_op\_delete\_ext\_start} initiates a @code{gpgme\_op\_delete} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the operation was started successfully, and `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}` or `@var{key}` is not a valid pointer.

```
@end deftypefun
```

The following functions allow only to use one particular flag.

```
@deftypefun gpgme_error_t gpgme_op_delete (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t @var{key}}, @w{int @var{allow_secret}})
```

Similar to `@code{gpgme_op_delete_ext}`, but only the flag `@code{GPGME_DELETE_ALLOW_SECRET}` can be provided.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_delete_start (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t @var{key}}, @w{int @var{allow_secret}})
```

Similar to `@code{gpgme_op_delete_ext_start}`, but only the flag `@code{GPGME_DELETE_ALLOW_SECRET}` can be provided.

```
@end deftypefun
```

```
@node Changing Passphrases
```

```
@subsection Changing Passphrases
```

```
@cindex passphrase, change
```

```
@deftypefun gpgme_error_t gpgme_op_passwd    @
    (@w{gpgme_ctx_t @var{ctx}},    @
    @w{const gpgme_key_t @var{key}}, @
    @w{unsigned int @var{flags}})
```

```
@since{1.3.0}
```

The function `@code{gpgme_op_passwd}` changes the passphrase of the private key associated with `@var{key}`. The only allowed value for `@var{flags}` is `@code{0}`. The backend engine will usually popup a window to ask for the old and the new passphrase. Thus this function is not useful in a server application (where passphrases are not required anyway).

Note that old `@code{gpg}` engines (before version 2.0.15) do not support this command and will silently ignore it.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_passwd_start    @
    (@w{gpgme_ctx_t @var{ctx}},    @
    @w{const gpgme_key_t @var{key}}, @
    @w{unsigned int @var{flags}})
```

```
@since{1.3.0}
```

The function `gpgme_op_passwd_start` initiates a `gpgme_op_passwd` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns `0` if the operation was started successfully, and an error code if one of the arguments is not valid or the operation could not be started.

`@end deftypefun`

`@c`

`@c CHANGING TOFU DATA`

`@c`

`@node Changing TOFU Data`

`@subsection Changing TOFU Data`

`@cindex validity, TOFU`

The OpenPGP engine features a Trust-On-First-Use (TOFU) key validation model. For resolving conflicts it is necessary to declare the policy for a key. See the GnuPG manual for details on the TOFU implementation.

`@deftp {Data type} {enum gpgme_tofu_policy_t}`

`@since{1.7.0}`

`@tindex gpgme_tofu_policy_t`

The `gpgme_tofu_policy_t` type specifies the set of possible policy values that are supported by [GPGME](#):

`@table @code`

`@item GPGME_TOFU_POLICY_AUTO`

Set the policy to ```auto```.

`@item GPGME_TOFU_POLICY_GOOD`

Set the policy to ```good```.

`@item GPGME_TOFU_POLICY_BAD`

Set the policy to ```bad```.

`@item GPGME_TOFU_POLICY_ASK`

Set the policy to ```ask```.

`@item GPGME_TOFU_POLICY_UNKNOWN`

Set the policy to ```unknown```.

`@end table`

`@end deftp`

To change the policy for a key the following functions can be used:

`@deftypefun gpgme_error_t gpgme_op_tofu_policy @`

```
(@w{gpgme_ctx_t @var{ctx}}, @  
@w{const gpgme_key_t @var{key}}, @  
@w{gpgme_tofu_policy_t @var{policy}})
```

@since{1.7.0}

The function @code{gpgme\_op\_tofu\_policy} changes the TOFU policy of @var{key}. The valid values for @var{policy} are listed above. As of now this function does only work for OpenPGP and requires at least version 2.1.10 of GnuPG.

The function returns zero on success, @code{GPG\_ERR\_NOT\_SUPPORTED} if the engine does not support the command, or a bunch of other error codes.

@end dectypedefun

```
@deftypedefun gpgme_error_t gpgme_op_tofu_policy_start @  
(@w{gpgme_ctx_t @var{ctx}}, @  
@w{const gpgme_key_t @var{key}}, @  
@w{gpgme_tofu_policy_t @var{policy}})
```

@since{1.7.0}

The function @code{gpgme\_op\_tofu\_policy\_start} initiates a @code{gpgme\_op\_tofu\_policy} operation. It can be completed by calling @code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns @code{0} if the operation was started successfully, and an error code if one of the arguments is not valid or the operation could not be started.

@end dectypedefun

@node Advanced Key Editing

@subsection Advanced Key Editing

@cindex key, edit

```
@defctyp {Data type} {gpgme_error_t (*gpgme_interact_cb_t) @  
(@w{void *@var{handle}}, @  
@w{const char *@var{status}}, @  
@w{const char *@var{args}}, @  
@w{int @var{fd}})}
```

@since{1.7.0}

@tindex gpgme\_interact\_cb\_t



The `gpgme_interact_cb_t` type is the type of functions which `GPGME` calls if a key interact operation is on-going. The status keyword `status` and the argument line `args` are passed through by `GPGME` from the crypto engine. An empty string represents EOF. The file descriptor `fd` is -1 for normal status messages. If `status` indicates a command rather than a status message, the response to the command should be written to `fd`. The `handle` is provided by the user at start of operation.

The function should return `GPG_ERR_FALSE` if it did not handle the status code, `0` for success, or any other error value.

`@end deftp`

```
@deftypefun gpgme_error_t gpgme_op_interact (@w{gpgme_ctx_t @var{ctx}}, @
@w{gpgme_key_t @var{key}}, @
@w{unsigned int @var{flags}}, @
@w{gpgme_interact_cb_t @var{fnc}}, @
@w{void *@var{handle}}, @
@w{gpgme_data_t @var{out}})
```

`@since{1.7.0}`

The function `gpgme_op_interact` processes the key `KEY` interactively, using the interact callback function `FNC` with the handle `HANDLE`. The callback is invoked for every status and command request from the crypto engine. The output of the crypto engine is written to the data object `out`.

Note that the protocol between the callback function and the crypto engine is specific to the crypto engine and no further support in implementing this protocol correctly is provided by `GPGME`.

`flags` modifies the behaviour of the function; the only defined bit value is:

```
@table @code
@item GPGME_INTERACT_CARD
@since{1.7.0}
```

This is used for smartcard based keys and uses `gpgs`

```
@code{--card-edit} command.
```

`@end table`

The function returns `0` if the edit operation completes successfully, `GPG_ERR_INV_VALUE` if `ctx` or `key` is not a valid pointer, and any error returned by the crypto engine or

the edit callback handler.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_interact_start (@w{gpgme_ctx_t @var{ctx}}, @
  @w{gpgme_key_t @var{key}}, @
  @w{unsigned int @var{flags}}, @
  @w{gpgme_interact_cb_t @var{fnc}}, @
  @w{void *@var{handle}}, @
  @w{gpgme_data_t @var{out}})
```

@since{1.7.0}

The function @code{gpgme\_op\_interact\_start} initiates a  
@code{gpgme\_op\_interact} operation. It can be completed by calling  
@code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns @code{0} if the operation was started  
successfully, and @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} or @var{key}  
is not a valid pointer.

@end deftypefun

@node Trust Item Management

@section Trust Item Management

@cindex trust item

@strong{Caution:} The trust items interface is experimental.

@deftp {Data type} gpgme\_trust\_item\_t

The @code{gpgme\_trust\_item\_t} type is a pointer to a trust item object.

It has the following members:

@table @code

@item char \*keyid

This is a string describing the key to which this trust items belongs.

@item int type

This is the type of the trust item. A value of 1 refers to a key, a  
value of 2 refers to a user ID.

@item int level

This is the trust level.

@item char \*owner\_trust

The owner trust if @code{type} is 1.

@item char \*validity  
The calculated validity.

@item char \*name  
The user name if @code{type} is 2.  
@end table  
@end deftp

@menu  
\* Listing Trust Items::        Browsing the list of available trust items.  
\* Manipulating Trust Items::    Operations on trust items.  
@end menu

@node Listing Trust Items  
@subsection Listing Trust Items  
@cindex trust item list

@deftypefun gpgme\_error\_t gpgme\_op\_trustlist\_start (@w{gpgme\_ctx\_t @var{ctx}}, @w{const char  
\*@var{pattern}}, @w{int @var{max\_level}})

The function @code{gpgme\_op\_trustlist\_start} initiates a trust item listing operation inside the context @var{ctx}. It sets everything up so that subsequent invocations of @code{gpgme\_op\_trustlist\_next} return the trust items in the list.

The string @var{pattern} contains an engine specific expression that is used to limit the list to all trust items matching the pattern. It can not be the empty string.

The argument @var{max\_level} is currently ignored.

The context will be busy until either all trust items are received (and @code{gpgme\_op\_trustlist\_next} returns @code{GPG\_ERR\_EOF}), or @code{gpgme\_op\_trustlist\_end} is called to finish the operation.

The function returns the error code @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} is not a valid pointer, and passes through any errors that are reported by the crypto engine support routines.  
@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_trustlist\_next (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_trust\_item\_t  
\*@var{r\_item}})

The function @code{gpgme\_op\_trustlist\_next} returns the next trust item in the list created by a previous @code{gpgme\_op\_trustlist\_start} operation in the context @var{ctx}. The trust item can be destroyed with @code{gpgme\_trust\_item\_release}. @xref{Manipulating Trust Items}.

This is the only way to get at @code{gpgme\_trust\_item\_t} objects in

@acronym{GPGME}.

If the last trust item in the list has already been returned,  
@code{gpgme\_op\_trustlist\_next} returns @code{GPG\_ERR\_EOF}.

The function returns the error code @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} or @var{r\_item} is not a valid pointer, and @code{GPG\_ERR\_ENOMEM} if there is not enough memory for the operation.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_trustlist\_end (@w{gpgme\_ctx\_t @var{ctx}})  
The function @code{gpgme\_op\_trustlist\_end} ends a pending trust list operation in the context @var{ctx}.

The function returns the error code @code{GPG\_ERR\_INV\_VALUE} if @var{ctx} is not a valid pointer, and @code{GPG\_ERR\_ENOMEM} if at some time during the operation there was not enough memory available.

@end deftypefun

@node Manipulating Trust Items

@subsection Manipulating Trust Items

@cindex trust item, manipulation

@deftypefun void gpgme\_trust\_item\_ref (@w{gpgme\_trust\_item\_t @var{item}})  
The function @code{gpgme\_trust\_item\_ref} acquires an additional reference for the trust item @var{item}.  
@end deftypefun

@deftypefun void gpgme\_trust\_item\_unref (@w{gpgme\_trust\_item\_t @var{item}})  
The function @code{gpgme\_trust\_item\_unref} releases a reference for the trust item @var{item}. If this was the last reference, the trust item will be destroyed and all resources associated to it will be released.  
@end deftypefun

@node Crypto Operations

@section Crypto Operations

@cindex cryptographic operation

Sometimes, the result of a crypto operation returns a list of invalid keys encountered in processing the request. The following structure is used to hold information about such a key.

@deftp {Data type} {gpgme\_invalid\_key\_t}

This is a pointer to a structure used to store a part of the result of a crypto operation which takes user IDs as one input parameter. The

structure contains the following members:

@table @code

@item gpgme\_invalid\_key\_t next

This is a pointer to the next invalid key structure in the linked list, or @code{NULL} if this is the last element.

@item char \*fpr

The fingerprint or key ID of the invalid key encountered.

@item gpgme\_error\_t reason

An error code describing the reason why the key was found invalid.

@end table

@end deftp

@menu

\* Decrypt::                Decrypting a ciphertext.

\* Verify::                 Verifying a signature.

\* Decrypt and Verify::     Decrypting a signed ciphertext.

\* Sign::                  Creating a signature.

\* Encrypt::                Encrypting a plaintext.

@end menu

@node Decrypt

@subsection Decrypt

@cindex decryption

@cindex cryptographic operation, decryption

@deftypefun gpgme\_error\_t gpgme\_op\_decrypt (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t @var{cipher}}, @w{gpgme\_data\_t @var{plain}})

The function @code{gpgme\_op\_decrypt} decrypts the ciphertext in the data object @var{cipher} and stores it into the data object @var{plain}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the ciphertext could be decrypted successfully, @code{GPG\_ERR\_INV\_VALUE} if @var{ctx}, @var{cipher} or @var{plain} is not a valid pointer, @code{GPG\_ERR\_NO\_DATA} if @var{cipher} does not contain any data to decrypt, @code{GPG\_ERR\_DECRYPT\_FAILED} if @var{cipher} is not a valid cipher text, @code{GPG\_ERR\_BAD\_PASSPHRASE} if the passphrase for the secret key could not be retrieved, and passes through some errors that are reported by the crypto engine support routines.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_decrypt\_start (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t @var{cipher}}, @w{gpgme\_data\_t @var{plain}})

The function `gpgme_op_decrypt_start` initiates a `gpgme_op_decrypt` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `cipher` or `plain` is not a valid pointer.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_decrypt_ext ( @
    @w{gpgme_ctx_t @var{ctx}}, @
    @w{gpgme_decrypt_flags_t @var{flags}}, @
    @w{gpgme_data_t @var{cipher}}, @
    @w{gpgme_data_t @var{plain}})
```

```
@since{1.8.0}
```

The function `gpgme_op_decrypt_ext` is the same as `gpgme_op_decrypt` but has an additional argument `flags`. If `flags` is 0 both function behave identically.

The value in `flags` is a bitwise-or combination of one or multiple of the following bit values:

```
@table @code
@item GPGME_DECRYPT_VERIFY
@since{1.8.0}
```

The `GPGME_DECRYPT_VERIFY` symbol specifies that this function shall exactly act as `gpgme_op_decrypt_verify`.

```
@item GPGME_DECRYPT_UNWRAP
@since{1.8.0}
```

The `GPGME_DECRYPT_UNWRAP` symbol specifies that the output shall be an OpenPGP message with only the encryption layer removed. This requires GnuPG 2.1.12 and works only for OpenPGP. This is the counterpart to `GPGME_ENCRYPT_WRAP`.

```
@end table
```

The function returns the error codes as described for `gpgme_op_decrypt` respective `gpgme_op_encrypt`.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_decrypt_ext_start ( @
    @w{gpgme_ctx_t @var{ctx}}, @
```

```
@w{gpgme_decrypt_flags_t @var{flags}}, @  
@w{gpgme_data_t @var{cipher}}, @  
@w{gpgme_data_t @var{plain}})
```

```
@since{1.8.0}
```

The function `gpgme_op_decrypt_ext_start` initiates a `gpgme_op_decrypt_ext` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `cipher` or `plain` is not a valid pointer.

```
@end deftypefun
```

```
@deftp {Data type} {gpgme_recipient_t}  
@since{1.1.0}
```

This is a pointer to a structure used to store information about the recipient of an encrypted text which is decrypted in a `gpgme_op_decrypt` operation. This information (except for the status field) is even available before the operation finished successfully, for example in a passphrase callback. The structure contains the following members:

```
@table @code
```

```
@item gpgme_recipient_t next
```

This is a pointer to the next recipient structure in the linked list, or `NULL` if this is the last element.

```
@item gpgme_pubkey_algo_t
```

The public key algorithm used in the encryption.

```
@item char *keyid
```

This is the key ID of the key (in hexadecimal digits) used as recipient.

```
@item gpgme_error_t status
```

This is an error number with the error code `GPG_ERR_NO_SECKEY` if the secret key for this recipient is not available, and 0 otherwise.

```
@end table
```

```
@end deftp
```

```
@deftp {Data type} {gpgme_decrypt_result_t}
```

This is a pointer to a structure used to store the result of a `gpgme_op_decrypt` operation. After successfully decrypting data, you can retrieve the pointer to the result with

`gpgme_op_decrypt_result`. As with all result structures, it this structure shall be considered read-only and an application must not allocate such a structure on its own. The structure contains the following members:

`@table @code`

`@item char *unsupported_algorithm`

If an unsupported algorithm was encountered, this string describes the algorithm that is not supported.

`@item unsigned int wrong_key_usage : 1`

`@since{0.9.0}`

This is true if the key was not used according to its policy.

`@item unsigned int legacy_cipher_nomdc : 1`

`@since{1.11.2}`

The message was made by a legacy algorithm without any integrity protection. This might be an old but legitimate message.

`@item unsigned int is_mime : 1;`

`@since{1.11.0}`

The message claims that the content is a MIME object.

`@item unsigned int is_de_vs : 1;`

`@since{1.10.0}`

The message was encrypted in a VS-NfD compliant way. This is a specification in Germany for a restricted communication level.

`@item gpgme_recipient_t recipients`

`@since{1.1.0}`

This is a linked list of recipients to which this message was encrypted.

`@item char *file_name`

This is the filename of the original plaintext message file if it is known, otherwise this is a null pointer.

`@item char *session_key`

`@since{1.8.0}`

A textual representation (nul-terminated string) of the session key used in symmetric encryption of the message, if the context has been set to export session keys (see `gpgme_set_ctx_flag`, "export-session-key"), and a session key was available for the most recent decryption operation. Otherwise, this is a null pointer.

You must not try to access this member of the struct unless

`gpgme_set_ctx_flag (ctx, "export-session-key")` returns success



or `gpgme_get_ctx_flag (ctx, "export-session-key")` returns true (non-empty string).

@item char \*symkey\_algo  
@since{1.11.0}

A string with the symmetric encryption algorithm and mode using the format "<algo>.<mode>". Note that the deprecated non-MDC encryption mode of OpenPGP is given as "PGPCFB".

@end table  
@end deftp

@deftypefun gpgme\_decrypt\_result\_t gpgme\_op\_decrypt\_result (@w{gpgme\_ctx\_t @var{ctx}})  
The function `gpgme_op_decrypt_result` returns a  
`gpgme_decrypt_result_t` pointer to a structure holding the  
result of a `gpgme_op_decrypt` operation. The pointer is only  
valid if the last operation on the context was a  
`gpgme_op_decrypt` or `gpgme_op_decrypt_start` operation.  
If the operation failed this might be a `NULL` pointer. The  
returned pointer is only valid until the next operation is started on  
the context.  
@end deftypefun

@node Verify  
@subsection Verify  
@cindex verification  
@cindex signature, verification  
@cindex cryptographic operation, verification  
@cindex cryptographic operation, signature check  
@cindex signature notation data  
@cindex notation data

@deftypefun gpgme\_error\_t gpgme\_op\_verify (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t @var{sig}},  
@w{gpgme\_data\_t @var{signed\_text}}, @w{gpgme\_data\_t @var{plain}})  
The function `gpgme_op_verify` verifies that the signature in the  
data object `@var{sig}` is a valid signature. If `@var{sig}` is a  
detached signature, then the signed text should be provided in  
`@var{signed_text}` and `@var{plain}` should be a null pointer.  
Otherwise, if `@var{sig}` is a normal (or cleartext) signature,  
`@var{signed_text}` should be a null pointer and `@var{plain}` should be a  
writable data object that will contain the plaintext after successful  
verification.

The results of the individual signature verifications can be retrieved  
with `gpgme_op_verify_result`.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be completed successfully, `GPG_ERR_INV_VALUE` if `ctx`, `sig` or `plain` is not a valid pointer, `GPG_ERR_NO_DATA` if `sig` does not contain any data to verify, and passes through any errors that are reported by the crypto engine support routines.

`@end deftypefun`

```
@deftypefun gpgme_error_t gpgme_op_verify_start (@w{gpgme_ctx_t} ctx, @w{gpgme_data_t} sig, @w{gpgme_data_t} signed_text, @w{gpgme_data_t} plain)
```

The function `gpgme_op_verify_start` initiates a `gpgme_op_verify` operation. It can be completed by calling `gpgme_wait` on the context. [@xref{Waiting For Completion}](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `ctx`, `sig` or `plain` is not a valid pointer, and `GPG_ERR_NO_DATA` if `sig` or `plain` does not contain any data to verify.

`@end deftypefun`

```
@deftp {Data type} {gpgme_sig_notation_t}
```

This is a pointer to a structure used to store a part of the result of a `gpgme_op_verify` operation. The structure contains the following members:

```
@table @code
```

```
@item gpgme_sig_notation_t next
```

This is a pointer to the next new signature notation structure in the linked list, or `NULL` if this is the last element.

```
@item char *name
```

The name of the notation field. If this is `NULL`, then the member `value` will contain a policy URL.

```
@item int name_len
```

The length of the `name` field. For strings the length is counted without the trailing binary zero.

```
@item char *value
```

The value of the notation field. If `name` is `NULL`, then this is a policy URL.

```
@item int value_len
```

The length of the `value` field. For strings the length is counted without the trailing binary zero.

```
@item gpgme_sig_notation_flags_t flags
```

The accumulated flags field. This field contains the flags associated with the notation data in an accumulated form which can be used as an argument to the function `gpgme_sig_notation_add`. The value `flags` is a bitwise-or combination of one or multiple of the following bit values:

```
@table @code
@item GPGME_SIG_NOTATION_HUMAN_READABLE
@since{1.1.0}
```

The `GPGME_SIG_NOTATION_HUMAN_READABLE` symbol specifies that the notation data is in human readable form

```
@item GPGME_SIG_NOTATION_CRITICAL
@since{1.1.0}
```

The `GPGME_SIG_NOTATION_CRITICAL` symbol specifies that the notation data is critical.

```
@end table
```

```
@item unsigned int human_readable : 1
```

This is true if the `GPGME_SIG_NOTATION_HUMAN_READABLE` flag is set and false otherwise. This flag is only valid for notation data, not for policy URLs.

```
@item unsigned int critical : 1
```

This is true if the `GPGME_SIG_NOTATION_CRITICAL` flag is set and false otherwise. This flag is valid for notation data and policy URLs.

```
@end table
```

```
@end deftp
```

```
@deftp {Data type} {gpgme_signature_t}
```

This is a pointer to a structure used to store a part of the result of a `gpgme_op_verify` operation. The structure contains the following members:

```
@table @code
```

```
@item gpgme_signature_t next
```

This is a pointer to the next new signature structure in the linked list, or `NULL` if this is the last element.

```
@item gpgme_sigsum_t summary
```

This is a bit vector giving a summary of the signature status. It provides an easy interface to a defined semantic of the signature status. Checking just one bit is sufficient to see whether a signature is valid without any restrictions. This means that

you can check for GPGME\_SIGSUM\_VALID like this:

```
@example
if ((sig.summary & GPGME_SIGSUM_VALID))
@{
  ..do stuff if valid..
@}
else
@{
  ..do stuff if not fully valid..
@}
@end example
```

The defined bits are:

@table @code

@item GPGME\_SIGSUM\_VALID

The signature is fully valid.

@item GPGME\_SIGSUM\_GREEN

The signature is good but one might want to display some extra information. Check the other bits.

@item GPGME\_SIGSUM\_RED

The signature is bad. It might be useful to check other bits and display more information, i.e. a revoked certificate might not render a signature invalid when the message was received prior to the cause for the revocation.

@item GPGME\_SIGSUM\_KEY\_REVOKED

The key or at least one certificate has been revoked.

@item GPGME\_SIGSUM\_KEY\_EXPIRED

The key or one of the certificates has expired. It is probably a good idea to display the date of the expiration.

@item GPGME\_SIGSUM\_SIG\_EXPIRED

The signature has expired.

@item GPGME\_SIGSUM\_KEY\_MISSING

Can't verify due to a missing key or certificate.

@item GPGME\_SIGSUM\_CRL\_MISSING

The CRL (or an equivalent mechanism) is not available.

@item GPGME\_SIGSUM\_CRL\_TOO\_OLD

Available CRL is too old.

@item GPGME\_SIGSUM\_BAD\_POLICY

A policy requirement was not met.

@item GPGME\_SIGSUM\_SYS\_ERROR

A system error occurred.

@item GPGME\_SIGSUM\_TOFU\_CONFLICT

A TOFU conflict was detected.

@end table

@item char \*fpr

This is the fingerprint or key ID of the signature.

@item gpgme\_error\_t status

This is the status of the signature. In particular, the following status codes are of interest:

@table @code

@item GPG\_ERR\_NO\_ERROR

This status indicates that the signature is valid. For the combined result this status means that all signatures are valid.

@item GPG\_ERR\_SIG\_EXPIRED

This status indicates that the signature is valid but expired. For the combined result this status means that all signatures are valid and expired.

@item GPG\_ERR\_KEY\_EXPIRED

This status indicates that the signature is valid but the key used to verify the signature has expired. For the combined result this status means that all signatures are valid and all keys are expired.

@item GPG\_ERR\_CERT\_REVOKED

This status indicates that the signature is valid but the key used to verify the signature has been revoked. For the combined result this status means that all signatures are valid and all keys are revoked.

@item GPG\_ERR\_BAD\_SIGNATURE

This status indicates that the signature is invalid. For the combined result this status means that all signatures are invalid.

@item GPG\_ERR\_NO\_PUBKEY

This status indicates that the signature could not be verified due to a missing key. For the combined result this status means that all signatures could not be checked due to missing keys.

@item GPG\_ERR\_GENERAL

This status indicates that there was some other error which prevented

the signature verification.

@end table

@item gpgme\_sig\_notation\_t notations

This is a linked list with the notation data and policy URLs.

@item unsigned long timestamp

The creation timestamp of this signature.

@item unsigned long exp\_timestamp

The expiration timestamp of this signature, or 0 if the signature does not expire.

@item unsigned int wrong\_key\_usage : 1

This is true if the key was not used according to its policy.

@item unsigned int pka\_trust : 2

This is set to the trust information gained by means of the PKA system.

Values are:

@table @code

@item 0

No PKA information available or verification not possible.

@item 1

PKA verification failed.

@item 2

PKA verification succeeded.

@item 3

Reserved for future use.

@end table

Depending on the configuration of the engine, this metric may also be reflected by the validity of the signature.

@item unsigned int chain\_model : 1

@since{1.1.6}

This is true if the validity of the signature has been checked using the chain model. In the chain model the time the signature has been created must be within the validity period of the certificate and the time the certificate itself has been created must be within the validity period of the issuing certificate. In contrast the default validation model checks the validity of signature as well at the entire certificate chain at the current time.

@item gpgme\_validity\_t validity

The validity of the signature.

@item gpgme\_error\_t validity\_reason

If a signature is not valid, this provides a reason why.

@item gpgme\_pubkey\_algo\_t

The public key algorithm used to create this signature.

@item gpgme\_hash\_algo\_t

The hash algorithm used to create this signature.

@item char \*pka\_address

The mailbox from the PKA information or @code{NULL}.

@item gpgme\_key\_t key

@since{1.7.0}

An object describing the key used to create the signature. This key object may be incomplete in that it only conveys information available directly with a signature. It may also be @code{NULL} if such information is not readily available.

@end table

@end deftp

@deftp {Data type} {gpgme\_verify\_result\_t}

This is a pointer to a structure used to store the result of a @code{gpgme\_op\_verify} operation. After verifying a signature, you can retrieve the pointer to the result with @code{gpgme\_op\_verify\_result}. If the operation failed this might be a @code{NULL} pointer. The structure contains the following member:

@table @code

@item gpgme\_signature\_t signatures

A linked list with information about all signatures for which a verification was attempted.

@item char \*file\_name

This is the filename of the original plaintext message file if it is known, otherwise this is a null pointer. Warning: The filename is not covered by the signature.

@item unsigned int is\_mime : 1;

@since{1.11.0}

The message claims that the content is a MIME object. Warning: This flag is not covered by the signature.

@end table

@end deftp

```
@deftypefun gpgme_verify_result_t gpgme_op_verify_result (@w{gpgme_ctx_t @var{ctx}})
```

The function `gpgme_op_verify_result` returns a

`gpgme_verify_result_t` pointer to a structure holding the result of a `gpgme_op_verify` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_verify`,

`gpgme_op_verify_start`, `gpgme_op_decrypt_verify` or

`gpgme_op_decrypt_verify_start` operation, and if this operation finished successfully (for `gpgme_op_decrypt_verify` and

`gpgme_op_decrypt_verify_start`, the error code

`GPG_ERR_NO_DATA` counts as successful in this context). The

returned pointer is only valid until the next operation is started on

the context.

```
@end deftypefun
```

```
@node Decrypt and Verify
```

```
@subsection Decrypt and Verify
```

```
@cindex decryption and verification
```

```
@cindex verification and decryption
```

```
@cindex signature check
```

```
@cindex cryptographic operation, decryption and verification
```

```
@deftypefun gpgme_error_t gpgme_op_decrypt_verify (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{cipher}}, @w{gpgme_data_t @var{plain}})
```

The function `gpgme_op_decrypt_verify` decrypts the ciphertext in the data object `var{cipher}` and stores it into the data object

`var{plain}`. If `var{cipher}` contains signatures, they will be verified.

After the operation completed, `gpgme_op_decrypt_result` and

`gpgme_op_verify_result` can be used to retrieve more information about the signatures.

If the error code `GPG_ERR_NO_DATA` is returned, `var{cipher}`

does not contain any data to decrypt. However, it might still be

signed. The information about detected signatures is available with

`gpgme_op_verify_result` in this case.

The function returns the error code `GPG_ERR_NO_ERROR` if the

ciphertext could be decrypted successfully, `GPG_ERR_INV_VALUE`

if `var{ctx}`, `var{cipher}` or `var{plain}` is not a valid pointer,

`GPG_ERR_NO_DATA` if `var{cipher}` does not contain any data to

decrypt, `GPG_ERR_DECRYPT_FAILED` if `var{cipher}` is not a valid

cipher text, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the

secret key could not be retrieved, and passes through any errors that

are reported by the crypto engine support routines.

```
@end deftypefun
```



```
@deftypefun gpgme_error_t gpgme_op_decrypt_verify_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t @var{cipher}}, @w{gpgme_data_t @var{plain}})
```

The function `gpgme_op_decrypt_verify_start` initiates a `gpgme_op_decrypt_verify` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `ctx`, `cipher`, `plain` or `r_stat` is not a valid pointer, and `GPG_ERR_NO_DATA` if `cipher` does not contain any data to decrypt.

```
@end deftypefun
```

When processing mails it is sometimes useful to extract the actual mail address (the `addr-spec`) from a string. GPGME provides this helper function which uses the same semantics as the internal functions in GPGME and GnuPG:

```
@deftypefun @w{char *} gpgme_addrspec_from_uid (@w{const char *@var{uid}})
```

```
@since{1.7.1}
```

Return the mail address (called `addr-spec` in RFC-5322) from the string `uid` which is assumed to be a user id (called `address` in RFC-5322). All plain ASCII characters (i.e. those with bit 7 cleared) in the result are converted to lowercase. Caller must free the result using `gpgme_free`. Returns `NULL` if no valid address was found (in which case `errno` is set to `EINVAL`) or for other errors.

```
@end deftypefun
```

```
@node Sign
```

```
@subsection Sign
```

```
@cindex signature, creation
```

```
@cindex sign
```

```
@cindex cryptographic operation, signing
```

A signature can contain signatures by one or more keys. The set of keys used to create a signatures is contained in a context, and is applied to all following signing operations in this context (until the set is changed).

```
@menu
```

```
* Selecting Signers::      How to choose the keys to sign with.
```

```
* Creating a Signature::   How to create a signature.
```

\* Signature Notation Data:: How to add notation data to a signature.

@end menu

@node Selecting Signers

@subsubsection Selecting Signers

@cindex signature, selecting signers

@cindex signers, selecting

The key or the keys used to create a signature are stored in the context. The following functions can be used to manipulate this list.

If no signer has been set into the context a default key is used for signing.

```
@deftypefun void gpgme_signers_clear (@w{gpgme_ctx_t @var{ctx}})
```

The function @code{gpgme\_signers\_clear} releases a reference for each key on the signers list and removes the list of signers from the context @var{ctx}.

Every context starts with an empty list.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_signers_add (@w{gpgme_ctx_t @var{ctx}}, @w{const gpgme_key_t @var{key}})
```

The function @code{gpgme\_signers\_add} adds the key @var{key} to the list of signers in the context @var{ctx}.

Calling this function acquires an additional reference for the key.

@end deftypefun

```
@deftypefun @w{unsigned int} gpgme_signers_count (@w{const gpgme_ctx_t @var{ctx}})
@since{1.4.3}
```

The function @code{gpgme\_signers\_count} returns the number of signer keys in the context @var{ctx}.

@end deftypefun

```
@deftypefun gpgme_key_t gpgme_signers_enum (@w{const gpgme_ctx_t @var{ctx}}, @w{int @var{seq}})
```

The function @code{gpgme\_signers\_enum} returns the @var{seq}th key in the list of signers in the context @var{ctx}. An additional reference is acquired for the user.

If @var{seq} is out of range, @code{NULL} is returned.

@end deftypefun

@node Creating a Signature

@subsubsection Creating a Signature

@deftp {Data type} {enum gpgme\_sig\_mode\_t}

@tindex gpgme\_sig\_mode\_t

The @code{gpgme\_sig\_mode\_t} type is used to specify the desired type of a signature. The following modes are available:

@table @code

@item GPGME\_SIG\_MODE\_NORMAL

A normal signature is made, the output includes the plaintext and the signature.

@item GPGME\_SIG\_MODE\_DETACH

A detached signature is made.

@item GPGME\_SIG\_MODE\_CLEAR

A clear text signature is made. The @acronym{ASCII} armor and text mode settings of the context are ignored.

@end table

@end deftp

@deftypefun gpgme\_error\_t gpgme\_op\_sign (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t @var{plain}}, @w{gpgme\_data\_t @var{sig}}, @w{gpgme\_sig\_mode\_t @var{mode}})

The function @code{gpgme\_op\_sign} creates a signature for the text in the data object @var{plain} and returns it in the data object

@var{sig}. The type of the signature created is determined by the

@acronym{ASCII} armor (or, if that is not set, by the encoding

specified for @var{sig}), the text mode attributes set for the context

@var{ctx} and the requested signature mode @var{mode}.

After the operation completed successfully, the result can be retrieved with @code{gpgme\_op\_sign\_result}.

If an S/MIME signed message is created using the CMS crypto engine, the number of certificates to include in the message can be specified with @code{gpgme\_set\_include\_certs}. @xref{Included Certificates}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the

signature could be created successfully, @code{GPG\_ERR\_INV\_VALUE} if

@var{ctx}, @var{plain} or @var{sig} is not a valid pointer,

@code{GPG\_ERR\_NO\_DATA} if the signature could not be created,

@code{GPG\_ERR\_BAD\_PASSPHRASE} if the passphrase for the secret key

could not be retrieved, @code{GPG\_ERR\_UNUSABLE\_SECKEY} if there are

invalid signers, and passes through any errors that are reported by the

crypto engine support routines.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_op\_sign\_start (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_data\_t @var{plain}}, @w{gpgme\_data\_t @var{sig}}, @w{gpgme\_sig\_mode\_t @var{mode}})

The function `gpgme_op_sign_start` initiates a `gpgme_op_sign` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `ctx`, `plain` or `sig` is not a valid pointer.

`gpgme_op_sign_start`

`gpgme_new_signature_t`

This is a pointer to a structure used to store a part of the result of a `gpgme_op_sign` operation. The structure contains the following members:

`next`

`gpgme_new_signature_t next`

This is a pointer to the next new signature structure in the linked list, or `NULL` if this is the last element.

`type`

`gpgme_sig_mode_t type`

The type of this signature.

`pubkey_algo`

`gpgme_pubkey_algo_t pubkey_algo`

The public key algorithm used to create this signature.

`hash_algo`

`gpgme_hash_algo_t hash_algo`

The hash algorithm used to create this signature.

`sig_class`

`unsigned int sig_class`

The signature class of this signature.

`timestamp`

`long int timestamp`

The creation timestamp of this signature.

`*fpr`

`char *fpr`

The fingerprint of the key which was used to create this signature.

`gpgme_op_sign_result_t`

`gpgme_op_sign_result_t`

`gpgme_sign_result_t`

This is a pointer to a structure used to store the result of a `gpgme_op_sign` operation. After successfully generating a signature, you can retrieve the pointer to the result with `gpgme_op_sign_result`. The structure contains the following members:

`invalid_signers`

`gpgme_invalid_key_t invalid_signers`

A linked list with information about all invalid keys for which a signature could not be created.

@item gpgme\_new\_signature\_t signatures

A linked list with information about all signatures created.

@end table

@end deftp

@deftypefun gpgme\_sig\_result\_t gpgme\_op\_sign\_result (@w{gpgme\_ctx\_t @var{ctx}})

The function @code{gpgme\_op\_sign\_result} returns a

@code{gpgme\_sig\_result\_t} pointer to a structure holding the result of a @code{gpgme\_op\_sign} operation. The pointer is only valid if the last operation on the context was a @code{gpgme\_op\_sign}, @code{gpgme\_op\_sign\_start}, @code{gpgme\_op\_encrypt\_sign} or @code{gpgme\_op\_encrypt\_sign\_start} operation. If that operation failed, the function might return a @code{NULL} pointer. The returned pointer is only valid until the next operation is started on the context.

@end deftypefun

@node Signature Notation Data

@subsubsection Signature Notation Data

@cindex notation data

@cindex signature notation data

@cindex policy URL

Using the following functions, you can attach arbitrary notation data to a signature. This information is then available to the user when the signature is verified.

@deftypefun void gpgme\_sig\_notation\_clear (@w{gpgme\_ctx\_t @var{ctx}})

@since{1.1.0}

The function @code{gpgme\_sig\_notation\_clear} removes the notation data from the context @var{ctx}. Subsequent signing operations from this context will not include any notation data.

Every context starts with an empty notation data list.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_sig\_notation\_add (@w{gpgme\_ctx\_t @var{ctx}}, @w{const char \*@var{name}}, @w{const char \*@var{value}}, @w{gpgme\_sig\_notation\_flags\_t @var{flags}})

@since{1.1.0}

The function @code{gpgme\_sig\_notation\_add} adds the notation data with the name @var{name} and the value @var{value} to the context

@var{ctx}.

Subsequent signing operations will include this notation data, as well as any other notation data that was added since the creation of the context or the last `gpgme_sig_notation_clear` operation.

The arguments `name` and `value` must be `NUL`-terminated strings in human-readable form. The flag `GPGME_SIG_NOTATION_HUMAN_READABLE` is implied (non-human-readable notation data is currently not supported). The strings must be in UTF-8 encoding.

If `name` is `NULL`, then `value` should be a policy URL.

The function `gpgme_sig_notation_add` returns the error code `GPG_ERR_NO_ERROR` if the notation data could be added successfully, `GPG_ERR_INV_VALUE` if `ctx` is not a valid pointer, or if `name`, `value` and `flags` are an invalid combination. The function also passes through any errors that are reported by the crypto engine support routines.

`end dectyfefun`

```
@dectyfefun gpgme_sig_notation_t gpgme_sig_notation_get (@w{const gpgme_ctx_t @var{ctx}})
@since{1.1.0}
```

The function `gpgme_sig_notation_get` returns the linked list of notation data structures that are contained in the context `ctx`.

If `ctx` is not a valid pointer, or there is no notation data added for this context, `NULL` is returned.

`end dectyfefun`

`node Encrypt`

`subsection Encrypt`

`cindex encryption`

`cindex cryptographic operation, encryption`

One plaintext can be encrypted for several recipients at the same time. The list of recipients is created independently of any context, and then passed to the encryption operation.

`menu`

\* Encrypting a Plaintext::     How to encrypt a plaintext.

`end menu`

`node Encrypting a Plaintext`

`subsubsection Encrypting a Plaintext`

@deftypefun gpgme\_error\_t gpgme\_op\_encrypt (@w{gpgme\_ctx\_t @var{ctx}}, @w{gpgme\_key\_t @var{recp}}[], @w{gpgme\_encrypt\_flags\_t @var{flags}}, @w{gpgme\_data\_t @var{plain}}, @w{gpgme\_data\_t @var{cipher}})

The function `gpgme_op_encrypt` encrypts the plaintext in the data object `@var{plain}` for the recipients `@var{recp}` and stores the ciphertext in the data object `@var{cipher}`. The type of the ciphertext created is determined by the `ASCII` armor (or, if that is not set, by the encoding specified for `@var{cipher}`) and the text mode attributes set for the context `@var{ctx}`.

`@var{recp}` must be a `NULL`-terminated array of keys. The user must keep references for all keys during the whole duration of the call (but see `gpgme_op_encrypt_start` for the requirements with the asynchronous variant).

The value in `@var{flags}` is a bitwise-or combination of one or multiple of the following bit values:

@table @code

@item GPGME\_ENCRYPT\_ALWAYS\_TRUST

The `GPGME_ENCRYPT_ALWAYS_TRUST` symbol specifies that all the recipients in `@var{recp}` should be trusted, even if the keys do not have a high enough validity in the keyring. This flag should be used with care; in general it is not a good idea to use any untrusted keys.

@item GPGME\_ENCRYPT\_NO\_ENCRYPT\_TO

@since{1.2.0}

The `GPGME_ENCRYPT_NO_ENCRYPT_TO` symbol specifies that no default or hidden default recipients as configured in the crypto backend should be included. This can be useful for managing different user profiles.

@item GPGME\_ENCRYPT\_NO\_COMPRESS

@since{1.5.0}

The `GPGME_ENCRYPT_NO_COMPRESS` symbol specifies that the plaintext shall not be compressed before it is encrypted. This is in some cases useful if the length of the encrypted message may reveal information about the plaintext.

@item GPGME\_ENCRYPT\_PREPARE

@itemx GPGME\_ENCRYPT\_EXPECT\_SIGN

The `GPGME_ENCRYPT_PREPARE` symbol is used with the UI Server protocol to prepare an encryption (i.e. sending the `PREP_ENCRYPT` command). With the `GPGME_ENCRYPT_EXPECT_SIGN` symbol the UI Server is advised to

also expect a sign command.

@item GPGME\_ENCRYPT\_SYMMETRIC  
@since{1.7.0}

The @code{GPGME\_ENCRYPT\_SYMMETRIC} symbol specifies that the output should be additionally encrypted symmetrically even if recipients are provided. This feature is only supported for the OpenPGP crypto engine.

@item GPGME\_ENCRYPT\_THROW\_KEYIDS  
@since{1.8.0}

The @code{GPGME\_ENCRYPT\_THROW\_KEYIDS} symbols requests that the identifiers for the decryption keys are not included in the ciphertext. On the receiving side, the use of this flag may slow down the decryption process because all available secret keys must be tried. This flag is only honored for OpenPGP encryption.

@item GPGME\_ENCRYPT\_WRAP  
@since{1.8.0}

The @code{GPGME\_ENCRYPT\_WRAP} symbol specifies that the input is an OpenPGP message and not a plain data. This is the counterpart to @code{GPGME\_DECRYPT\_UNWRAP}.

@item GPGME\_ENCRYPT\_WANT\_ADDRESS  
@since{1.11.0}

The @code{GPGME\_ENCRYPT\_WANT\_ADDRESS} symbol requests that all supplied keys or key specifications include a syntactically valid mail address. If this is not the case the operation is not even tried and the error code @code{GPG\_ERR\_INV\_USER\_ID} is returned. Only the address part of the key specification is conveyed to the backend. As of now the key must be specified using the @var{recpstring} argument of the extended encrypt functions. This feature is currently only supported for the OpenPGP crypto engine.

@end table

If @code{GPG\_ERR\_UNUSABLE\_PUBKEY} is returned, some recipients in @var{recp} are invalid, but not all. In this case the plaintext might be encrypted for all valid recipients and returned in @var{cipher} (if this happens depends on the crypto engine). More information about the invalid recipients is available with @code{gpgme\_op\_encrypt\_result}.

If @var{recp} is @code{NULL}, symmetric rather than public key



encryption is performed. Symmetrically encrypted cipher text can be deciphered with `gpgme_op_decrypt`. Note that in this case the crypto backend needs to retrieve a passphrase from the user. Symmetric encryption is currently only supported for the OpenPGP crypto backend.

The function returns the error code `GPG_ERR_NO_ERROR` if the ciphertext could be created successfully, `GPG_ERR_INV_VALUE` if `ctx`, `recp`, `plain` or `cipher` is not a valid pointer, `GPG_ERR_UNUSABLE_PUBKEY` if `recp` contains some invalid recipients, `GPG_ERR_BAD_PASSPHRASE` if the passphrase for the symmetric key could not be retrieved, and passes through any errors that are reported by the crypto engine support routines.

```
@deftypefun gpgme_error_t gpgme_op_encrypt_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t @var{recp}}[], @w{gpgme_encrypt_flags_t @var{flags}}, @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

The function `gpgme_op_encrypt_start` initiates a `gpgme_op_encrypt` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

References to the keys only need to be held for the duration of this call. The user can release its references to the keys after this function returns, even if the operation is not yet finished.

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, `GPG_ERR_INV_VALUE` if `ctx`, `rset`, `plain` or `cipher` is not a valid pointer, and `GPG_ERR_UNUSABLE_PUBKEY` if `rset` does not contain any valid recipients.

```
@deftypefun gpgme_error_t gpgme_op_encrypt_ext @  
  (@w{gpgme_ctx_t @var{ctx}}, @  
   @w{gpgme_key_t @var{recp}}[], @  
   @w{const char *@var{recpstring}}, @  
   @w{gpgme_encrypt_flags_t @var{flags}}, @  
   @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

`@since{1.11.0}`

This is an extended version of `gpgme_op_encrypt` with `recpstring` as additional parameter. If `recp` is NULL and `recpstring` is not NULL, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `recp` the keys are given directly as strings and there is no need to first create key objects. Leading and trailing white space is

remove from each line in `@var{recpstring}`. The keys are then passed verbatim to the backend engine.

For the OpenPGP backend several special keywords are supported to modify the operation. These keywords are given instead of a key specification. The currently supported keywords are:

`@table @code`

`@item --hidden`

`@itemx --no-hidden`

These keywords toggle between normal and hidden recipients for all following key specifications. When a hidden recipient is requested the gpg option `@option{-R}` (or `@option{-F}` in file mode) is used instead of `@option{-r}` (`@option{-f}` in file mode).

`@item --file`

`@itemx --no-file`

These keywords toggle between regular and file mode for all following key specification. In file mode the option `@option{-f}` or `@option{-F}` is passed to gpg. At least GnuPG version 2.1.14 is required to handle these options. The `@code{GPGME_ENCRYPT_WANT_ADDRESS}` flag is ignored in file mode.

`@item --`

This keyword disables all keyword detection up to the end of the string. All keywords are treated as verbatim arguments.

`@end table`

To create a `@var{recpstring}` it is often useful to employ a `strconcat` style function. For example this function creates a string to encrypt to two keys:

`@example`

`char *`

`xbuild_recstring (const char *key1, const char *key2)`

`@{`

`char *result = gpg_strconcat ("--\n", key1, "\n", key2, NULL);`

`if (!result)`

`@{ perror ("strconcat failed"); exit (2); @ }`

`return result;`

`@ }`

`@end example`

Note the use of the double dash here; unless you want to specify a keyword, it is a good idea to avoid any possible trouble with key specifications starting with a double dash. The used `strconcat` function is available in Libgpg-error 1.28 and later; Libgpg-error

(aka Gpgrt) is a dependency of GPGME. The number of arguments to `gpgmt_strconcat` is limited to 47 but that should always be sufficient. In case a larger and non-fixed number of keys are to be supplied the following code can be used:

```
@example
char *
xbuild_long_recpstring (void)
@{
    gpgmt_stream_t memfp;
    const char *s;
    void *result;

    memfp = gpgmt_fopenmem (0, "w+b");
    if (!memfp)
        @ { perror ("fopenmem failed"); exit (2); @ }
    gpgmt_fputs ("--", memfp);
    while ((s = get_next_keyspec ()))
        @ {
            gpgmt_fputc ('\n', memfp);
            gpgmt_fputs (s, memfp);
        @ }
    gpgmt_fputc (0, memfp);
    if (gpgmt_ferror (memfp))
        @ { perror ("writing to memstream failed"); exit (2); @ }
    if (gpgmt_fclose_snatch (memfp, &result, NULL))
        @ { perror ("fclose_snatch failed"); exit (2); @ }
    return result;
@ }
@end example
```

In this example `get_next_keyspec` is expected to return the next key to be added to the string. Please take care: Encrypting to a large number of recipients is often questionable due to security reasons and also for the technicality that all keys are currently passed on the command line to `gpg` which has as a platform specific length limitation.

`@end deftypefun`

```
@deftypefun gpgme_error_t gpgme_op_encrypt_ext_start @
    (@w{gpgme_ctx_t @var{ctx}}, @
    @w{gpgme_key_t @var{recp}[]}, @
    @w{const char *@var{recpstring}}, @
    @w{gpgme_encrypt_flags_t @var{flags}}, @
    @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

`@since{1.11.0}`

This is an extended version of `gpgme_op_encrypt_start` with `recpstring` as additional parameter. If `recp` is NULL and `recpstring` is not NULL, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `recp` the keys are given directly as strings and there is no need to first create key objects. The keys are passed verbatim to the backend engine.

`@end deftypefun`

`@deftp {Data type} {gpgme_encrypt_result_t}`

This is a pointer to a structure used to store the result of a `gpgme_op_encrypt` operation. After successfully encrypting data, you can retrieve the pointer to the result with `gpgme_op_encrypt_result`. The structure contains the following members:

`@table @code`

`@item gpgme_invalid_key_t invalid_recipients`

A linked list with information about all invalid keys for which the data could not be encrypted.

`@end table`

`@end deftp`

`@deftypefun gpgme_encrypt_result_t gpgme_op_encrypt_result (@w{gpgme_ctx_t @var{ctx}})`

The function `gpgme_op_encrypt_result` returns a `gpgme_encrypt_result_t` pointer to a structure holding the result of a `gpgme_op_encrypt` operation. The pointer is only valid if the last operation on the context was a `gpgme_op_encrypt`, `gpgme_op_encrypt_start`, `gpgme_op_sign` or `gpgme_op_sign_start` operation. If this operation failed, this might be a `NULL` pointer. The returned pointer is only valid until the next operation is started on the context.

`@end deftypefun`

`@deftypefun gpgme_error_t gpgme_op_encrypt_sign (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t @var{recp}}[], @w{gpgme_encrypt_flags_t @var{flags}}, @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})`

The function `gpgme_op_encrypt_sign` does a combined encrypt and sign operation. It is used like `gpgme_op_encrypt`, but the ciphertext also contains signatures for the signers listed in `ctx`.

The combined encrypt and sign operation is currently only available for the OpenPGP crypto engine.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_encrypt_sign_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t @var{recp}}[], @w{gpgme_encrypt_flags_t @var{flags}}, @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

The function `gpgme_op_encrypt_sign_start` initiates a `gpgme_op_encrypt_sign` operation. It can be completed by calling `gpgme_wait` on the context. [Waiting For Completion](#).

The function returns the error code `GPG_ERR_NO_ERROR` if the operation could be started successfully, and `GPG_ERR_INV_VALUE` if `@var{ctx}`, `@var{rset}`, `@var{plain}` or `@var{cipher}` is not a valid pointer.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_encrypt_sign_ext @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{recp}}[], @
   @w{const char *@var{recpstring}}, @
   @w{gpgme_encrypt_flags_t @var{flags}}, @
   @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

@since{1.11.0}

This is an extended version of `gpgme_op_encrypt_sign` with `@var{recpstring}` as additional parameter. If `@var{recp}` is NULL and `@var{recpstring}` is not NULL, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to `@var{recp}` the keys are given directly as strings and there is no need to first create the key objects. The keys are passed verbatim to the backend engine.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_encrypt_sign_ext_start @
  (@w{gpgme_ctx_t @var{ctx}}, @
   @w{gpgme_key_t @var{recp}}[], @
   @w{const char *@var{recpstring}}, @
   @w{gpgme_encrypt_flags_t @var{flags}}, @
   @w{gpgme_data_t @var{plain}}, @w{gpgme_data_t @var{cipher}})
```

@since{1.11.0}

This is an extended version of `gpgme_op_encrypt_sign_start` with `@var{recpstring}` as additional parameter. If `@var{recp}` is NULL and `@var{recpstring}` is not NULL, the latter is expected to be a linefeed delimited string with the set of key specifications. In contrast to

@var{recp} the keys are given directly as strings and there is no need to first create the key objects. The keys are passed verbatim to the backend engine.

@end deftypefun

@node Miscellaneous

@section Miscellaneous operations

Here are some support functions which are sometimes useful.

@menu

\* Running other Programs:: Running other Programs

\* Using the Assuan protocol:: Using the Assuan protocol

\* Checking for updates:: How to check for software updates

@end menu

@node Running other Programs

@subsection Running other Programs

GPGME features an internal subsystem to run the actual backend engines. Along with data abstraction object this subsystem can be used to run arbitrary simple programs which even need not be related to cryptographic features. It may for example be used to run tools which are part of the GnuPG system but are not directly accessible with the GPGME API.

@deftypefun gpgme\_error\_t gpgme\_op\_spawn @

(@w{gpgme\_ctx\_t @var{ctx}}, @w{const char \*@var{file}}, @  
@w{const char \*@var{argv}[]}, @w{gpgme\_data\_t @var{datain}}, @  
@w{gpgme\_data\_t @var{dataout}}, @w{gpgme\_data\_t @var{dataerr}}, @  
@w{unsigned int @var{flags}})

@since{1.5.0}

The function @code{gpgme\_op\_spawn} runs the program @var{file} with the arguments taken from the NULL terminated array @var{argv}. If no arguments are required @var{argv} may be given as @code{NULL}. In the latter case or if @code{argv[0]} is the empty string, GPGME uses the basename of @var{file} for @code{argv[0]}. The file descriptors @code{stdin}, @code{stdout}, and @code{stderr} are connected to the data objects @var{datain}, @var{dataout}, and @var{dataerr}. If NULL is passed for one of these data objects the corresponding file descriptor is connected to @file{/dev/null}.

The value in `@var{flags}` is a bitwise-or combination of one or multiple of the following bit values:

```
@table @code
@item GPGME_SPAWN_DETACHED
@since{1.5.0}
```

Under Windows this flag inhibits the allocation of a new console for the program. This is useful for a GUI application which needs to call a command line helper tool.

```
@item GPGME_SPAWN_ALLOW_SET_FG
@since{1.5.0}
```

Under Windows this flag allows the called program to put itself into the foreground.

```
@end table
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_spawn_start @
  (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{file}}, @
   @w{const char *@var{argv}[]}, @w{gpgme_data_t @var{datain}}, @
   @w{gpgme_data_t @var{dataout}}, @w{gpgme_data_t @var{dataerr}}, @
   @w{unsigned int @var{flags}})
```

```
@since{1.5.0}
```

This is the asynchronous variant of `@code{gpgme_op_spawn}`.

```
@end deftypefun
```

```
@node Using the Assuan protocol
@subsection Using the Assuan protocol
```

The Assuan protocol can be used to talk to arbitrary Assuan servers. By default it is connected to the GnuPG agent, but it may be connected to arbitrary servers by using `@code{gpgme_ctx_set_engine_info}`, passing the location of the servers socket as `@var{file_name}` argument, and an empty string as `@var{home_dir}` argument.

The Assuan protocol functions use three kinds of callbacks to transfer data:

```
@defftp {Data type} {gpgme_error_t (*gpgme_assuan_data_cb_t) @
  (@w{void *@var{opaque}}, @w{const void *@var{data}}, @
   @w{size_t @var{datalen}})}
```

```
@since{1.2.0}
```

This callback receives any data sent by the server. `@var{opaque}` is the pointer passed to `@code{gpgme_op_assuan_transact_start}`, `@var{data}` of length `@var{datalen}` refers to the data sent.

```
@end deftp
```

```
@deftp {Data type} {gpgme_error_t (*gpgme_assuan_inquire_cb_t) @  
    (@w{void *@var{opaque}}, @w{const char *@var{name}}, @  
    @w{const char *@var{args}}, @w{gpgme_data_t *@var{r_data}})}
```

```
@since{1.2.0}
```

This callback is used to provide additional data to the Assuan server. `@var{opaque}` is the pointer passed to `@code{gpgme_op_assuan_transact_start}`, `@var{name}` and `@var{args}` specify what kind of data the server requested, and `@var{r_data}` is used to return the actual data.

Note: Returning data is currently not implemented in `@acronym{GPGME}`.

```
@end deftp
```

```
@deftp {Data type} {gpgme_error_t (*gpgme_assuan_status_cb_t) @  
    (@w{void *@var{opaque}}, @w{const char *@var{status}}, @  
    @w{const char *@var{args}})}
```

```
@since{1.2.0}
```

This callback receives any status lines sent by the server. `@var{opaque}` is the pointer passed to `@code{gpgme_op_assuan_transact_start}`, `@var{status}` and `@var{args}` denote the status update sent.

```
@end deftp
```

```
@deftypedef gpgme_error_t gpgme_op_assuan_transact_start @  
    (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{command}}, @  
    @w{gpgme_assuan_data_cb_t @var{data_cb}}, @  
    @w{void * @var{data_cb_value}}, @  
    @w{gpgme_assuan_inquire_cb_t @var{inquire_cb}}, @  
    @w{void * @var{inquire_cb_value}}, @  
    @w{gpgme_assuan_status_cb_t @var{status_cb}}, @  
    @w{void * @var{status_cb_value}})
```

```
@since{1.2.0}
```

Send the Assuan `@var{command}` and return results via the callbacks. Any callback may be `@code{NULL}`. The result of the operation may be retrieved using `@code{gpgme_wait_ext}`.



Asynchronous variant.

@end deftypefun

```
@deftypefun gpgme_error_t gpgme_op_assuan_transact_ext @
  (@w{gpgme_ctx_t @var{ctx}}, @w{const char *@var{command}}, @
   @w{gpgme_assuan_data_cb_t @var{data_cb}}, @
   @w{void * @var{data_cb_value}}, @
   @w{gpgme_assuan_inquire_cb_t @var{inquire_cb}}, @
   @w{void * @var{inquire_cb_value}}, @
   @w{gpgme_assuan_status_cb_t @var{status_cb}}, @
   @w{void * @var{status_cb_value}}, @
   @w{gpgme_error_t *@var{op_err}})
```

Send the Assuan @var{command} and return results via the callbacks.

The result of the operation is returned in @var{op\_err}.

Synchronous variant.

@end deftypefun

@node Checking for updates

@subsection How to check for software updates

The GnuPG Project operates a server to query the current versions of software packages related to GnuPG. GPGME can be used to access this online database and check whether a new version of a software package is available.

```
@deftp {Data type} {gpgme_query_swdb_result_t}
```

```
@since{1.8.0}
```

This is a pointer to a structure used to store the result of a @code{gpgme\_op\_query\_swdb} operation. After successful call to that function, you can retrieve the pointer to the result with @code{gpgme\_op\_query\_swdb\_result}. The structure contains the following member:

@table @code

@item name

This is the name of the package.

@item iversion

The currently installed version or an empty string. This value is either a copy of the argument given to @code{gpgme\_op\_query\_swdb} or the version of the installed software as figured out by GPGME or GnuPG.

@item created

This gives the date the file with the list of version numbers has

originally be created by the GnuPG project.

@item retrieved

This gives the date the file was downloaded.

@item warning

If this flag is set either an error has occurred or some of the information in this structure are not properly set. For example if the version number of the installed software could not be figured out, the @code{update} flag may not reflect a required update status.

@item update

If this flag is set an update of the software is available.

@item urgent

If this flag is set an available update is important.

@item noinfo

If this flag is set, no valid information could be retrieved.

@item unknown

If this flag is set the given @code{name} is not known.

@item toold

If this flag is set the available information is not fresh enough.

@item error

If this flag is set some other error has occurred.

@item version

The version string of the latest released version.

@item reldate

The release date of the latest released version.

@end table

@end deftp

@deftypefun gpgme\_error\_t gpgme\_op\_query\_swdb @

(@w{gpgme\_ctx\_t @var{ctx}}, @

@w{const char \*@var{name}}, @

@w{const char \*@var{iversion}}, @

@w{gpgme\_data\_t @var{reserved}})

@since{1.8.0}

Query the software version database for software package @var{name} and check against the installed version given by @var{iversion}. If

@var{iversion} is given as @code{NULL} a check is only done if GPGME can figure out the version by itself (for example when using "gpgme" or "gnupg"). If @code{NULL} is used for @var{name} the current gpgme version is checked. @var{reserved} must be set to 0.

@end deftypefun

@deftypefun gpgme\_query\_swdb\_result\_t gpgme\_op\_query\_swdb\_result @  
(@w{gpgme\_ctx\_t @var{ctx}})

@since{1.8.0}

The function @code{gpgme\_op\_query\_swdb\_result} returns a @code{gpgme\_query\_swdb\_result\_t} pointer to a structure holding the result of a @code{gpgme\_op\_query\_swdb} operation. The pointer is only valid if the last operation on the context was a successful call to @code{gpgme\_op\_query\_swdb}. If that call failed, the result might be a @code{NULL} pointer. The returned pointer is only valid until the next operation is started on the context @var{ctx}.

@end deftypefun

@noindent

Here is an example on how to check whether GnuPG is current:

@example

```
#include <gpgme.h>
```

```
int
```

```
main (void)
```

```
@{
```

```
gpg_error_t err;
```

```
gpgme_ctx_t ctx;
```

```
gpgme_query_swdb_result_t result;
```

```
gpgme_check_version (NULL);
```

```
err = gpgme_new (&ctx);
```

```
if (err)
```

```
    fprintf (stderr, "error creating context: %s\n", gpg_strerror (err));
```

```
else
```

```
@{
```

```
    gpgme_set_protocol (ctx, GPGME_PROTOCOL_GPGCONF);
```

```
    err = gpgme_op_query_swdb (ctx, "gnupg", NULL, 0);
```

```
    if (err)
```

```
        fprintf (stderr, "error querying swdb: %s\n", gpg_strerror (err));
```

```
    else
```

```
@{
```

```
        result = gpgme_op_query_swdb_result (ctx);
```

```

if (!result)
    fprintf(stderr, "error querying swdb\n");
if (!result->warning && !result->update)
    printf ("GnuPG version %s is current\n",
            result->iversion);
else if (!result->warning && result->update)
    printf ("GnuPG version %s can be updated to %s\n",
            result->iversion, result->version);
else
    fprintf(stderr, "error finding the update status\n");
@}
gpgme_release (ctx);
@}
return 0;
@}
@end example

```

```

@node Run Control
@section Run Control
@cindex run control
@cindex cryptographic operation, running

```

@acronym{GPGME} supports running operations synchronously and asynchronously. You can use asynchronous operation to set up a context up to initiating the desired operation, but delay performing it to a later point.

Furthermore, you can use an external event loop to control exactly when @acronym{GPGME} runs. This ensures that @acronym{GPGME} only runs when necessary and also prevents it from blocking for a long time.

```

@menu
* Waiting For Completion::   Waiting until an operation is completed.
* Using External Event Loops:: Advanced control over what happens when.
* Cancellation::           How to end pending operations prematurely.
@end menu

```

```

@node Waiting For Completion
@subsection Waiting For Completion
@cindex cryptographic operation, wait for
@cindex wait for completion

```

```

@deftypedefun gpgme_ctx_t gpgme_wait (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_error_t *@var{status}},
@w{int @var{hang}})

```

The function @code{gpgme\_wait} continues the pending operation within

the context `@var{ctx}`. In particular, it ensures the data exchange between `@acronym{GPGME}` and the crypto backend and watches over the run time status of the backend process.

If `@var{hang}` is true, the function does not return until the operation is completed or cancelled. Otherwise the function will not block for a long time.

The error status of the finished operation is returned in `@var{status}` if `@code{gpgme_wait}` does not return `@code{NULL}`.

The `@var{ctx}` argument can be `@code{NULL}`. In that case, `@code{gpgme_wait}` waits for any context to complete its operation.

`@code{gpgme_wait}` can be used only in conjunction with any context that has a pending operation initiated with one of the `@code{gpgme_op_*_start}` functions except `@code{gpgme_op_keylist_start}` and `@code{gpgme_op_trustlist_start}` (for which you should use the corresponding `@code{gpgme_op_*_next}` functions). If `@var{ctx}` is `@code{NULL}`, all of such contexts are waited upon and possibly returned. Synchronous operations running in parallel, as well as key and trust item list operations, do not affect `@code{gpgme_wait}`.

In a multi-threaded environment, only one thread should ever call `@code{gpgme_wait}` at any time, regardless of whether `@var{ctx}` is specified or not. This means that all calls to this function should be fully synchronized by locking primitives. It is safe to start asynchronous operations while a thread is running in `@code{gpgme_wait}`.

The function returns the `@var{ctx}` of the context which has finished the operation. If `@var{hang}` is false, and the timeout expires, `@code{NULL}` is returned and `@code{*status}` will be set to 0. If an error occurs, `@code{NULL}` is returned and the error is returned in `@code{*status}`.  
`@end deftypefun`

`@node Using External Event Loops`  
`@subsection Using External Event Loops`  
`@cindex event loop, external`

`@acronym{GPGME}` hides the complexity of the communication between the library and the crypto engine. The price of this convenience is that the calling thread can block arbitrary long waiting for the data returned by the crypto engine. In single-threaded programs, in particular if they are interactive, this is an unwanted side-effect. OTOH, if `@code{gpgme_wait}` is used without the `@var{hang}` option being enabled, it might be called unnecessarily often, wasting CPU time that

could be used otherwise.

The I/O callback interface described in this section lets the user take control over what happens when. `@acronym{GPGME}` will provide the user with the file descriptors that should be monitored, and the callback functions that should be invoked when a file descriptor is ready for reading or writing. It is then the user's responsibility to decide when to check the file descriptors and when to invoke the callback functions. Usually this is done in an event loop, that also checks for events in other parts of the program. If the callback functions are only called when the file descriptors are ready, `@acronym{GPGME}` will never block. This gives the user more control over the program flow, and allows to perform other tasks when `@acronym{GPGME}` would block otherwise.

By using this advanced mechanism, `@acronym{GPGME}` can be integrated smoothly into GUI toolkits like GTK+ even for single-threaded programs.

`@menu`

- \* I/O Callback Interface:: How I/O callbacks are registered.
- \* Registering I/O Callbacks:: How to use I/O callbacks for a context.
- \* I/O Callback Example:: An example how to use I/O callbacks.
- \* I/O Callback Example GTK+:: How to use `@acronym{GPGME}` with GTK+.
- \* I/O Callback Example GDK:: How to use `@acronym{GPGME}` with GDK.
- \* I/O Callback Example Qt:: How to use `@acronym{GPGME}` with Qt.

`@end menu`

`@node I/O Callback Interface`

`@subsubsection I/O Callback Interface`

```
@deftp {Data type} {gpgme_error_t (*gpgme_io_cb_t) (@w{void *@var{data}}, @w{int @var{fd}})}  
@tindex gpgme_io_cb_t
```

The `@code{gpgme_io_cb_t}` type is the type of functions which `@acronym{GPGME}` wants to register as I/O callback handlers using the `@code{gpgme_register_io_cb_t}` functions provided by the user.

`@var{data}` and `@var{fd}` are provided by `@acronym{GPGME}` when the I/O callback handler is registered, and should be passed through to the handler when it is invoked by the user because it noticed activity on the file descriptor `@var{fd}`.

The callback handler always returns `@code{0}`, but you should consider the return value to be reserved for later use.

`@end deftp`

```
@deftp {Data type} {gpgme_error_t (*gpgme_register_io_cb_t) (@w{void *@var{data}}, @w{int @var{fd}}),
```

```
@w{int @var{dir}}, @w{gpgme_io_cb_t @var{fnc}}, @w{void *@var{fnc_data}}, @w{void **@var{tag}}})  
@tindex gpgme_register_io_cb_t
```

The `gpgme_register_io_cb_t` type is the type of functions which can be called by `GPGME` to register an I/O callback function `@var{fnc}` for the file descriptor `@var{fd}` with the user.

`@var{fnc_data}` should be passed as the first argument to `@var{fnc}` when the handler is invoked (the second argument should be `@var{fd}`).

If `@var{dir}` is 0, `@var{fnc}` should be called by the user when `@var{fd}` is ready for writing. If `@var{dir}` is 1, `@var{fnc}` should be called when `@var{fd}` is ready for reading.

`@var{data}` was provided by the user when registering the `gpgme_register_io_cb_t` function with `GPGME` and will always be passed as the first argument when registering a callback function.

For example, the user can use this to determine the event loop to which the file descriptor should be added.

`GPGME` will call this function when a crypto operation is initiated in a context for which the user has registered I/O callback handler functions with `gpgme_set_io_cbs`. It can also call this function when it is in an I/O callback handler for a file descriptor associated to this context.

The user should return a unique handle in `@var{tag}` identifying this I/O callback registration, which will be passed to the `gpgme_register_io_cb_t` function without interpretation when the file descriptor should not be monitored anymore.

```
@end deftp
```

```
@deftp {Data type} {void (*gpgme_remove_io_cb_t) (@w{void **@var{tag}})}
```

The `gpgme_remove_io_cb_t` type is the type of functions which can be called by `GPGME` to remove an I/O callback handler that was registered before. `@var{tag}` is the handle that was returned by the `gpgme_register_io_cb_t` for this I/O callback.

`GPGME` can call this function when a crypto operation is in an I/O callback. It will also call this function when the context is destroyed while an operation is pending.

```
@end deftp
```

```
@deftp {Data type} {enum gpgme_event_io_t}
```

```
@tindex gpgme_event_io_t
```

The `gpgme_event_io_t` type specifies the type of an event that is reported to the user by `GPGME` as a consequence of an I/O operation. The following events are defined:

```
@table @code
```

```
@item GPGME_EVENT_START
```

The operation is fully initialized now, and you can start to run the registered I/O callback handlers now. Note that registered I/O callback handlers must not be run before this event is signalled. `@var{type_data}` is `@code{NULL}` and reserved for later use.

`@item GPGME_EVENT_DONE`

The operation is finished, the last I/O callback for this operation was removed. The accompanying `@var{type_data}` points to a `@code{struct gpgme_io_event_done_data}` variable that contains the status of the operation that finished. This event is signalled after the last I/O callback has been removed.

`@item GPGME_EVENT_NEXT_KEY`

In a `@code{gpgme_op_keylist_start}` operation, the next key was received from the crypto engine. The accompanying `@var{type_data}` is a `@code{gpgme_key_t}` variable that contains the key with one reference for the user.

`@item GPGME_EVENT_NEXT_TRUSTITEM`

In a `@code{gpgme_op_trustlist_start}` operation, the next trust item was received from the crypto engine. The accompanying `@var{type_data}` is a `@code{gpgme_trust_item_t}` variable that contains the trust item with one reference for the user.

`@end table`

`@end deftp`

`@deftp {Data type} {void (*gpgme_event_io_cb_t) (@w{void *}@var{data}), @w{gpgme_event_io_t}@var{type}}, @w{void *}@var{type_data}}}`

The `@code{gpgme_event_io_cb_t}` type is the type of functions which can be called by `@acronym{GPGME}` to signal an event for an operation running in a context which has I/O callback functions registered by the user.

`@var{data}` was provided by the user when registering the `@code{gpgme_event_io_cb_t}` function with `@acronym{GPGME}` and will always be passed as the first argument when registering a callback function. For example, the user can use this to determine the context in which this event has occurred.

`@var{type}` will specify the type of event that has occurred.

`@var{type_data}` specifies the event further, as described in the above list of possible `@code{gpgme_event_io_t}` types.

`@acronym{GPGME}` can call this function in an I/O callback handler.

`@end deftp`

`@node Registering I/O Callbacks`

`@subsubsection Registering I/O Callbacks`



@deftp {Data type} {struct gpgme\_io\_cbs}

@tindex gpgme\_event\_io\_t

This structure is used to store the I/O callback interface functions described in the previous section. It has the following members:

@table @code

@item gpgme\_register\_io\_cb\_t add

This is the function called by @acronym{GPGME} to register an I/O callback handler. It must be specified.

@item void \*add\_priv

This is passed as the first argument to the @code{add} function when it is called by @acronym{GPGME}. For example, it can be used to determine the event loop to which the file descriptor should be added.

@item gpgme\_remove\_io\_cb\_t remove

This is the function called by @acronym{GPGME} to remove an I/O callback handler. It must be specified.

@item gpgme\_event\_io\_cb\_t event

This is the function called by @acronym{GPGME} to signal an event for an operation. It must be specified, because at least the start event must be processed.

@item void \*event\_priv

This is passed as the first argument to the @code{event} function when it is called by @acronym{GPGME}. For example, it can be used to determine the context in which the event has occurred.

@end table

@end deftp

@deftypefun void gpgme\_set\_io\_cbs (@w{gpgme\_ctx\_t @var{ctx}}, @w{struct gpgme\_io\_cbs \*@var{io\_cbs}})

The function @code{gpgme\_set\_io\_cbs} enables the I/O callback interface for the context @var{ctx}. The I/O callback functions are specified by @var{io\_cbs}.

If @var{io\_cbs}->@code{add} is @code{NULL}, the I/O callback interface is disabled for the context, and normal operation is restored.

@end deftypefun

@deftypefun void gpgme\_get\_io\_cbs (@w{gpgme\_ctx\_t @var{ctx}}, @w{struct gpgme\_io\_cbs \*@var{io\_cbs}})

The function @code{gpgme\_get\_io\_cbs} returns the I/O callback functions set with @code{gpgme\_set\_io\_cbs} in @var{io\_cbs}.

@end deftypefun

@node I/O Callback Example

## @subsection I/O Callback Example

To actually use an external event loop, you have to implement the I/O callback functions that are used by @acronym{GPGME} to register and unregister file descriptors. Furthermore, you have to actually monitor these file descriptors for activity and call the appropriate I/O callbacks.

The following example illustrates how to do that. The example uses locking to show in which way the callbacks and the event loop can run concurrently. For the event loop, we use a fixed array. For a real-world implementation, you should use a dynamically sized structure because the number of file descriptors needed for a crypto operation in @acronym{GPGME} is not predictable.

```
@example
#include <assert.h>
#include <errno.h>
#include <stdlib.h>
#include <pthread.h>
#include <sys/types.h>
#include <gpgme.h>

/* The following structure holds the result of a crypto operation. */
struct op_result
@{
    int done;
    gpgme_error_t err;
@};

/* The following structure holds the data associated with one I/O
callback. */
struct one_fd
@{
    int fd;
    int dir;
    gpgme_io_cb_t fnc;
    void *fnc_data;
    void *loop;
@};

struct event_loop
@{
    pthread_mutex_t lock;
#define MAX_FDS 32
    /* Unused slots are marked with FD being -1. */
    struct one_fd fds[MAX_FDS];
@};
```

@end example

The following functions implement the I/O callback interface.

@example

```
gpgme_error_t  
add_io_cb (void *data, int fd, int dir, gpgme_io_cb_t fnc, void *fnc_data,  
          void **r_tag)
```

```
@{
```

```
struct event_loop *loop = data;  
struct one_fd *fds = loop->fds;  
int i;
```

```
pthread_mutex_lock (&loop->lock);
```

```
for (i = 0; i < MAX_FDS; i++)
```

```
  @{
```

```
    if (fds[i].fd == -1)
```

```
  @{
```

```
    fds[i].fd = fd;  
    fds[i].dir = dir;  
    fds[i].fnc = fnc;  
    fds[i].fnc_data = fnc_data;  
    fds[i].loop = loop;  
    break;
```

```
  @ }
```

```
  @ }
```

```
pthread_mutex_unlock (&loop->lock);
```

```
if (i == MAX_FDS)
```

```
  return gpg_error (GPG_ERR_GENERAL);
```

```
*r_tag = &fds[i];
```

```
return 0;
```

```
@ }
```

```
void
```

```
remove_io_cb (void *tag)
```

```
@{
```

```
struct one_fd *fd = tag;  
struct event_loop *loop = fd->loop;
```

```
pthread_mutex_lock (&loop->lock);
```

```
fd->fd = -1;
```

```
pthread_mutex_unlock (&loop->lock);
```

```
@ }
```

```
void
```

```
event_io_cb (void *data, gpgme_event_io_t type, void *type_data)
```

```
@{
```

```
struct op_result *result = data;
```

```

/* We don't support list operations here. */
if (type == GPGME_EVENT_DONE)
  @{
    result->done = 1;
    result->err = *type_data;
  @}
@}
@end example

```

The final missing piece is the event loop, which will be presented next. We only support waiting for the success of a single operation.

```

@example
int
do_select (struct event_loop *loop)
@{
  fd_set rfd;
  fd_set wfd;
  int i, n;
  int any = 0;
  struct timeval tv;
  struct one_fd *fdlist = loop->fds;

  pthread_mutex_lock (&loop->lock);
  FD_ZERO (&rfd);
  FD_ZERO (&wfd);
  for (i = 0; i < MAX_FDS; i++)
    if (fdlist[i].fd != -1)
      FD_SET (fdlist[i].fd, fdlist[i].dir ? &rfd : &wfd);
  pthread_mutex_unlock (&loop->lock);

  tv.tv_sec = 0;
  tv.tv_usec = 1000;

  do
    @{
      n = select (FD_SETSIZE, &rfd, &wfd, NULL, &tv);
    @}
  while (n < 0 && errno == EINTR);

  if (n < 0)
    return n; /* Error or timeout. */

  pthread_mutex_lock (&loop->lock);
  for (i = 0; i < MAX_FDS && n; i++)
    @{
      if (fdlist[i].fd != -1)

```

```

@{
if (FD_ISSET (fdlist[i].fd, fdlist[i].dir ? &rfd : &wfds))
    @{
        assert (n);
        n--;
        any = 1;
        /* The I/O callback handler can register/remove callbacks,
           so we have to unlock the file descriptor list. */
        pthread_mutex_unlock (&loop->lock);
        (*fdlist[i].fnc) (fdlist[i].fnc_data, fdlist[i].fd);
        pthread_mutex_lock (&loop->lock);
    @}
@}
@}
@}
pthread_mutex_unlock (&loop->lock);
return any;
@}

void
wait_for_op (struct event_loop *loop, struct op_result *result)
@{
int ret;

do
    @{
        ret = do_select (loop);
    @}
while (ret >= 0 && !result->done);
@}
@end example

```

The main function shows how to put it all together.

```

@example
int
main (int argc, char *argv[])
@{
    struct event_loop loop;
    struct op_result result;
    gpgme_ctx_t ctx;
    gpgme_error_t err;
    gpgme_data_t sig, text;
    int i;
    pthread_mutexattr_t attr;
    struct gpgme_io_cbs io_cbs =
    @{
        add_io_cb,
        &loop,

```

```

remove_io_cb,
event_io_cb,
&result
@};

init_gpgme ();

/* Initialize the loop structure. */

/* The mutex must be recursive, since remove_io_cb (which acquires a
   lock) can be called while holding a lock acquired in do_select. */
pthread_mutexattr_init (&attr);
pthread_mutexattr_settype (&attr, PTHREAD_MUTEX_RECURSIVE);
pthread_mutex_init (&loop.lock, &attr);
pthread_mutexattr_destroy (&attr);

for (i = 0; i < MAX_FDS; i++)
    loop.fds[i].fd = -1;

/* Initialize the result structure. */
result.done = 0;

err = gpgme_data_new_from_file (&sig, "signature", 1);
if (!err)
    err = gpgme_data_new_from_file (&text, "text", 1);
if (!err)
    err = gpgme_new (&ctx);
if (!err)
    @ {
        gpgme_set_io_cbs (ctx, &io_cbs);
        err = gpgme_op_verify_start (ctx, sig, text, NULL);
    }
if (err)
    @ {
        fprintf (stderr, "gpgme error: %s: %s\n",
                gpgme_strerror (err), gpgme_strerror (err));
        exit (1);
    }

wait_for_op (&loop, &result);
if (!result.done)
    @ {
        fprintf (stderr, "select error\n");
        exit (1);
    }
if (!result.err)
    @ {
        fprintf (stderr, "verification failed: %s: %s\n",

```

```

        gpgme_strsource (result.err), gpgme_strerror (result.err));
    exit (1);
    @}
    /* Evaluate verify result. */
    @dots{ }
    return 0;
    @}
@end example

```

```

@node I/O Callback Example GTK+
@subsection I/O Callback Example GTK+
@cindex GTK+, using @acronym{GPGME} with

```

The I/O callback interface can be used to integrate @acronym{GPGME} with the GTK+ event loop. The following code snippets shows how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any GTK+ specific setup.

```
@example
```

```
#include <gtk/gtk.h>
```

```
struct my_gpgme_io_cb
```

```
@{
```

```
gpgme_io_cb_t fnc;
```

```
void *fnc_data;
```

```
guint input_handler_id
```

```
@};
```

```
void
```

```
my_gpgme_io_cb (gpointer data, gint source, GdkInputCondition condition)
```

```
@{
```

```
struct my_gpgme_io_cb *iocb = data;
```

```
(*iocb->fnc) (iocb->data, source);
```

```
@}
```

```
void
```

```
my_gpgme_remove_io_cb (void *data)
```

```
@{
```

```
struct my_gpgme_io_cb *iocb = data;
```

```
gtk_input_remove (data->input_handler_id);
```

```
@}
```

```
void
```

```
my_gpgme_register_io_callback (void *data, int fd, int dir, gpgme_io_cb_t fnc,
```

```
void *fnc_data, void **tag)
```

```

@{
struct my_gpgme_io_cb *iocb = g_malloc (sizeof (struct my_gpgme_io_cb));
iocb->fnc = fnc;
iocb->data = fnc_data;
iocb->input_handler_id = gtk_input_add_full (fd, dir
      ? GDK_INPUT_READ
      : GDK_INPUT_WRITE,
      my_gpgme_io_callback,
      0, iocb, NULL);

*tag = iocb;
return 0;
@}
@end example

```

```

@node I/O Callback Example GDK
@subsection I/O Callback Example GDK
@cindex GDK, using @acronym{GPGME} with

```

The I/O callback interface can also be used to integrate @acronym{GPGME} with the GDK event loop. The following code snippets shows how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any GDK specific setup.

It is very similar to the GTK+ example in the previous section.

```

@example
#include <gdk/gdk.h>

struct my_gpgme_io_cb
@{
  gpgme_io_cb_t fnc;
  void *fnc_data;
  gint tag;
@};

void
my_gpgme_io_cb (gpointer data, gint source, GdkInputCondition condition)
@{
  struct my_gpgme_io_cb *iocb = data;
  (*(iocb->fnc)) (iocb->data, source);
@}

void
my_gpgme_remove_io_cb (void *data)
@{

```



```

struct my_gpgme_io_cb *iocb = data;
gdk_input_remove (data->tag);
@}

void
my_gpgme_register_io_callback (void *data, int fd, int dir, gpgme_io_cb_t fnc,
                               void *fnc_data, void **tag)
@{
struct my_gpgme_io_cb *iocb = g_malloc (sizeof (struct my_gpgme_io_cb));
iocb->fnc = fnc;
iocb->data = fnc_data;
iocb->tag = gtk_input_add_full (fd, dir ? GDK_INPUT_READ : GDK_INPUT_WRITE,
                               my_gpgme_io_callback, iocb, NULL);

*tag = iocb;
return 0;
@}
@end example

```

```

@node I/O Callback Example Qt
@subsection I/O Callback Example Qt
@cindex Qt, using @acronym{GPGME} with

```

The I/O callback interface can also be used to integrate @acronym{GPGME} with the Qt event loop. The following code snippets show how this can be done using the appropriate register and remove I/O callback functions. In this example, the private data of the register I/O callback function is unused. The event notifications is missing because it does not require any Qt specific setup.

```

@example
#include <qsocketnotifier.h>
#include <qapplication.h>

struct IOCB @{
IOCB( GpgmeIOCb f, void * d, QSocketNotifier * n )
: func( f ), data( d ), notifier( n ) @{}
GpgmeIOCb func;
void * data;
QSocketNotifier * notifier;
@}

class MyApp : public QApplication @{

// ...

static void registerGpgmeIOCallback( void * data, int fd, int dir,
                                     GpgmeIOCb func, void * func_data,

```

```

        void ** tag ) @{
    QSocketNotifier * n =
        new QSocketNotifier( fd, dir ? QSocketNotifier::Read
            : QSocketNotifier::Write );
    connect( n, SIGNAL(activated(int)),
        qApp, SLOT(slotGpgmeIOCallback(int)) );
    qApp->mIOCBs.push_back( IOCB( func, func_data, n ) );
    *tag = (void*)n;
@}

static void removeGpgmeIOCallback( void * tag ) @{
    if ( !tag ) return;
    QSocketNotifier * n = static_cast<QSocketNotifier*>( tag );
    for ( QValueList<IOCB>::iterator it = qApp->mIOCBs.begin() ;
        it != qApp->mIOCBs.end() ; ++it )
        if ( it->notifier == n ) @{
            delete it->notifier;
            qApp->mIOCBs.erase( it );
            return;
        }
@}

public slots:
void slotGpgmeIOCallback( int fd ) @{
    for ( QValueList<IOCB>::const_iterator it = mIOCBs.begin() ;
        it != mIOCBs.end() ; ++it )
        if ( it->notifier && it->notifier->socket() == fd )
            (*(it->func))( it->func_data, fd );
@}

// ...

private:
QValueList<IOCB> mIOCBs;
// ...
@};
@end example

```

```

@node Cancellation
@subsection Cancellation
@cindex cryptographic operation, aborting
@cindex cryptographic operation, cancelling
@cindex aborting operations
@cindex cancelling operations

```

Sometimes you do not want to wait for an operation to finish.

@acronym{GPGME} provides two different functions to achieve that. The

function `gpgme_cancel` takes effect immediately. When it returns, the operation is effectively canceled. However, it has some limitations and can not be used with synchronous operations. In contrast, the function `gpgme_cancel_async` can be used with any context and from any thread, but it is not guaranteed to take effect immediately. Instead, cancellation occurs at the next possible time (typically the next time I/O occurs in the target context).

```
@deftypefun gpgme_ctx_t gpgme_cancel (@w{gpgme_ctx_t @var{ctx}})
@since{0.4.5}
```

The function `gpgme_cancel` attempts to cancel a pending operation in the context `@var{ctx}`. This only works if you use the global event loop or your own event loop.

If you use the global event loop, you must not call `gpgme_wait` during cancellation. After successful cancellation, you can call `gpgme_wait` (optionally waiting on `@var{ctx}`), and the context `@var{ctx}` will appear as if it had finished with the error code `GPG_ERR_CANCEL`.

If you use an external event loop, you must ensure that no I/O callbacks are invoked for this context (for example by halting the event loop). On successful cancellation, all registered I/O callbacks for this context will be unregistered, and a `GPGME_EVENT_DONE` event with the error code `GPG_ERR_CANCEL` will be signalled.

The function returns an error code if the cancellation failed (in this case the state of `@var{ctx}` is not modified).

```
@end deftypefun
```

```
@deftypefun gpgme_ctx_t gpgme_cancel_async (@w{gpgme_ctx_t @var{ctx}})
@since{1.1.7}
```

The function `gpgme_cancel_async` attempts to cancel a pending operation in the context `@var{ctx}`. This can be called by any thread at any time after starting an operation on the context, but will not take effect immediately. The actual cancellation happens at the next time GPGME processes I/O in that context.

The function returns an error code if the cancellation failed (in this case the state of `@var{ctx}` is not modified).

```
@end deftypefun
```

```
@c *****
@c ***** Appendices *****
@c *****
```

@include uiserver.texti

@node Debugging

@appendix How to solve problems

@cindex debug

@cindex GPGME\_DEBUG

Everyone knows that software often does not do what it should do and thus there is a need to track down problems. This is in particular true for applications using a complex library like @acronym{GPGME} and of course also for the library itself. Here we give a few hints on how to solve such problems.

First of all you should make sure that the keys you want to use are installed in the GnuPG engine and are usable. Thus the first test is to run the desired operation using @command{gpg} or @command{gpgsm} on the command line. If you can't figure out why things don't work, you may use @acronym{GPGME}'s built in trace feature. This feature is either enabled using the environment variable @code{GPGME\_DEBUG} or, if this is not possible, by calling the function @code{gpgme\_set\_global\_flag}. The value is the trace level and an optional file name. If no file name is given the trace output is printed to @code{stderr}.

@noindent

For example

@smallexample

```
GPGME_DEBUG=9:/home/user/mygpgme.log
```

@end smallexample

@noindent

(Note that under Windows you use a semicolon in place of the colon to separate the fields.)

A trace level of 9 is pretty verbose and thus you may want to start off with a lower level. The exact definition of the trace levels and the output format may change with any release; you need to check the source code for details. In any case the trace log should be helpful to understand what is going on. Warning: The trace log may reveal sensitive details like passphrases or other data you use in your application. If you are asked to send a log file, make sure that you run your tests only with play data.

@node Deprecated Functions

@appendix Deprecated Functions

@cindex deprecated

For backward compatibility `@acronym{GPGME}` has a number of functions, data types and constants which are deprecated and should not be used anymore. We document here those which are really old to help understanding old code and to allow migration to their modern counterparts.

**Warning:** These interfaces will be removed in a future version of `@acronym{GPGME}`.

```
@deftypefun void gpgme_key_release (@w{gpgme_key_t @var{key}})
The function gpgme_key_release is equivalent to
gpgme_key_unref.
@end deftypefun
```

```
@deftypefun void gpgme_trust_item_release (@w{gpgme_trust_item_t @var{item}})
The function gpgme_trust_item_release is an alias for
gpgme_trust_item_unref.
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_import_ext (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_data_t
@var{keydata}}, @w{int *@var{nr}})
@since{0.3.9}
```

The function `gpgme_op_import_ext` is equivalent to:

```
@example
gpgme_error_t err = gpgme_op_import (ctx, keydata);
if (!err)
  @ {
    gpgme_import_result_t result = gpgme_op_import_result (ctx);
    *nr = result->considered;
  @ }
@end example
@end deftypefun
```

```
@deftp {Data type} {gpgme_error_t (*gpgme_edit_cb_t) @
(@w{void *@var{handle}}, @
@w{gpgme_status_code_t @var{status}}, @
@w{const char *@var{args}}, @
@w{int @var{fd}})}
@tindex gpgme_edit_cb_t
```

The `gpgme_edit_cb_t` type is the type of functions which `@acronym{GPGME}` calls if it a key edit operation is on-going. The status code `@var{status}` and the argument line `@var{args}` are passed through by `@acronym{GPGME}` from the crypto engine. The file descriptor `@var{fd}` is -1 for normal status messages. If `@var{status}`

indicates a command rather than a status message, the response to the command should be written to `@var{fd}`. The `@var{handle}` is provided by the user at start of operation.

The function should return `@code{GPG_ERR_FALSE}` if it did not handle the status code, `@code{0}` for success, or any other error value.

`@end deftp`

```
@deftypefun gpgme_error_t gpgme_op_edit (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t @var{key}},
@w{gpgme_edit_cb_t @var{fnc}}, @w{void *@var{handle}}, @w{gpgme_data_t @var{out}})
@since{0.3.9}
```

Note: This function is deprecated, please use `@code{gpgme_op_interact}` instead.

The function `@code{gpgme_op_edit}` processes the key `@var{KEY}` interactively, using the edit callback function `@var{FNC}` with the handle `@var{HANDLE}`. The callback is invoked for every status and command request from the crypto engine. The output of the crypto engine is written to the data object `@var{out}`.

Note that the protocol between the callback function and the crypto engine is specific to the crypto engine and no further support in implementing this protocol correctly is provided by `@acronym{GPGME}`.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the edit operation completes successfully, `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}` or `@var{key}` is not a valid pointer, and any error returned by the crypto engine or the edit callback handler.

`@end deftypefun`

```
@deftypefun gpgme_error_t gpgme_op_edit_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
@var{key}}, @w{gpgme_edit_cb_t @var{fnc}}, @w{void *@var{handle}}, @w{gpgme_data_t @var{out}})
```

`@since{0.3.9}`

Note: This function is deprecated, please use `@code{gpgme_op_interact_start}` instead.

The function `@code{gpgme_op_edit_start}` initiates a `@code{gpgme_op_edit}` operation. It can be completed by calling `@code{gpgme_wait}` on the context. `@xref{Waiting For Completion}`.

The function returns the error code `@code{GPG_ERR_NO_ERROR}` if the operation was started successfully, and `@code{GPG_ERR_INV_VALUE}` if `@var{ctx}` or `@var{key}` is not a valid pointer.

`@end deftypefun`

```
@deftypefun gpgme_error_t gpgme_op_card_edit (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
@var{key}}, @w{gpgme_edit_cb_t @var{fnc}}, @w{void *@var{handle}}, @w{gpgme_data_t @var{out}})
Note: This function is deprecated, please use @code{gpgme_op_interact}
with the flag @code{GPGME_INTERACT_CARD} instead.
```

The function @code{gpgme\_op\_card\_edit} is analogous to  
@code{gpgme\_op\_edit}, but should be used to process the smart card corresponding to the key @var{key}.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_op_card_edit_start (@w{gpgme_ctx_t @var{ctx}}, @w{gpgme_key_t
@var{key}}, @w{gpgme_edit_cb_t @var{fnc}}, @w{void *@var{handle}}, @w{gpgme_data_t @var{out}})
Note: This function is deprecated, please use @code{gpgme_op_interact_start}
with the flag @code{GPGME_INTERACT_CARD} instead.
```

The function @code{gpgme\_op\_card\_edit\_start} initiates a  
@code{gpgme\_op\_card\_edit} operation. It can be completed by calling  
@code{gpgme\_wait} on the context. @xref{Waiting For Completion}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the  
operation was started successfully, and @code{GPG\_ERR\_INV\_VALUE} if  
@var{ctx} or @var{key} is not a valid pointer.

```
@end deftypefun
```

```
@deftypefun gpgme_error_t gpgme_data_new_with_read_cb (@w{gpgme_data_t *@var{dh}}, @w{int
(*@var{readfunc})} (@w{void *@var{hook}}, @w{char *@var{buffer}}, @w{size_t @var{count}}, @w{size_t
*@var{nread}}), @w{void *@var{hook_value}})
The function @code{gpgme_data_new_with_read_cb} creates a new
@code{gpgme_data_t} object and uses the callback function @var{readfunc}
to retrieve the data on demand. As the callback function can supply
the data in any way it wants, this is the most flexible data type
@acronym{GPGME} provides. However, it can not be used to write data.
```

The callback function receives @var{hook\_value} as its first argument  
whenever it is invoked. It should return up to @var{count} bytes in  
@var{buffer}, and return the number of bytes actually read in  
@var{nread}. It may return @code{0} in @var{nread} if no data is  
currently available. To indicate @code{EOF} the function should  
return with an error code of @code{-1} and set @var{nread} to  
@code{0}. The callback function may support to reset its internal  
read pointer if it is invoked with @var{buffer} and @var{nread} being  
@code{NULL} and @var{count} being @code{0}.

The function returns the error code @code{GPG\_ERR\_NO\_ERROR} if the  
data object was successfully created, @code{GPG\_ERR\_INV\_VALUE} if  
@var{dh} or @var{readfunc} is not a valid pointer, and

@code{GPG\_ERR\_ENOMEM} if not enough memory is available.

@end deftypefun

@deftypefun gpgme\_error\_t gpgme\_data\_rewind (@w{gpgme\_data\_t @var{dh}})

The function @code{gpgme\_data\_rewind} is equivalent to:

@example

```
return (gpgme_data_seek (dh, 0, SEEK_SET) == -1)
```

```
  ? gpgme_error_from_errno (errno) : 0;
```

@end example

@end deftypefun

@defstp {Data type} gpgme\_attr\_t

The @code{gpgme\_attr\_t} type is used to specify a key or trust item attribute. The following attributes are defined:

@table @code

@item GPGME\_ATTR\_KEYID

This is the key ID of a sub key. It is representable as a string.

For trust items, the trust item refers to the key with this ID.

@item GPGME\_ATTR\_FPR

This is the fingerprint of a sub key. It is representable as a string.

@item GPGME\_ATTR\_ALGO

This is the crypto algorithm for which the sub key can be used. It is representable as a string and as a number. The numbers correspond to the @code{enum gcry\_pk\_algos} values in the gcrypt library.

@item GPGME\_ATTR\_LEN

This is the key length of a sub key. It is representable as a number.

@item GPGME\_ATTR\_CREATED

This is the timestamp at creation time of a sub key. It is representable as a number.

@item GPGME\_ATTR\_EXPIRE

This is the expiration time of a sub key. It is representable as a number.

@item GPGME\_ATTR\_OTRUST

XXX FIXME (also for trust items)

@item GPGME\_ATTR\_USERID



This is a user ID. There can be more than one user IDs in a `@var{gpgme_key_t}` object. The first one (with index 0) is the primary user ID. The user ID is representable as a number.

For trust items, this is the user ID associated with this trust item.

`@item GPGME_ATTR_NAME`

This is the name belonging to a user ID. It is representable as a string.

`@item GPGME_ATTR_EMAIL`

This is the email address belonging to a user ID. It is representable as a string.

`@item GPGME_ATTR_COMMENT`

This is the comment belonging to a user ID. It is representable as a string.

`@item GPGME_ATTR_VALIDITY`

This is the validity belonging to a user ID. It is representable as a string and as a number. See below for a list of available validities.

For trust items, this is the validity that is associated with this trust item.

`@item GPGME_ATTR_UID_REVOKED`

This specifies if a user ID is revoked. It is representable as a number, and is `@code{1}` if the user ID is revoked, and `@code{0}` otherwise.

`@item GPGME_ATTR_UID_INVALID`

This specifies if a user ID is invalid. It is representable as a number, and is `@code{1}` if the user ID is invalid, and `@code{0}` otherwise.

`@item GPGME_ATTR_LEVEL`

This is the trust level of a trust item.

`@item GPGME_ATTR_TYPE`

This returns information about the type of key. For the string function this will either be "PGP" or "X.509". The integer function returns 0 for PGP and 1 for X.509. It is also used for the type of a trust item.

`@item GPGME_ATTR_IS_SECRET`

This specifies if the key is a secret key. It is representable as a number, and is `@code{1}` if the key is revoked, and `@code{0}` otherwise.

`@item GPGME_ATTR_KEY_REVOKED`

This specifies if a sub key is revoked. It is representable as a

number, and is @code{1} if the key is revoked, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_INVALID

This specifies if a sub key is invalid. It is representable as a number, and is @code{1} if the key is invalid, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_EXPIRED

This specifies if a sub key is expired. It is representable as a number, and is @code{1} if the key is expired, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_DISABLED

This specifies if a sub key is disabled. It is representable as a number, and is @code{1} if the key is disabled, and @code{0} otherwise.

@item GPGME\_ATTR\_KEY\_CAPS

This is a description of the capabilities of a sub key. It is representable as a string. The string contains the letter `e" if the key can be used for encryption, `s" if the key can be used for signatures, and `c" if the key can be used for certifications.

@item GPGME\_ATTR\_CAN\_ENCRYPT

This specifies if a sub key can be used for encryption. It is representable as a number, and is @code{1} if the sub key can be used for encryption, and @code{0} otherwise.

@item GPGME\_ATTR\_CAN\_SIGN

This specifies if a sub key can be used to create data signatures. It is representable as a number, and is @code{1} if the sub key can be used for signatures, and @code{0} otherwise.

@item GPGME\_ATTR\_CAN\_CERTIFY

This specifies if a sub key can be used to create key certificates. It is representable as a number, and is @code{1} if the sub key can be used for certifications, and @code{0} otherwise.

@item GPGME\_ATTR\_SERIAL

The X.509 issuer serial attribute of the key. It is representable as a string.

@item GPGME\_ATTR\_ISSUE

The X.509 issuer name attribute of the key. It is representable as a string.

@item GPGME\_ATTR\_CHAINID

The X.509 chain ID can be used to build the certification chain. It is representable as a string.

@end table

@end deftp

```
@deftypefun {const char *} gpgme_key_get_string_attr (@w{gpgme_key_t @var{key}}, @w{gpgme_attr_t @var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function `gpgme_key_get_string_attr` returns the value of the string-representable attribute `@var{what}` of key `@var{key}`. If the attribute is an attribute of a sub key or an user ID, `@var{idx}` specifies the sub key or user ID of which the attribute value is returned. The argument `@var{reserved}` is reserved for later use and should be `NULL`.

The string returned is only valid as long as the key is valid.

The function returns `0` if an attribute can't be returned as a string, `@var{key}` is not a valid pointer, `@var{idx}` out of range, or `@var{reserved}` not `NULL`.

```
@end deftypefun
```

```
@deftypefun {unsigned long} gpgme_key_get_ulong_attr (@w{gpgme_key_t @var{key}}, @w{gpgme_attr_t @var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function `gpgme_key_get_ulong_attr` returns the value of the number-representable attribute `@var{what}` of key `@var{key}`. If the attribute is an attribute of a sub key or an user ID, `@var{idx}` specifies the sub key or user ID of which the attribute value is returned. The argument `@var{reserved}` is reserved for later use and should be `NULL`.

The function returns `0` if the attribute can't be returned as a number, `@var{key}` is not a valid pointer, `@var{idx}` out of range, or `@var{reserved}` not `NULL`.

```
@end deftypefun
```

```
@c
```

```
@c Key Signatures
```

```
@c
```

The signatures on a key are only available if the key was retrieved via a listing operation with the `GPGME_KEYLIST_MODE_SIGS` mode enabled, because it is expensive to retrieve all signatures of a key.

So, before using the below interfaces to retrieve the signatures on a key, you have to make sure that the key was listed with signatures enabled. One convenient, but blocking, way to do this is to use the function `gpgme_get_key`.

```
@defpt {Data type} gpgme_attr_t
```

The `gpgme_attr_t` type is used to specify a key signature attribute. The following attributes are defined:

@table @code

@item GPGME\_ATTR\_KEYID

This is the key ID of the key which was used for the signature. It is representable as a string.

@item GPGME\_ATTR\_ALGO

This is the crypto algorithm used to create the signature. It is representable as a string and as a number. The numbers correspond to the @code{enum gcry\_pk\_algos} values in the gcrypt library.

@item GPGME\_ATTR\_CREATED

This is the timestamp at creation time of the signature. It is representable as a number.

@item GPGME\_ATTR\_EXPIRE

This is the expiration time of the signature. It is representable as a number.

@item GPGME\_ATTR\_USERID

This is the user ID associated with the signing key. The user ID is representable as a number.

@item GPGME\_ATTR\_NAME

This is the name belonging to a user ID. It is representable as a string.

@item GPGME\_ATTR\_EMAIL

This is the email address belonging to a user ID. It is representable as a string.

@item GPGME\_ATTR\_COMMENT

This is the comment belonging to a user ID. It is representable as a string.

@item GPGME\_ATTR\_KEY\_REVOKED

This specifies if a key signature is a revocation signature. It is representable as a number, and is @code{1} if the key is revoked, and @code{0} otherwise.

@c @item GPGME\_ATTR\_KEY\_EXPIRED

@c This specifies if a key signature is expired. It is representable as @c a number, and is @code{1} if the key is revoked, and @code{0} @c otherwise.

@c

@item GPGME\_ATTR\_SIG\_CLASS

This specifies the signature class of a key signature. It is representable as a number. The meaning is specific to the crypto engine.

@item GPGME\_ATTR\_SIG\_CLASS

This specifies the signature class of a key signature. It is representable as a number. The meaning is specific to the crypto engine.

@item GPGME\_ATTR\_SIG\_STATUS

This is the same value as returned by @code{gpgme\_get\_sig\_status}.

@end table

@end deftp

```
@deftypefun {const char *} gpgme_key_sig_get_string_attr (@w{gpgme_key_t @var{key}}, @w{int @var{uid_idx}}, @w{gpgme_attr_t @var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function @code{gpgme\_key\_sig\_get\_string\_attr} returns the value of the string-representable attribute @var{what} of the signature @var{idx} on the user ID @var{uid\_idx} in the key @var{key}. The argument @var{reserved} is reserved for later use and should be @code{NULL}.

The string returned is only valid as long as the key is valid.

The function returns @code{0} if an attribute can't be returned as a string, @var{key} is not a valid pointer, @var{uid\_idx} or @var{idx} out of range, or @var{reserved} not @code{NULL}.

@end deftypefun

```
@deftypefun {unsigned long} gpgme_key_sig_get_ulong_attr (@w{gpgme_key_t @var{key}}, @w{int @var{uid_idx}}, @w{gpgme_attr_t @var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function @code{gpgme\_key\_sig\_get\_ulong\_attr} returns the value of the number-representable attribute @var{what} of the signature @var{idx} on the user ID @var{uid\_idx} in the key @var{key}. The argument @var{reserved} is reserved for later use and should be @code{NULL}.

The function returns @code{0} if an attribute can't be returned as a string, @var{key} is not a valid pointer, @var{uid\_idx} or @var{idx} out of range, or @var{reserved} not @code{NULL}.

@end deftypefun

@c node Information About Trust Items

@c subsection Information About Trust Items

@c cindex trust item, information about

@c cindex trust item, attributes

@c cindex attributes, of a trust item

Trust items have attributes which can be queried using the interfaces below. The attribute identifiers are shared with those for key attributes. @xref{Information About Keys}.

```
@deftypefun {const char *} gpgme_trust_item_get_string_attr (@w{gpgme_trust_item_t @var{item}},
@w{gpgme_attr_t @var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function `gpgme_trust_item_get_string_attr` returns the value of the string-representable attribute `@var{what}` of trust item `@var{item}`. The arguments `@var{idx}` and `@var{reserved}` are reserved for later use and should be `0` and `NULL` respectively.

The string returned is only valid as long as the key is valid.

The function returns `0` if an attribute can't be returned as a string, `@var{key}` is not a valid pointer, `@var{idx}` out of range, or `@var{reserved}` not `NULL`.

```
@end deftypefun
```

```
@deftypefun int gpgme_trust_item_get_int_attr (@w{gpgme_trust_item_t @var{item}}, @w{gpgme_attr_t
@var{what}}, @w{const void *@var{reserved}}, @w{int @var{idx}})
```

The function `gpgme_trust_item_get_int_attr` returns the value of the number-representable attribute `@var{what}` of trust item `@var{item}`. If the attribute occurs more than once in the trust item, the index is specified by `@var{idx}`. However, currently no such attribute exists, so `@var{idx}` should be `0`. The argument `@var{reserved}` is reserved for later use and should be `NULL`.

The function returns `0` if the attribute can't be returned as a number, `@var{key}` is not a valid pointer, `@var{idx}` out of range, or `@var{reserved}` not `NULL`.

```
@end deftypefun
```

```
@deftp {Data type} {enum gpgme_sig_stat_t}
```

```
@tindex gpgme_sig_stat_t
```

The `gpgme_sig_stat_t` type holds the result of a signature check, or the combined result of all signatures. The following results are possible:

```
@table @code
```

```
@item GPGME_SIG_STAT_NONE
```

This status should not occur in normal operation.

```
@item GPGME_SIG_STAT_GOOD
```

This status indicates that the signature is valid. For the combined result this status means that all signatures are valid.

```
@item GPGME_SIG_STAT_GOOD_EXP
```

This status indicates that the signature is valid but expired. For the combined result this status means that all signatures are valid and expired.

@item GPGME\_SIG\_STAT\_GOOD\_EXPKEY

This status indicates that the signature is valid but the key used to verify the signature has expired. For the combined result this status means that all signatures are valid and all keys are expired.

@item GPGME\_SIG\_STAT\_BAD

This status indicates that the signature is invalid. For the combined result this status means that all signatures are invalid.

@item GPGME\_SIG\_STAT\_NOKEY

This status indicates that the signature could not be verified due to a missing key. For the combined result this status means that all signatures could not be checked due to missing keys.

@item GPGME\_SIG\_STAT\_NOSIG

This status indicates that the signature data provided was not a real signature.

@item GPGME\_SIG\_STAT\_ERROR

This status indicates that there was some other error which prevented the signature verification.

@item GPGME\_SIG\_STAT\_DIFF

For the combined result this status means that at least two signatures have a different status. You can get each key's status with

```
@code{gpgme_get_sig_status}.
```

```
@end table
```

```
@end deftp
```

```
@deftypefun {const char *} gpgme_get_sig_status (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{idx}},  
@w{gpgme_sig_stat_t *@var{r_stat}}, @w{time_t *@var{r_created}})
```

The function @code{gpgme\_get\_sig\_status} is equivalent to:

@example

```
gpgme_verify_result_t result;
```

```
gpgme_signature_t sig;
```

```
result = gpgme_op_verify_result (ctx);
```

```
sig = result->signatures;
```

```
while (sig && idx)
```

```
  @ {
```

```
    sig = sig->next;
```

```
    idx--;
```

```
  @ }
```

```
if (!sig || idx)
```

```
  return NULL;
```

```

if (r_stat)
  @ {
    switch (gpg_err_code (sig->status))
  @ {
case GPG_ERR_NO_ERROR:
  *r_stat = GPGME_SIG_STAT_GOOD;
  break;

case GPG_ERR_BAD_SIGNATURE:
  *r_stat = GPGME_SIG_STAT_BAD;
  break;

case GPG_ERR_NO_PUBKEY:
  *r_stat = GPGME_SIG_STAT_NOKEY;
  break;

case GPG_ERR_NO_DATA:
  *r_stat = GPGME_SIG_STAT_NOSIG;
  break;

case GPG_ERR_SIG_EXPIRED:
  *r_stat = GPGME_SIG_STAT_GOOD_EXP;
  break;

case GPG_ERR_KEY_EXPIRED:
  *r_stat = GPGME_SIG_STAT_GOOD_EXPKEY;
  break;

default:
  *r_stat = GPGME_SIG_STAT_ERROR;
  break;
  @ }
  @ }
if (r_created)
  *r_created = sig->timestamp;
return sig->fpr;
@end example
@end deotypefun

@deotypefun {const char *} gpgme_get_sig_string_attr (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{idx}},
@w{gpgme_attr_t @var{what}}, @w{int @var{whatidx}})
The function @code{gpgme_get_sig_string_attr} is equivalent to:

@example
gpgme_verify_result_t result;
gpgme_signature_t sig;

```



```
result = gpgme_op_verify_result (ctx);
sig = result->signatures;
```

```
while (sig && idx)
```

```
  @ {
    sig = sig->next;
    idx--;
  } @ }
```

```
if (!sig || idx)
  return NULL;
```

```
switch (what)
```

```
  @ {
    case GPGME_ATTR_FPR:
      return sig->fpr;
```

```
    case GPGME_ATTR_ERRTOK:
```

```
      if (whatidx == 1)
        return sig->wrong_key_usage ? "Wrong_Key_Usage" : "";
```

```
      else
```

```
return "";
```

```
default:
```

```
  break;
```

```
  } @ }
```

```
return NULL;
```

```
@end example
```

```
@end deftypefun
```

```
@deftypefun {const char *} gpgme_get_sig_ulong_attr (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{idx}},
@w{gpgme_attr_t @var{what}}, @w{int @var{whatidx}})
```

The function @code{gpgme\_get\_sig\_ulong\_attr} is equivalent to:

```
@example
```

```
gpgme_verify_result_t result;
```

```
gpgme_signature_t sig;
```

```
result = gpgme_op_verify_result (ctx);
```

```
sig = result->signatures;
```

```
while (sig && idx)
```

```
  @ {
    sig = sig->next;
    idx--;
  } @ }
```

```
if (!sig || idx)
```

```
  return 0;
```

```

switch (what)
@{
case GPGME_ATTR_CREATED:
    return sig->timestamp;

case GPGME_ATTR_EXPIRE:
    return sig->exp_timestamp;

case GPGME_ATTR_VALIDITY:
    return (unsigned long) sig->validity;

case GPGME_ATTR_SIG_STATUS:
    switch (sig->status)
@{
case GPG_ERR_NO_ERROR:
    return GPGME_SIG_STAT_GOOD;

case GPG_ERR_BAD_SIGNATURE:
    return GPGME_SIG_STAT_BAD;

case GPG_ERR_NO_PUBKEY:
    return GPGME_SIG_STAT_NOKEY;

case GPG_ERR_NO_DATA:
    return GPGME_SIG_STAT_NOSIG;

case GPG_ERR_SIG_EXPIRED:
    return GPGME_SIG_STAT_GOOD_EXP;

case GPG_ERR_KEY_EXPIRED:
    return GPGME_SIG_STAT_GOOD_EXPKEY;

default:
    return GPGME_SIG_STAT_ERROR;
@}

case GPGME_ATTR_SIG_SUMMARY:
    return sig->summary;

default:
    break;
@}
return 0;
@end example
@end deftypefun

@deftypefun {const char *} gpgme_get_sig_key (@w{gpgme_ctx_t @var{ctx}}, @w{int @var{idx}},
@w{gpgme_key_t *@var{r_key}})

```

The function `gpgme_get_sig_key` is equivalent to:

```
@example
gpgme_verify_result_t result;
gpgme_signature_t sig;

result = gpgme_op_verify_result (ctx);
sig = result->signatures;

while (sig && idx)
  @ {
    sig = sig->next;
    idx--;
  @ }
if (!sig || idx)
  return gpg_error (GPG_ERR_EOF);

return gpgme_get_key (ctx, sig->fpr, r_key, 0);
@end example
@end deftypefun
```

```
@include lesser.texi
```

```
@include gpl.texi
```

```
@node Concept Index
```

```
@unnumbered Concept Index
```

```
@printindex cp
```

```
@node Function and Data Index
```

```
@unnumbered Function and Data Index
```

```
@printindex fn
```

```
@bye
```

```
(21:protected-private-key(3:elg(1:p129:|B36I(s7}+ZJ/pvE;"tg7N ca"Gxvnyu&bB#h'7=89&oG
R<hO)(1:g1:)(1:y128:Ji]WU_UP}AQ\YMhAl|2e{ _tcMNDg][ QnWsK 4pY{ $bDCs)(9:protected25:openpgp-s2k3-
sha1-aes-cbc((4:sha18:JcE7:6452224)16: i[Q*vK)192:FJA!O!ZAF
biJ&Tsb!t
&9@R\~V+x>?sedDz-W(yqf?u^e?s1saV8<T0:tC5%ZMh?$|,y_e[1D)(12:protected-at15:20130812T105135)))
(private-key
(oid.1.2.840.113549.1.1.1
```

```

(n
#00e0ce96f90b6c9e02f3922beada93fe50a875eac6bcc18bb9a9cf2e84965caa2d1ff95a7f542465c6c0c19d276e4526ce
048868a7a914fd343cc3a87dd74291ffc565506d5bbb25cbac6a0e2dd1f8bcaab0d4a29c2f37c950f363484bf269f78914
40464baf79827e03a36e70b814938eebdc63e964247be75dc58b014b7ea251#)
(e #010001#)
(d
#046129F2489D71579BE0A75FE029BD6CDB574EBF57EA8A5B0FDA942CAB943B117D7BB95E5D28875E0F
9FC5FCC06A72F6D502464DABDED78EF6B716177B83D5BDC543DC5D3FED932E59F5897E92E6F58A0F334
24106A3B6FA2CBF877510E4AC21C3EE47851E97D12996222AC3566D4CCB0B83D164074ABF7DE655FC244
6DA1781#)
(p
#00e861b700e17e8afe6837e7512e35b6ca11d0ae47d8b85161c67baf64377213fe52d772f2035b3ca830af41d8a4120e
1c1c70d12cc22f00d28d31dd48a8d424f1#)
(q
#00f7a7ca5367c661f8e62df34f0d05c10c88e5492348dd7bdc942c9a8f369f935a07785d2db805215ed786e4285df16
58eed3ce84f469b81b50d358407b4ad361#)
(u
#304559a9ead56d2309d203811a641bb1a09626bc8eb36ffa23c968ec5bd891eebbafc73ae666e01ba7c8990bae06cc2
bbe10b75e69fcacb353a6473079d8e9b#)
)
)
# libgpgme.vers - List of symbols to export.
# Copyright (C) 2002, 2004, 2005, 2009, 2012 g10 Code GmbH
#
# This file is part of GPGME.
#
# GPGME is free software; you can redistribute it and/or modify
# it under the terms of the GNU Lesser general Public License as
# published by the Free Software Foundation; either version 2.1 of
# the License, or (at your option) any later version.
#
# GPGME is distributed in the hope that it will be useful,
# but WITHOUT ANY WARRANTY; without even the implied warranty of
# MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
# GNU Lesser General Public License for more details.
#
# You should have received a copy of the GNU Lesser General Public
# License along with this program; if not, see <https://www.gnu.org/licenses/>.

#-----
# Please remember to add new functions also to gpgme.def
#-----

GPGME_1.1 {
global:
    gpgme_set_engine_info;

    gpgme_ctx_get_engine_info;

```

gpgme\_ctx\_set\_engine\_info;

gpgme\_data\_set\_file\_name;  
gpgme\_data\_get\_file\_name;  
gpgme\_data\_identify;

gpgme\_sig\_notation\_clear;  
gpgme\_sig\_notation\_add;  
gpgme\_sig\_notation\_get;

gpgme\_free;

gpgme\_op\_getauditlog\_start;  
gpgme\_op\_getauditlog;

gpgme\_conf\_release;  
gpgme\_conf\_arg\_new;  
gpgme\_conf\_arg\_release;  
gpgme\_conf\_opt\_change;  
gpgme\_op\_conf\_load;  
gpgme\_op\_conf\_save;  
gpgme\_op\_conf\_dir;

gpgme\_cancel\_async;

gpgme\_op\_assuan\_result;  
gpgme\_op\_assuan\_transact;  
gpgme\_op\_assuan\_transact\_start;

gpgme\_check\_version\_internal;

gpgme\_io\_read;  
gpgme\_io\_write;

gpgme\_result\_ref;  
gpgme\_result\_unref;

gpgme\_op\_import\_keys;  
gpgme\_op\_import\_keys\_start;  
gpgme\_op\_export\_keys;  
gpgme\_op\_export\_keys\_start;

gpgme\_op\_assuan\_transact\_ext;

gpgme\_wait\_ext;

gpgme\_op\_vfs\_mount\_result;  
gpgme\_op\_vfs\_mount;

gpgme\_op\_vfs\_create;

gpgme\_key\_from\_uid;  
gpgme\_set\_sub\_protocol;  
gpgme\_get\_sub\_protocol;

gpgme\_op\_passwd\_start;  
gpgme\_op\_passwd;

gpgme\_set\_global\_flag;

gpgme\_io\_writen;

gpgme\_set\_pinentry\_mode;  
gpgme\_get\_pinentry\_mode;

gpgme\_get\_dirinfo;

gpgme\_op\_spawn\_start;  
gpgme\_op\_spawn;

gpgme\_set\_offline;  
gpgme\_get\_offline;

gpgme\_set\_status\_cb;  
gpgme\_get\_status\_cb;

gpgme\_pubkey\_algo\_string;  
gpgme\_set\_ctx\_flag;  
gpgme\_get\_ctx\_flag;  
gpgme\_data\_set\_flag;

gpgme\_op\_createkey\_start;  
gpgme\_op\_createkey;  
gpgme\_op\_createsubkey\_start;  
gpgme\_op\_createsubkey;  
gpgme\_op\_adduid\_start;  
gpgme\_op\_adduid;  
gpgme\_op\_revuid\_start;  
gpgme\_op\_revuid;  
gpgme\_op\_keysign\_start;  
gpgme\_op\_keysign;  
gpgme\_op\_tofu\_policy\_start;  
gpgme\_op\_tofu\_policy;  
gpgme\_op\_interact\_start;  
gpgme\_op\_interact;

gpgme\_addrspec\_from\_uid;

```

gpgme_set_sender;
gpgme_get_sender;

gpgme_op_query_swdb;
gpgme_op_query_swdb_result;

gpgme_op_set_uid_flag_start;
gpgme_op_set_uid_flag;

gpgme_op_decrypt_ext;
gpgme_op_decrypt_ext_start;

gpgme_data_new_from_estream;

};

GPGME_1.0 {
global:
gpgme_check_version;
gpgme_get_engine_info;
gpgme_engine_check_version;

gpgme_err_code_from_errno;
gpgme_err_code_to_errno;
gpgme_err_make_from_errno;
gpgme_error_from_errno;
gpgme_strerror;
gpgme_strerror_r;
gpgme_strerror;

gpgme_data_get_encoding;
gpgme_data_new;
gpgme_data_new_from_cbs;
gpgme_data_new_from_fd;
gpgme_data_new_from_file;
gpgme_data_new_from_filepart;
gpgme_data_new_from_mem;
gpgme_data_new_from_stream;
gpgme_data_read;
gpgme_data_release;
gpgme_data_release_and_get_mem;
gpgme_data_seek;
gpgme_data_set_encoding;
gpgme_data_write;

gpgme_get_protocol_name;

```

gpgme\_hash\_algo\_name;  
gpgme\_pubkey\_algo\_name;

gpgme\_new;  
gpgme\_get\_armor;  
gpgme\_get\_include\_certs;  
gpgme\_get\_io\_cbs;  
gpgme\_get\_keylist\_mode;  
gpgme\_get\_passphrase\_cb;  
gpgme\_get\_progress\_cb;  
gpgme\_get\_protocol;  
gpgme\_get\_textmode;  
gpgme\_release;  
gpgme\_set\_armor;  
gpgme\_set\_include\_certs;  
gpgme\_set\_io\_cbs;  
gpgme\_set\_keylist\_mode;  
gpgme\_set\_locale;  
gpgme\_set\_passphrase\_cb;  
gpgme\_set\_progress\_cb;  
gpgme\_set\_protocol;  
gpgme\_set\_textmode;  
gpgme\_signers\_add;  
gpgme\_signers\_clear;  
gpgme\_signers\_count;  
gpgme\_signers\_enum;

gpgme\_key\_ref;  
gpgme\_key\_unref;  
gpgme\_key\_release;

gpgme\_trust\_item\_ref;  
gpgme\_trust\_item\_unref;

gpgme\_cancel;  
gpgme\_op\_card\_edit;  
gpgme\_op\_card\_edit\_start;  
gpgme\_op\_decrypt;  
gpgme\_op\_decrypt\_result;  
gpgme\_op\_decrypt\_start;  
gpgme\_op\_decrypt\_verify;  
gpgme\_op\_decrypt\_verify\_start;  
gpgme\_op\_delete;  
gpgme\_op\_delete\_start;  
gpgme\_op\_delete\_ext;  
gpgme\_op\_delete\_ext\_start;  
gpgme\_op\_edit;  
gpgme\_op\_edit\_start;



gpgme\_op\_encrypt;  
gpgme\_op\_encrypt\_start;  
gpgme\_op\_encrypt\_ext;  
gpgme\_op\_encrypt\_ext\_start;  
gpgme\_op\_encrypt\_sign;  
gpgme\_op\_encrypt\_sign\_ext;  
gpgme\_op\_encrypt\_sign\_start;  
gpgme\_op\_encrypt\_sign\_ext\_start;  
gpgme\_op\_encrypt\_result;

gpgme\_op\_export;  
gpgme\_op\_export\_ext;  
gpgme\_op\_export\_ext\_start;  
gpgme\_op\_export\_start;  
gpgme\_op\_genkey;  
gpgme\_op\_genkey\_result;  
gpgme\_op\_genkey\_start;  
gpgme\_get\_key;  
gpgme\_op\_import;  
gpgme\_op\_import\_result;  
gpgme\_op\_import\_start;  
gpgme\_op\_keylist\_end;  
gpgme\_op\_keylist\_ext\_start;  
gpgme\_op\_keylist\_from\_data\_start;  
gpgme\_op\_keylist\_next;  
gpgme\_op\_keylist\_result;  
gpgme\_op\_keylist\_start;  
gpgme\_op\_sign;  
gpgme\_op\_sign\_result;  
gpgme\_op\_sign\_start;  
gpgme\_op\_trustlist\_end;  
gpgme\_op\_trustlist\_next;  
gpgme\_op\_trustlist\_start;  
gpgme\_op\_verify;  
gpgme\_op\_verify\_result;  
gpgme\_op\_verify\_start;  
gpgme\_wait;

gpgme\_data\_new\_with\_read\_cb;  
gpgme\_data\_rewind;  
gpgme\_get\_sig\_status;  
gpgme\_get\_sig\_string\_attr;  
gpgme\_get\_sig\_ulong\_attr;  
gpgme\_get\_sig\_key;  
gpgme\_key\_get\_string\_attr;  
gpgme\_key\_get\_ulong\_attr;  
gpgme\_key\_sig\_get\_string\_attr;  
gpgme\_key\_sig\_get\_ulong\_attr;

```

gpgme_op_import_ext;
gpgme_trust_item_get_int_attr;
gpgme_trust_item_get_string_attr;
gpgme_trust_item_release;

gpgme_err_code_from_syserror;
gpgme_err_set_errno;

local:
*;

};
#+TITLE: Stuff To Do
#+LATEX_COMPILER: xelatex
#+LATEX_CLASS: article
#+LATEX_CLASS_OPTIONS: [12pt]
#+LATEX_HEADER: \usepackage{xltextra}
#+LATEX_HEADER: \usepackage[margin=1in]{geometry}
#+LATEX_HEADER: \setmainfont[Ligatures={Common}]{Latin Modern Roman}

* Project Task List
:PROPERTIES:
:CUSTOM_ID: task-list
:END:

** DONE Documentation default format
CLOSED: [2018-02-15 Thu 21:29]
:PROPERTIES:
:CUSTOM_ID: todo-docs-default
:END:

Decide on a default file format for documentation. The two main
contenders being Org Mode, the default for the GnuPG Project and
reStructuredText, the default for Python projects. A third option
of DITA XML was considered due to a number of beneficial features
it provides.

The decision was made to use Org Mode in order to fully integrate
with the rest of the GPGME and GnuPG documentation. It is possible
to produce reST versions via Pandoc and DITA XML can be reached
through converting to either Markdown or XHTML first.

** TODO Documentation build systems
:PROPERTIES:
:CUSTOM_ID: todo-docs-build-systems
:END:

```

Though Org Mode is being used for the default documentation format, it still needs to end up as usable by end users. So the Org Mode files are used to produce the "source" files used by the two main contenders for documenting the bindings: Texinfo and ReStructuredText/Docutils.

\*\*\* TODO Texinfo documentation

:PROPERTIES:  
:CUSTOM\_ID: todo-docs-build-texinfo  
:END:

Need to add all of Texinfo's ... special systems to make it do its things.

\*\*\* TODO ReStructuredText documentation

:PROPERTIES:  
:CUSTOM\_ID: todo-docs-build-docutils  
:END:

Need to run Sphinx's quick start, add it to the requirements and tweak the index page for the rst files to point to the HOWTO and other files.

It might just be easier to do all that in Org Mode and convert the lot, then the Sphinx bits can be automated.

\*\* STARTED Documentation HOWTO

:PROPERTIES:  
:CUSTOM\_ID: todo-docs-howto  
:END:

- State "STARTED" from "TODO" [2018-03-08 Thu 13:59] \\  
Started yesterday.

Write a HOWTO style guide for the current Python bindings.

\*\*\* DONE Start python bindings HOWTO

CLOSED: [2018-03-07 Wed 18:14]  
:PROPERTIES:  
:CUSTOM\_ID: howto-start  
:END:

\*\*\* STARTED Include certain specific instructions in the HOWTO

:PROPERTIES:  
:CUSTOM\_ID: howto-requests  
:END:

Note: moved the S/MIME bits out to their own section of the TODO list and may be served better by separate HOWTO documentation anyway.

- State "STARTED" from "TODO" [2018-03-09 Fri 15:27]  
Some functions can be worked out from the handful of examples available, but many more can't and I've already begun receiving requests for certain functions to be explained.

\*\*\*\* DONE Standard scenarios

CLOSED: [2018-03-19 Mon 12:34]

:PROPERTIES:

:CUSTOM\_ID: howto-the-basics

:END:

- State "DONE" from "STARTED" [2018-03-19 Mon 12:34] \\  
All four of those are done.

- State "STARTED" from "TODO" [2018-03-09 Fri 15:26] \\  
Began with the example code, now to add the text.

What everyone expects: encryption, decryption, signing and verifying.

\*\*\*\* STARTED Key control

:PROPERTIES:

:CUSTOM\_ID: howto-key-control

:END:

- State "STARTED" from "TODO" [2018-03-19 Mon 12:35] \\  
Generating keys and subkeys are done, but revocation is still to be done.  
Generating keys, adding subkeys, revoking subkeys (and keeping the cert key), adding and revoking UIDs, signing/certifying keys.

\*\*\*\* DONE More key control

CLOSED: [2018-03-19 Mon 12:36]

:PROPERTIES:

:CUSTOM\_ID: howto-key-selection

:END:

- State "DONE" from "TODO" [2018-03-19 Mon 12:36] \\  
Key selection, searching, matching and counting is done.

Selecting keys to encrypt to or manipulate in other ways (e.g. as with key control or the basics).

\*\* TODO Documentation SWIG

:PROPERTIES:

:CUSTOM\_ID: todo-docs-swig  
:END:

Write documentation for the complete SWIG bindings demonstrating the correspondence with GPGME itself.

Note: it is likely that this will be more in the nature of something to be used in conjunction with the existing GPGME documentation which makes it easier for Python developers to use.

\*\* TODO GUI examples

:PROPERTIES:  
:CUSTOM\_ID: todo-gui-examples  
:END:

Create some examples of using Python bindings in a GUI application to either match or be similar to the old GTK2 examples available with PyME.

\*\* TODO Replace SWIG

:PROPERTIES:  
:CUSTOM\_ID: todo-replace-swig  
:END:

Selecting SWIG for this project in 2002 was understandable and effectively the only viable option. The options available now, however, are significantly improved and some of those would resolve a number of existing problems with using SWIG, particularly when running code on both POSIX compliant and Windows platforms.

The long term goal is to replace SWIG by reimplementing the Python bindings using a more suitable means of interfacing with the GPGME C source code.

\*\*\* TODO Replacement for SWIG

:PROPERTIES:  
:CUSTOM\_ID: todo-replace-swig-replacement  
:END:

Decide on a replacement for SWIG. Currently CFFI is looking like the most viable candidate, but some additional testing and checks are yet to be completed.

\*\* TODO API for an API

```
:PROPERTIES:  
:CUSTOM_ID: todo-api-squared  
:END:
```

A C API like GPGME is not what most modern developers think of when they hear the term API. Normally they think of something they can interact with like a RESTful web API. Though RESTful is unlikely given the nature of GPGME and the process of encryption, it may be possible to provide a more familiar interface which can be utilised by developers of other languages for which bindings are not available or for which it is too difficult to create proper bindings.

```
** TODO S/MIME  
:PROPERTIES:  
:CUSTOM_ID: s-mime  
:END:
```

Eventually add some of this, but the OpenPGP details are far more important at the moment.

```
* Project Task Details  
:PROPERTIES:  
:CUSTOM_ID: detailed-tasks  
:END:
```

```
** Working examples  
:PROPERTIES:  
:CUSTOM_ID: working-examples  
:END:
```

The old GUI examples were unable to be retained since they depended on GTK2 and Python 2's integration with GTK2.

Current GPGME examples so far only include command line tools or basic Python code for use with either Python 2.7 or Python 3.4 and above.

Future GUI examples ought to utilise available GUI modules and libraries supported by Python 3. This may include Qt frameworks, Tkinter, GTK3 or something else entirely.

```
** Documentation  
:PROPERTIES:  
:CUSTOM_ID: documentation  
:END:
```

The legacy documentation which no longer applies to the Python bindings has been removed.

Current and future documentation will adhere to the GnuPG standard of using Org Mode and not use the reStructuredText (reST) format more commonly associated with Python documentation. The reasons for this are that this project is best served as shipping with the rest of GPGME and the documentation ought to match that. There are also aspects of Org Mode's publishing features which are superior to the defaults of reST, including the capacity to generate fully validating strict XHTML output.

If reST files are required at a later point for future inclusion with other Python packages, then that format can be generated from the .org files with Pandoc before being leveraged by either Docutils, Sphinx or something else.

While there are some advanced typesetting features of reST which are not directly available to Org Mode, more often than not those features are best implemented with either HTML and CSS, with LaTeX to produce a PDF or via a number of XML solutions. Both reST and Org Mode have multiple paths by which to achieve all of these.

-----BEGIN PGP PRIVATE KEY BLOCK-----

```
IQOYBFrsKEkBCADKw4Wt8J6M/88qD8PO6lSMCxH1cpwH8iK0uPaFFYsJkkXo7kWf
PTAtrV+REqF/o80dvYcdLvRsV21pvncZz/HXLU1yQ18mC3XObrKokbdgrTTKA5XE
BzkNsqyaMMJauT18H4hYkSg62/tTdO1cu/zWv/LFf7Xyn6+uA74ovXCJIO1s0N2c
PSht98QRzPMf2owgVk37JnDNp4gGVDGHxSZOuUwxgYAZYnA8SFc+c+3ZrQfY870
+O4j3Mz4p7yD13AwP4buQLBsb/icxekeQCqpRjLH9f7MdEcGXa1x36RcEkHdu+M
yJ392eMgD+dKNfRCtyTPhjZTxvbNELIBYICfABEBAAEAB/wLJ0gyMjs2ffft83wM
5Lzz2yQIwV4t3bbIBAUjdHTqeN5Zmsm/oakFyjSokULK96Kv0R4ej9eoIgmFvxFk
HRkrngxTrbsNJ7I6QcKYHTPeIj318ykNL6fj0WJUcdPIENukX15jbqNyk3/4D2y
TTDySyq6jHTgvMH4K4KJUSpglvSJPntTk9RhuFGHAF+sNR9atygDYctAaERMrtSg
LCoSt/AoX5GRMIQjXT9oqQjwSQoZyF4s8HMC8wdTFIE/E0L4IVdHvp8sz2UzNtT
W/evmCA+KVruKjRH/Fhrq4hHkEamW28+j4L6uAyagONP7BONs+S5Oo2zTT9+tV2R
ILTZBADdgLuAgF6C5Lu9jCF6DfFgaT/uafMyQNkEGNlxOHMWHTgLHe475V2eG9gA
amd4yXKYEFKU1PWnvlGuicQSGdzVcwmq61msvXgYD0FK3LP3yWzKnE4X1tzc9Vp
/uHJxKjewCuyt1f5in919v+T8TbUxBYKC0zX/qWtX+10cTx77QQA6leqhToJ95Yc
u4UBrKMEO+y2v8Svb3LG7yI5oY8tkw0EkJ/kpZ8xTafZYCe6fXdVVE3PHg2lrxyc
Wv/EU3QY/qA3G82mbXYeJ2jNZaTNYo4MyIMrt4Mx25x4ke7JlE8SVrQ+4CrHkqp
OjSIa7fppLrQ78uW980AtN8NNQGrlTsD/A9aoA60Igxy1Q3K2uSyDCyjLknv57ym
ZSBD3/t7m0l6Q6gdbfhnGosT+Hd4y3actqEqzXZHW2VG4dKZ/wRNkxtSm9adU9vs
EHyzxj6mKIH32zAG5TaFT20hC+NK6lsyHr9UE2ZrS6ma2sLxGW2O40hqNsdD+5m
NrqeBc2I/js1PMK0EHRlc3RAZXhhbXBsZS5vcmeJAVQEEwEIAD4WIQTUFzW5Ejb9
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AQIXgAAKCRajAWNe7/DLBf9kB/wOQ/S60HGwFq07W9N01HWULyhHKOmmcHL6rfZ6
4oDqLxolPSasz7WAMW1jN4qtWJ0mFzwo83V6kaBe+wF6Kqir6udFSBW9rPcFg6V
```

ZXPtT0a6uacIHq6DyQ5iMW4YQWbVy9OR2rNGkYo1JCBR0XdRJYCSX3yB4TWv/eX  
nZ37/WjmiTOIZh35rjs+NuU/S5JPDfAp2/k70DevQeBsv+UjVXjWpNTZmPbvDnd9  
95uSmC6UY4hzyP84ORYMYn9n1QAR0goxDN6UunOf9Rlp1oMzdxMool/d1MICxg2h  
3jheuhv7lgUF4KpvHOuEPXQ7UO417E0TYcDZ1J8Nsv87SZeEnQOYBFrsKEkBCADj  
oEBhG/QPqZHG8VyoD1xYRAWGxyDjKX/GrSs6yE+x2hk5FoQCajxKa/d4AVxOnJpd  
whAfeXeSNaql5Ejgzax+Tdj9BV6vtGVJVv0pO7bgAiZxkA6RHxtNqhpPnPQoXvUz  
kzpRgpuL+Nj4yIg7z1ITH6KQH4u5SI9vd+j/8i9Taz67pdZwuJjac8qBuJHjzAo1  
bjYctFYUSG5pbmMQyNLYSzgiNkFa4DajODlt3RuqVGP316Fk+Sy2+60tC/HIX8jg  
MyMONfOGBQx6jk8tvAphS/LAqrrNepnagIyLUGKU+L8cB2g1PGGp2biBFWqZbudZ  
oyRBet/0yH/zirBdQJw1ABEBAAEAB/4IN3gXOI4OuoOcsvHak4pebx61Mt0YP9cT  
qZASIBqxok5x8E28pFh/tYfkYdqRCtdNYZOnxcEoUWh5j6nfwZkEnJ9P/T8GPNk7  
pMKnKXmExi05b5uGHD8nU1rSbf/YkvAF0vpbx4/RDxbbtQhbUwGzusSI+pBLM0w  
5TreEB+vRGBc2gOvXXOtKLNEa7M9rH2EwbAkP3jOGGwgk6adxbQdBcRxq4merqHL  
YrVz73bcJ8TDc0fsNjyIaZJZ++ejfBFYavsF1pvx9z7FNF8rSXoiB3SBtaWGfhr  
bwNaMZrDc7TRIq/fgGaL6g//bzcWrr1YaHXZ10Bgx6UymDOIYkCpBADm0Hv46sPw  
07SO8+IACcaQliOto1pndOPwTimCe058/7rf8I2a5uuJloGrnPwAX65bKDnUALp6  
X3lnXRNmhnB3Uewx4i00LQmjsxhJfQiGLpMv0j58tn64s7GqQzGVV1JKcQm992RV  
jFOdyjZ+K4LGWEOITG/bZrMEVNGCM+OnQQA/Haz8xN0NFS1q7tyfFc0pkx/TiCX  
xGfBqbO0wU2b5GMnZbY/06HENpidIzpa231VQaw5/nPTvfhlLKW1iGAkc148cX1q  
IL9w2ksXuaHR3LXud2VcfVTIidxU/7h7u1dD/85+c0+7j1GOBD9cXKxIM6OjpIJz1  
I5/1h3C5S0TuxHkEAL/3BGihkhNfv1Xx0rWu0/732usX/nE/A9C26hGu41FUf3fp  
0ilonKpKZUEwWt5hWSEFCsRznNVekiO0rxvuu3RVegvzThPNU4Pf4JZtJpRVhvUQ  
d9ulxJw7V9rs75uNBatTNC0kXuGoXhehw4Bn93xa67gYGd3LfrH+oT0GCDpTSHCJ  
ATwEGAEIACYWIQTUFzW5Ejb9uIIEjFojAWNe7/DLBQUCWuwoSQIbDAUJA8JnAAAK  
CRAjAWNe7/DLBf0pCACPP5hBuUWngu2Hqvg+tNiuifsiYzId3MffFxEk3CbXeHcJ  
5F32NDJ9PYCnra4L8wSv+NZt9gIa8lFwoFSFQCjzH7KE86XcV3MhfdJTNb/+9CR7  
Jq3e/4Iy0N5ip7PNYMCyakcAsxvsNCJKrSaDuYe/OAoTXRBtgRWE2uyT315em02L  
kr+2Cc/Qk6H+v1NOHGRgnpI/OZZjnUuUfBUvMGHr1phW+y7aeymC9PnUGdViRdJe  
23nntMSDA+0/I7ESO9JsWvJbyBmuiZpu9JjScOjYH9xpQLqRNyW4WHpZriN69F0t  
9Mmd7bM1+UyPgbPER0iWMeyctYsuOLEUyQKMscDT

=hkUm

-----END PGP PRIVATE KEY BLOCK-----

\input texinfo @c -\* texinfo -\*

@c %\*\*start of header

@setfilename maintenance-mode.info

@settitle Maintenance Mode

@documentencoding utf-8

@documentlanguage en

@c %\*\*end of header

@finalout

@titlepage

@title Maintenance Mode

@author Ben McGinnes

@end titlepage

@contents



@ifnottex  
@node Top  
@top Maintenance Mode  
@end ifnottex

@menu  
\* Maintenance Mode from 2019::

@detailmenu  
--- The Detailed Node Listing ---

Maintenance Mode from 2019

\* Maintainer from 2019 onward::  
\* Using the Python Bindings from 2019 and beyond::  
\* Documentation formats::

Documentation formats

\* Cautionary Notes regarding Sphinx and EPUB::

@end detailmenu  
@end menu

@node Maintenance Mode from 2019  
@chapter Maintenance Mode from 2019

@multitable {aaaaaaaaaaaaaaaa} {aa}  
@item Version:  
@tab 0.0.1  
@item GPGME Version:  
@tab 1.13.0  
@item Author:  
@tab Ben McGinnes <ben@@gnupg.org>  
@item Author GPG Key:  
@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D  
@item Language:  
@tab Australian English, British English  
@item xml:lang:  
@tab en-AU, en-GB, en  
@end multitable

From the beginning of 2019 the Python bindings to GPGME will enter maintenance mode, meaning that new features will not be added and only bug fixes and security fixes will be made. This also means that documentation beyond that existing at the end of 2018 will not be developed further except to correct errors.

Though use of these bindings appears to have been quite well received, there has been no indication of what demand there is, if any for either financial backing of the current Python bindings development or support contracts with g10code GmbH citing the necessity of including the bindings.

@menu

\* Maintainer from 2019 onward::

\* Using the Python Bindings from 2019 and beyond::

\* Documentation formats::

@end menu

@node Maintainer from 2019 onward

@section Maintainer from 2019 onward

How does this affect the position of GnuPG Python Bindings Maintainer?

Well, I will remain as maintainer of the bindings; but without funding for that position, the amount of time I will be able to dedicate solely to this task will be limited and reduced to volunteered time. As with all volunteered time and effort in free software projects, this will be subject to numerous external imperatives.

@node Using the Python Bindings from 2019 and beyond

@section Using the Python Bindings from 2019 and beyond

For most, if not all, Python developers using these bindings; they will continue to just work the same as they always have. Expansions of GPGME itself are usually handled by SWIG with the existing code and thus bindings are generated properly when the bindings are installed alongside GPGME and when the latter is built from source.

In the rare circumstances where that is not enough to address some new addition to GPGME, then that is a bug and thus subject to the maintenance mode provisions (i.e. it will be fixed following a bug report being raised and your humble author will need to remember where the timesheet template was filed, depending on how many years off such an event is).

All the GPGME functionality will continue to be accessible via the lower level, dynamically generated methods which match the GPGME C documentation. While the more intuitively Pythonic higher level layer already covers the vast majority of functionality people require with key generation, signatures, certifications (key signing), encryption, decryption, verification, validation, trust levels and so on.

Any wanted features lacking in the Python bindings are usually lacking because they are missing from GPGME itself (e.g. revoking keys via the

API) and in such cases they are usually deliberately excluded. More discussion of these issues can be found in the archives of the [@uref{https://lists.gnupg.org/mailman/listinfo/gnupg-devel}](https://lists.gnupg.org/mailman/listinfo/gnupg-devel), gnupg-devel mailing list).

Any features existing in the dynamically generated layer for which people want a specific, higher level function included to make it more Pythonic (e.g. to avoid needing to learn or memorise cryptographic mode values or GnuPG status code numbers), would be a feature request and **not** a bug.

It is still worthwhile requesting it, but the addition of such a feature would not be guaranteed and provided on a purely volunteer basis. Expediting such a request would require funding that request.

Those with a commercial interest in expediting such a feature request already know how to [@uref{https://gnupg.org/cgi-bin/procdonate.cgi?mode=preset}](https://gnupg.org/cgi-bin/procdonate.cgi?mode=preset), expedite it} (use the message field to state what feature is being requested).

**Documentation formats**

The documentation has been written in Org mode for GNU Emacs, with both Texinfo and reStructuredText formats generated from that. The Texinfo files are intended for use with the rest of the GnuPG documentation; while the reStructuredText files are intended for use with Docutils and Sphinx, as with other Python projects.

**Cautionary Notes regarding Sphinx and EPUB:**

**Cautionary Notes regarding Sphinx and EPUB**

Though Python's Docutils in conjunction with Sphinx is capable of generating some very useful HTML sites, as proven by [@uref{https://readthedocs.org/}](https://readthedocs.org/), Read the Docs} and the [@uref{https://docs.python.org/}](https://docs.python.org/), Python documentation}, there are a number of output formats it does not handle well. At the top of the list of things it manages to break so atrociously as to be embarrassing is the [@uref{http://idpf.org/epub}](http://idpf.org/epub), EPUB 3} format.

The automatically generated EPUB of the CPython documentation always contains hundreds of validation errors and even the modest amount of documentation here [@uref{https://files.au.adversary.org.s3.amazonaws.com/crypto/gpgme-python/rst/epub/GPGMEPythonBindings.epub}](https://files.au.adversary.org.s3.amazonaws.com/crypto/gpgme-python/rst/epub/GPGMEPythonBindings.epub), produced a file} with approximately thirty validation errors. As the volume of documentation content increases, so does the induced errors. Whereas Texinfo doesn't produce EPUB output at all, nor does Org-mode.

Should there ever be genuine demand for this format, lodge a  
@uref{<https://dev.gnupg.org/maniphest/task/edit/form/4/>, feature  
request} case marked for @uref{<https://dev.gnupg.org/p/BenM/>, my} attention. The means of generating such  
files flawlessly is already available, but is not yet part of the  
GnuPG build system. Nor is it integrated with a means of converting  
Org mode input files to the relevant base format automatically, as can  
already be done when converting Org to reStructuredText or Org to  
Texinfo. As a certain amount of work would be required to get it  
done, there would need to be clear demand for that work to be done.

@bye

;;; gpgme.lisp

;;; Copyright (C) 2006 g10 Code GmbH

;;;

;;; This file is part of GPGME-CL.

;;;

;;; GPGME-CL is free software; you can redistribute it and/or modify it  
;;; under the terms of the GNU General Public License as published by  
;;; the Free Software Foundation; either version 2 of the License, or  
;;; (at your option) any later version.

;;;

;;; GPGME-CL is distributed in the hope that it will be useful, but  
;;; WITHOUT ANY WARRANTY; without even the implied warranty of  
;;; MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU  
;;; Lesser General Public License for more details.

;;;

;;; You should have received a copy of the GNU General Public License  
;;; along with GPGME; if not, write to the Free Software Foundation,  
;;; Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA.

;;; TODO

;;; Set up the library.

(in-package :gpgme)

(deftype byte-array ()

'(simple-array (unsigned-byte 8) (\*)))

(deftype character-array ()

'(simple-array character (\*)))

;;; Debugging.

(defvar \*debug\* nil "If debugging output should be given or not.")

```

;;; Load the foreign library.

(define-foreign-library libgpgme
  (:unix "libgpgme.so")
  (t (:default "libgpgme")))

(use-foreign-library libgpgme)

;;; System dependencies.

; Access to ERRNO.
(defun ("strerror" c-strerror) :string
  (err :int))

(defun get-errno ()
  *errno*)

(defun set-errno (errno)
  (setf *errno* errno))

(define-condition system-error (error)
  ((:errno :initarg :errno :reader system-error-errno))
  (:report (lambda (c stream)
    (format stream "System error: ~A: ~A"
      (system-error-errno c)
      (c-strerror (system-error-errno c))))))
  (:documentation "Signalled when an errno is encountered.))

; Needed to write passphrases.
(defun ("write" c-write) ssize-t
  (fd :int)
  (buffer :string) ; Actually :pointer, but we only need string.
  (size size-t))

(defun system-write (fd buffer size)
  (let ((res (c-write fd buffer size)))
    (when (< res 0) (error 'system-error :errno (get-errno)))
    res))

;;;
;;; C Interface Definitions
;;;

;;; Data Type Interface

;;; Some new data types used for easier translation.

;;; The number of include certs. Translates to NIL for default.

```

```
(defctype cert-int-t
  (:wrapper :int
   :from-c translate-cert-int-t-from-foreign
   :to-c translate-cert-int-t-to-foreign))
```

;;; A string that may be NIL to indicate a null pointer.

```
(defctype string-or-nil-t
  (:wrapper :string
   :to-c translate-string-or-nil-t-to-foreign))
```

;;; Some opaque data types used by GPGME.

```
(defctype gpgme-ctx-t
  (:wrapper :pointer
   :to-c translate-gpgme-ctx-t-to-foreign)
  "The GPGME context type.")
```

```
(defctype gpgme-data-t
  (:wrapper :pointer
   :to-c translate-gpgme-data-t-to-foreign)
  "The GPGME data object type.")
```

;;; Wrappers for the libgpg-error library.

```
(defctype gpgme-error-t
  (:wrapper gpg-error::gpg-error-t
   :from-c translate-gpgme-error-t-from-foreign
   :to-c translate-gpgme-error-t-to-foreign)
  "The GPGME error type.")
```

```
(defctype gpgme-error-no-signal-t
  (:wrapper gpg-error::gpg-error-t
   :from-c translate-gpgme-error-no-signal-t-from-foreign)
  "The GPGME error type (this version does not signal conditions in translation.)")
```

```
(defctype gpgme-err-code-t gpg-error::gpg-err-code-t
  "The GPGME error code type.")
```

```
(defctype gpgme-err-source-t gpg-error::gpg-err-source-t
  "The GPGME error source type.")
```

```
(defun gpgme-err-make (source code)
  "Construct an error value from an error code and source."
  (gpg-err-make source code))
```

```
(defun gpgme-error (code)
  "Construct an error value from an error code."
  (gpgme-err-make :gpg-err-source-gpgme code))
```

```

(defun gpgme-err-code (err)
  "Retrieve an error code from the error value ERR."
  (gpg-err-code err))

(defun gpgme-err-source (err)
  "Retrieve an error source from the error value ERR."
  (gpg-err-source err))

(defun gpgme-strerror (err)
  "Return a string containing a description of the error code."
  (gpg-strerror err))

(defun gpgme-strsource (err)
  "Return a string containing a description of the error source."
  (gpg-strsource err))

(defun gpgme-err-code-from-errno (err)
  "Retrieve the error code for the system error. If the system error
  is not mapped, :gpg-err-unknown-errno is returned."
  (gpg-err-code-from-errno err))

(defun gpgme-err-code-to-errno (code)
  "Retrieve the system error for the error code. If this is not a
  system error, 0 is returned."
  (gpg-err-code-to-errno code))

(defun gpgme-err-make-from-errno (source err)
  (gpg-err-make-from-errno source err))

(defun gpgme-error-from-errno (err)
  (gpg-error-from-errno err))

;;;

(defcenum gpgme-data-encoding-t
  "The possible encoding mode of gpgme-data-t objects."
  (:none 0)
  (:binary 1)
  (:base64 2)
  (:armor 3)
  (:url 4)
  (:urlesc 5)
  (:url0 6)
  (:mime 7))

;;;

```

(defcenum gpgme-pubkey-algo-t  
"Public key algorithms from libgcrypt."  
(:rsa 1)  
(:rsa-e 2)  
(:rsa-s 3)  
(:elg-e 16)  
(:dsa 17)  
(:ecc 18)  
(:elg 20)  
(:ecdsa 301)  
(:ecdh 302)  
(:eddsa 303))

(defcenum gpgme-hash-algo-t  
"Hash algorithms from libgcrypt."  
(:none 0)  
(:md5 1)  
(:sha1 2)  
(:rmd160 3)  
(:md2 5)  
(:tiger 6)  
(:haval 7)  
(:sha256 8)  
(:sha384 9)  
(:sha512 10)  
(:sha224 11)  
(:md4 301)  
(:crc32 302)  
(:crc32-rfc1510 303)  
(:crc24-rfc2440 304))

:::

(defcenum gpgme-sig-mode-t  
"The available signature modes."  
(:none 0)  
(:detach 1)  
(:clear 2))

:::

(defcenum gpgme-validity-t  
"The available validities for a trust item or key."  
(:unknown 0)  
(:undefined 1)  
(:never 2)  
(:marginal 3)  
(:full 4)



```
(:ultimate 5))
```

```
;;
```

```
(defcenum gpgme-protocol-t
```

```
"The available protocols."
```

```
(:openpgp 0)
```

```
(:cms 1)
```

```
(:gpgconf 2)
```

```
(:assuan 3)
```

```
(:g13 4)
```

```
(:uiserver 5)
```

```
(:spawn 6)
```

```
(:default 254)
```

```
(:unknown 255))
```

```
;;
```

```
(defbitfield (gpgme-keylist-mode-t :unsigned-int)
```

```
"The available keylist mode flags."
```

```
(:local 1)
```

```
(:extern 2)
```

```
(:sigs 4)
```

```
(:sig-notations)
```

```
(:with-secret 16)
```

```
(:with-tofu 32)
```

```
(:ephemeral 128)
```

```
(:validate 256))
```

```
;;
```

```
(defbitfield (gpgme-sig-notation-flags-t :unsigned-int)
```

```
"The available signature notation flags."
```

```
(:human-readable 1)
```

```
(:critical 2))
```

```
(defctype gpgme-sig-notation-t
```

```
(:wrapper :pointer
```

```
:from-c translate-gpgme-sig-notation-t-from-foreign)
```

```
"Signature notation pointer type.")
```

```
;; FIXME: Doesn't this depend on endianness?
```

```
(defbitfield (gpgme-sig-notation-bitfield :unsigned-int)
```

```
(:human-readable 1)
```

```
(:critical 2))
```

```
(defcstruct gpgme-sig-notation
```

```
"Signature notations."
```

```
(next gpgme-sig-notation-t)
(name :pointer)
(value :pointer)
(name-len :int)
(value-len :int)
(flags gpgme-sig-notation-flags-t)
(bitfield gpgme-sig-notation-bitfield))
```

```
;;;
```

```
(defcenum gpgme-status-code-t
"The possible status codes for the edit operation."
```

```
(:eof 0)
(:enter 1)
(:leave 2)
(:abort 3)
(:goodsig 4)
(:badsig 5)
(:errsig 6)
(:badarmor 7)
(:rsa-or-idea 8)
(:keyexpired 9)
(:keyrevoked 10)
(:trust-undefined 11)
(:trust-never 12)
(:trust-marginal 13)
(:trust-fully 14)
(:trust-ultimate 15)
(:shm-info 16)
(:shm-get 17)
(:shm-get-bool 18)
(:shm-get-hidden 19)
(:need-passphrase 20)
(:validsig 21)
(:sig-id 22)
(:enc-to 23)
(:nodata 24)
(:bad-passphrase 25)
(:no-pubkey 26)
(:no-seckey 27)
(:need-passphrase-sym 28)
(:decryption-failed 29)
(:decryption-okay 30)
(:missing-passphrase 31)
(:good-passphrase 32)
(:goodmdc 33)
(:badmdc 34)
(:errmdc 35)
```

(:imported 36)  
(:import-ok 37)  
(:import-problem 38)  
(:import-res 39)  
(:file-start 40)  
(:file-done 41)  
(:file-error 42)  
(:begin-decryption 43)  
(:end-decryption 44)  
(:begin-encryption 45)  
(:end-encryption 46)  
(:delete-problem 47)  
(:get-bool 48)  
(:get-line 49)  
(:get-hidden 50)  
(:got-it 51)  
(:progress 52)  
(:sig-created 53)  
(:session-key 54)  
(:notation-name 55)  
(:notation-data 56)  
(:policy-url 57)  
(:begin-stream 58)  
(:end-stream 59)  
(:key-created 60)  
(:userid-hint 61)  
(:unexpected 62)  
(:inv-recp 63)  
(:no-recp 64)  
(:already-signed 65)  
(:sigexpired 66)  
(:expsig 67)  
(:expkeysig 68)  
(:truncated 69)  
(:error 70)  
(:newsig 71)  
(:revkeysig 72)  
(:sig-subpacket 73)  
(:need-passphrase-pin 74)  
(:sc-op-failure 75)  
(:sc-op-success 76)  
(:cardctrl 77)  
(:backup-key-created 78)  
(:pka-trust-bad 79)  
(:pka-trust-good 80)  
(:plaintext 81)  
(:inv-sgnr 82)  
(:no-sgnr 83)

```
(:success 84)
(:decryption-info 85)
(:plaintext-length 86)
(:mountpoint 87)
(:pinentry-launched 88)
(:attribute 89)
(:begin-signing 90)
(:key-not-created 91)
(:inquire-maxlen 92)
(:failure 93)
(:key-considered 94)
(:tofu-user 95)
(:tofu-stats 96)
(:tofu-stats-long 97)
(:notation-flags 98)
(:decryption-compliance-mode 99)
(:verification-compliance-mode 100))
```

```
;;
```

```
(defctype gpgme-engine-info-t
  (:wrapper :pointer
   :from-c translate-gpgme-engine-info-t-to-foreign)
  "The engine information structure pointer type.")
```

```
(defcstruct gpgme-engine-info
  "Engine information."
  (next gpgme-engine-info-t)
  (protocol gpgme-protocol-t)
  (file-name :string)
  (version :string)
  (req-version :string)
  (home-dir :string))
```

```
;;
```

```
(defctype gpgme-subkey-t
  (:wrapper :pointer
   :from-c translate-gpgme-subkey-t-from-foreign)
  "A subkey from a key.")
```

```
;; FIXME: Doesn't this depend on endianness?
```

```
(defbitfield (gpgme-subkey-bitfield :unsigned-int)
  "The subkey bitfield."
  (:revoked 1)
  (:expired 2)
  (:disabled 4)
  (:invalid 8))
```

```
(:can-encrypt 16)
(:can-sign 32)
(:can-certify 64)
(:secret 128)
(:can-authenticate 256)
(:is-qualified 512)
(:is-cardkey 1024)
(:is-de-vs 2048))
```

```
(defcstruct gpgme-subkey
  "Subkey from a key."
  (next gpgme-subkey-t)
  (bitfield gpgme-subkey-bitfield)
  (pubkey-algo gpgme-pubkey-algo-t)
  (length :unsigned-int)
  (keyid :string)
  (-keyid :char :count 17)
  (fpr :string)
  (timestamp :long)
  (expires :long))
```

```
(defctype gpgme-key-sig-t
  (:wrapper :pointer
   :from-c translate-gpgme-key-sig-t-from-foreign)
  "A signature on a user ID.")
```

```
:: FIXME: Doesn't this depend on endianness?
(defbitfield (gpgme-key-sig-bitfield :unsigned-int)
  "The key signature bitfield."
  (:revoked 1)
  (:expired 2)
  (:invalid 4)
  (:exportable 16))
```

```
(defcstruct gpgme-key-sig
  "A signature on a user ID."
  (next gpgme-key-sig-t)
  (bitfield gpgme-key-sig-bitfield)
  (pubkey-algo gpgme-pubkey-algo-t)
  (keyid :string)
  (-keyid :char :count 17)
  (timestamp :long)
  (expires :long)
  (status gpgme-error-no-signal-t)
  (-class :unsigned-int)
  (uid :string)
  (name :string))
```

```
(email :string)
(comment :string)
(sig-class :unsigned-int))
```

```
(defctype gpgme-user-id-t
  (:wrapper :pointer
   :from-c translate-gpgme-user-id-t-from-foreign)
  "A user ID from a key.")
```

```
:: FIXME: Doesn't this depend on endianness?
(defbitfield (gpgme-user-id-bitfield :unsigned-int)
  "The user ID bitfield."
  (:revoked 1)
  (:invalid 2))
```

```
(defcstruct gpgme-user-id
  "A user ID from a key."
  (next gpgme-user-id-t)
  (bitfield gpgme-user-id-bitfield)
  (validity gpgme-validity-t)
  (uid :string)
  (name :string)
  (email :string)
  (comment :string)
  (signatures gpgme-key-sig-t)
  (-last-keysig gpgme-key-sig-t))
```

```
(defctype gpgme-key-t
  (:wrapper :pointer
   :from-c translate-gpgme-key-t-from-foreign
   :to-c translate-gpgme-key-t-to-foreign)
  "A key from the keyring.")
```

```
:: FIXME: Doesn't this depend on endianness?
(defbitfield (gpgme-key-bitfield :unsigned-int)
  "The key bitfield."
  (:revoked 1)
  (:expired 2)
  (:disabled 4)
  (:invalid 8)
  (:can-encrypt 16)
  (:can-sign 32)
  (:can-certify 64)
  (:secret 128)
  (:can-authenticate 256)
  (:is-qualified 512))
```

```

(defcstruct gpgme-key
  "A signature on a user ID."
  (-refs :unsigned-int)
  (bitfield gpgme-key-bitfield)
  (protocol gpgme-protocol-t)
  (issuer-serial :string)
  (issuer-name :string)
  (chain-id :string)
  (owner-trust gpgme-validity-t)
  (subkeys gpgme-subkey-t)
  (uids gpgme-user-id-t)
  (-last-subkey gpgme-subkey-t)
  (-last-uid gpgme-user-id-t)
  (keylist-mode gpgme-keylist-mode-t))

;;;

;;; There is no support in CFFI to define callback C types and have
;;; automatic type checking with the callback definition.

(defctype gpgme-passphrase-cb-t :pointer)

(defctype gpgme-progress-cb-t :pointer)

(defctype gpgme-edit-cb-t :pointer)

;;;
;;; Function Interface
;;;

;;; Context management functions.

(defcfun ("gpgme_new" c-gpgme-new) gpgme-error-t
  (ctx :pointer))

(defcfun ("gpgme_release" c-gpgme-release) :void
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_set_protocol" c-gpgme-set-protocol) gpgme-error-t
  (ctx gpgme-ctx-t)
  (proto gpgme-protocol-t))

(defcfun ("gpgme_get_protocol" c-gpgme-get-protocol) gpgme-protocol-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_get_protocol_name" c-gpgme-get-protocol-name) :string

```

```

(proto gpgme-protocol-t))

(defcfun ("gpgme_set_armor" c-gpgme-set-armor) :void
  (ctx gpgme-ctx-t)
  (yes :boolean))

(defcfun ("gpgme_get_armor" c-gpgme-get-armor) :boolean
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_set_textmode" c-gpgme-set-textmode) :void
  (ctx gpgme-ctx-t)
  (yes :boolean))

(defcfun ("gpgme_get_textmode" c-gpgme-get-textmode) :boolean
  (ctx gpgme-ctx-t))

(defconstant +include-certs-default+ -256)

(defcfun ("gpgme_set_include_certs" c-gpgme-set-include-certs) :void
  (ctx gpgme-ctx-t)
  (nr-of-certs cert-int-t))

(defcfun ("gpgme_get_include_certs" c-gpgme-get-include-certs) cert-int-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_set_keylist_mode" c-gpgme-set-keylist-mode) gpgme-error-t
  (ctx gpgme-ctx-t)
  (mode gpgme-keylist-mode-t))

(defcfun ("gpgme_get_keylist_mode" c-gpgme-get-keylist-mode)
  gpgme-keylist-mode-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_set_passphrase_cb" c-gpgme-set-passphrase-cb) :void
  (ctx gpgme-ctx-t)
  (cb gpgme-passphrase-cb-t)
  (hook-value :pointer))

(defcfun ("gpgme_get_passphrase_cb" c-gpgme-get-passphrase-cb) :void
  (ctx gpgme-ctx-t)
  (cb-p :pointer)
  (hook-value-p :pointer))

(defcfun ("gpgme_set_progress_cb" c-gpgme-set-progress-cb) :void
  (ctx gpgme-ctx-t)
  (cb gpgme-progress-cb-t)
  (hook-value :pointer))

```



```

(defcfun ("gpgme_get_progress_cb" c-gpgme-get-progress-cb) :void
  (ctx gpgme-ctx-t)
  (cb-p :pointer)
  (hook-value-p :pointer))

(defcfun ("gpgme_set_locale" c-gpgme-set-locale) gpgme-error-t
  (ctx gpgme-ctx-t)
  (category :int)
  (value string-or-nil-t))

(defcfun ("gpgme_ctx_get_engine_info" c-gpgme-ctx-get-engine-info)
  gpgme-engine-info-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_ctx_set_engine_info" c-gpgme-ctx-set-engine-info)
  gpgme-error-t
  (ctx gpgme-ctx-t)
  (proto gpgme-protocol-t)
  (file-name string-or-nil-t)
  (home-dir string-or-nil-t))

;;;

(defcfun ("gpgme_pubkey_algo_name" c-gpgme-pubkey-algo-name) :string
  (algo gpgme-pubkey-algo-t))

(defcfun ("gpgme_hash_algo_name" c-gpgme-hash-algo-name) :string
  (algo gpgme-hash-algo-t))

;;;

(defcfun ("gpgme_signers_clear" c-gpgme-signers-clear) :void
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_signers_add" c-gpgme-signers-add) gpgme-error-t
  (ctx gpgme-ctx-t)
  (key gpgme-key-t))

(defcfun ("gpgme_signers_enum" c-gpgme-signers-enum) gpgme-key-t
  (ctx gpgme-ctx-t)
  (seq :int))

;;;

(defcfun ("gpgme_sig_notation_clear" c-gpgme-sig-notation-clear) :void
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_sig_notation_add" c-gpgme-sig-notation-add) gpgme-error-t

```

```

(ctx gpgme-ctx-t)
(name :string)
(value string-or-nil-t)
(flags gpgme-sig-notation-flags-t))

(defcfun ("gpgme_sig_notation_get" c-gpgme-sig-notation-get)
  gpgme-sig-notation-t
  (ctx gpgme-ctx-t))

```

;;; Run Control.

;;; There is no support in CFFI to define callback C types and have  
 ;;; automatic type checking with the callback definition.

```

(defctype gpgme-io-cb-t :pointer)

(defctype gpgme-register-io-cb-t :pointer)

(defctype gpgme-remove-io-cb-t :pointer)

(defcenum gpgme-event-io-t
  "The possible events on I/O event callbacks."
  (:start 0)
  (:done 1)
  (:next-key 2)
  (:next-trustitem 3))

```

```

(defctype gpgme-event-io-cb-t :pointer)

```

```

(defcstruct gpgme-io-cbs
  "I/O callbacks."
  (add gpgme-register-io-cb-t)
  (add-priv :pointer)
  (remove gpgme-remove-io-cb-t)
  (event gpgme-event-io-cb-t)
  (event-priv :pointer))

```

```

(defctype gpgme-io-cbs-t :pointer)

```

```

(defcfun ("gpgme_set_io_cbs" c-gpgme-set-io-cbs) :void
  (ctx gpgme-ctx-t)
  (io-cbs gpgme-io-cbs-t))

```

```

(defcfun ("gpgme_get_io_cbs" c-gpgme-get-io-cbs) :void
  (ctx gpgme-ctx-t)
  (io-cbs gpgme-io-cbs-t))

```

```

(defcfun ("gpgme_wait" c-gpgme-wait) gpgme-ctx-t

```

```
(ctx gpgme-ctx-t)
(status-p :pointer)
(hang :int))
```

;;; Functions to handle data objects.

;;; There is no support in CFFI to define callback C types and have  
;;; automatic type checking with the callback definition.

```
(defctype gpgme-data-read-cb-t :pointer)
(defctype gpgme-data-write-cb-t :pointer)
(defctype gpgme-data-seek-cb-t :pointer)
(defctype gpgme-data-release-cb-t :pointer)
```

```
(defcstruct gpgme-data-cbs
  "Data callbacks."
  (read gpgme-data-read-cb-t)
  (write gpgme-data-write-cb-t)
  (seek gpgme-data-seek-cb-t)
  (release gpgme-data-release-cb-t))
```

```
(defctype gpgme-data-cbs-t :pointer
  "Data callbacks pointer.")
```

```
(defcfun ("gpgme_data_read" c-gpgme-data-read) ssize-t
  (dh gpgme-data-t)
  (buffer :pointer)
  (size size-t))
```

```
(defcfun ("gpgme_data_write" c-gpgme-data-write) ssize-t
  (dh gpgme-data-t)
  (buffer :pointer)
  (size size-t))
```

```
(defcfun ("gpgme_data_seek" c-gpgme-data-seek) off-t
  (dh gpgme-data-t)
  (offset off-t)
  (whence :int))
```

```
(defcfun ("gpgme_data_new" c-gpgme-data-new) gpgme-error-t
  (dh-p :pointer))
```

```
(defcfun ("gpgme_data_release" c-gpgme-data-release) :void
  (dh gpgme-data-t))
```

```
(defcfun ("gpgme_data_new_from_mem" c-gpgme-data-new-from-mem) gpgme-error-t
  (dh-p :pointer)
  (buffer :pointer))
```

```

(size size-t)
(copy :int)

(defcfun ("gpgme_data_release_and_get_mem" c-gpgme-data-release-and-get-mem)
  :pointer
  (dh gpgme-data-t)
  (len-p :pointer))

(defcfun ("gpgme_data_new_from_cbs" c-gpgme-data-new-from-cbs) gpgme-error-t
  (dh-p :pointer)
  (cbs gpgme-data-cbs-t)
  (handle :pointer))

(defcfun ("gpgme_data_new_from_fd" c-gpgme-data-new-from-fd) gpgme-error-t
  (dh-p :pointer)
  (fd :int))

(defcfun ("gpgme_data_new_from_stream" c-gpgme-data-new-from-stream)
  gpgme-error-t
  (dh-p :pointer)
  (stream :pointer))

(defcfun ("gpgme_data_get_encoding" c-gpgme-data-get-encoding)
  gpgme-data-encoding-t
  (dh gpgme-data-t))

(defcfun ("gpgme_data_set_encoding" c-gpgme-data-set-encoding)
  gpgme-error-t
  (dh gpgme-data-t)
  (enc gpgme-data-encoding-t))

(defcfun ("gpgme_data_get_file_name" c-gpgme-data-get-file-name) :string
  (dh gpgme-data-t))

(defcfun ("gpgme_data_set_file_name" c-gpgme-data-set-file-name) gpgme-error-t
  (dh gpgme-data-t)
  (file-name string-or-nil-t))

(defcfun ("gpgme_data_new_from_file" c-gpgme-data-new-from-file) gpgme-error-t
  (dh-p :pointer)
  (fname :string)
  (copy :int))

(defcfun ("gpgme_data_new_from_filepart" c-gpgme-data-new-from-filepart)
  gpgme-error-t
  (dh-p :pointer)
  (fname :string)
  (fp :pointer))

```

```
(offset off-t)
(length size-t))
```

::: Key and trust functions.

```
(defcfun ("gpgme_get_key" c-gpgme-get-key) gpgme-error-t
  (ctx gpgme-ctx-t)
  (fpr :string)
  (key-p :pointer)
  (secret :boolean))
```

```
(defcfun ("gpgme_key_ref" c-gpgme-key-ref) :void
  (key gpgme-key-t))
```

```
(defcfun ("gpgme_key_unref" c-gpgme-key-unref) :void
  (key gpgme-key-t))
```

::: Crypto operations.

```
(defcfun ("gpgme_cancel" c-gpgme-cancel) gpgme-error-t
  (ctx gpgme-ctx-t))
```

:::

```
(defctype gpgme-invalid-key-t
  (:wrapper :pointer
   :from-c translate-gpgme-invalid-key-t-from-foreign)
  "An invalid key structure.")
```

```
(defcstruct gpgme-invalid-key
  "An invalid key structure."
  (next gpgme-invalid-key-t)
  (fpr :string)
  (reason gpgme-error-no-signal-t))
```

::: Encryption.

```
(defcstruct gpgme-op-encrypt-result
  "Encryption result structure."
  (invalid-recipients gpgme-invalid-key-t))
```

```
(defctype gpgme-op-encrypt-result-t
  (:wrapper :pointer
   :from-c translate-gpgme-op-encrypt-result-t-from-foreign)
  "An encryption result structure.")
```

```
(defcfun ("gpgme_op_encrypt_result" c-gpgme-op-encrypt-result)
  gpgme-op-encrypt-result-t
```

```

(ctx gpgme-ctx-t))

(defbitfield gpgme-encrypt-flags-t
  (:always-trust 1)
  (:no-encrypt-to 2)
  (:prepare 4)
  (:expect-sign 8)
  (:no-compress 16)
  (:symmetric 32)
  (:throw-keyids 64)
  (:wrap 128)
  (:want-address 256))

(defcfun ("gpgme_op_encrypt_start" c-gpgme-op-encrypt-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (recp :pointer) ; Key array.
  (flags gpgme-encrypt-flags-t)
  (plain gpgme-data-t)
  (cipher gpgme-data-t))

(defcfun ("gpgme_op_encrypt" c-gpgme-op-encrypt) gpgme-error-t
  (ctx gpgme-ctx-t)
  (recp :pointer) ; Key array.
  (flags gpgme-encrypt-flags-t)
  (plain gpgme-data-t)
  (cipher gpgme-data-t))

(defcfun ("gpgme_op_encrypt_sign_start" c-gpgme-op-encrypt-sign-start)
  gpgme-error-t
  (ctx gpgme-ctx-t)
  (recp :pointer) ; Key array.
  (flags gpgme-encrypt-flags-t)
  (plain gpgme-data-t)
  (cipher gpgme-data-t))

(defcfun ("gpgme_op_encrypt_sign" c-gpgme-op-encrypt-sign) gpgme-error-t
  (ctx gpgme-ctx-t)
  (recp :pointer) ; Key array.
  (flags gpgme-encrypt-flags-t)
  (plain gpgme-data-t)
  (cipher gpgme-data-t))

;;; Decryption.

(defctype gpgme-recipient-t
  (:wrapper :pointer
   :from-c translate-gpgme-recipient-t-from-foreign)
  "A recipient structure.")

```

```

(defcstruct gpgme-recipient
  "Recipient structure."
  (next gpgme-recipient-t)
  (keyid :string)
  (-keyid :char :count 17)
  (pubkey-algo gpgme-pubkey-algo-t)
  (status gpgme-error-no-signal-t))

(defbitfield gpgme-op-decrypt-result-bitfield
  "Decryption result structure bitfield."
  (:wrong-key-usage 1)
  (:is-de-vs 2)
  (:is-mine 4))

(defcstruct gpgme-op-decrypt-result
  "Decryption result structure."
  (unsupported-algorithm :string)
  (bitfield gpgme-op-decrypt-result-bitfield)
  (recipients gpgme-recipient-t)
  (file-name :string))

(defctype gpgme-op-decrypt-result-t
  (:wrapper :pointer
   :from-c translate-gpgme-op-decrypt-result-t-from-foreign)
  "A decryption result structure.")

(defcfun ("gpgme_op_decrypt_result" c-gpgme-op-decrypt-result)
  gpgme-op-decrypt-result-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_op_decrypt_start" c-gpgme-op-decrypt-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (cipher gpgme-data-t)
  (plain gpgme-data-t))

(defcfun ("gpgme_op_decrypt" c-gpgme-op-decrypt) gpgme-error-t
  (ctx gpgme-ctx-t)
  (cipher gpgme-data-t)
  (plain gpgme-data-t))

(defcfun ("gpgme_op_decrypt_verify_start" c-gpgme-op-decrypt-verify-start)
  gpgme-error-t
  (ctx gpgme-ctx-t)
  (cipher gpgme-data-t)
  (plain gpgme-data-t))

(defcfun ("gpgme_op_decrypt_verify" c-gpgme-op-decrypt-verify) gpgme-error-t

```

```
(ctx gpgme-ctx-t)
(cipher gpgme-data-t)
(plain gpgme-data-t))
```

::: Signing.

```
(defctype gpgme-new-signature-t
  (:wrapper :pointer
   :from-c translate-gpgme-new-signature-t-from-foreign)
  "A new signature structure.")
```

```
(defcstruct gpgme-new-signature
  "New signature structure."
  (next gpgme-new-signature-t)
  (type gpgme-sig-mode-t)
  (pubkey-algo gpgme-pubkey-algo-t)
  (hash-algo gpgme-hash-algo-t)
  (-obsolete-class :unsigned-long)
  (timestamp :long)
  (fpr :string)
  (-obsolete-class-2 :unsigned-int)
  (sig-class :unsigned-int))
```

```
(defcstruct gpgme-op-sign-result
  "Signing result structure."
  (invalid-signers gpgme-invalid-key-t)
  (signatures gpgme-new-signature-t))
```

```
(defctype gpgme-op-sign-result-t
  (:wrapper :pointer
   :from-c translate-gpgme-op-sign-result-t-from-foreign)
  "A signing result structure.")
```

```
(defcfun ("gpgme_op_sign_result" c-gpgme-op-sign-result)
  gpgme-op-sign-result-t
  (ctx gpgme-ctx-t))
```

```
(defcfun ("gpgme_op_sign_start" c-gpgme-op-sign-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (plain gpgme-data-t)
  (sig gpgme-data-t)
  (mode gpgme-sig-mode-t))
```

```
(defcfun ("gpgme_op_sign" c-gpgme-op-sign) gpgme-error-t
  (ctx gpgme-ctx-t)
  (plain gpgme-data-t)
  (sig gpgme-data-t)
  (mode gpgme-sig-mode-t))
```



::: Verify.

```
(defbitfield (gpgme-sigsum-t :unsigned-int)
  "Flags used for the summary field in a gpgme-signature-t."
  (:valid #x0001)
  (:green #x0002)
  (:red #x0004)
  (:key-revoked #x0010)
  (:key-expired #x0020)
  (:sig-expired #x0040)
  (:key-missing #x0080)
  (:crl-missing #x0100)
  (:crl-too-old #x0200)
  (:bad-policy #x0400)
  (:sys-error #x0800)
  (:tofu-conflict #x1000))
```

```
(defctype gpgme-signature-t
  (:wrapper :pointer
   :from-c translate-gpgme-signature-t-from-foreign)
  "A signature structure.")
```

::: FIXME: Doesn't this depend on endianness?

```
(defbitfield (gpgme-signature-bitfield :unsigned-int)
  "The signature bitfield."
  (:wrong-key-usage 1)
  (:pka-trust 2)
  (:chain-model 4)
  (:is-de-vs 8))
```

```
(defcstruct gpgme-signature
  "Signature structure."
  (next gpgme-signature-t)
  (summary gpgme-sigsum-t)
  (fpr :string)
  (status gpgme-error-no-signal-t)
  (notations gpgme-sig-notation-t)
  (timestamp :unsigned-long)
  (exp-timestamp :unsigned-long)
  (bitfield gpgme-signature-bitfield)
  (validity gpgme-validity-t)
  (validity-reason gpgme-error-no-signal-t)
  (pubkey-algo gpgme-pubkey-algo-t)
  (hash-algo gpgme-hash-algo-t))
```

```
(defcstruct gpgme-op-verify-result
  "Verify result structure."
```

```

(signatures gpgme-signature-t)
(file-name :string))

(defctype gpgme-op-verify-result-t
  (:wrapper :pointer
   :from-c translate-gpgme-op-verify-result-t-from-foreign)
  "A verify result structure.")

(defcfun ("gpgme_op_verify_result" c-gpgme-op-verify-result)
  gpgme-op-verify-result-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_op_verify_start" c-gpgme-op-verify-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (sig gpgme-data-t)
  (signed-text gpgme-data-t)
  (plaintext gpgme-data-t))

(defcfun ("gpgme_op_verify" c-gpgme-op-verify) gpgme-error-t
  (ctx gpgme-ctx-t)
  (sig gpgme-data-t)
  (signed-text gpgme-data-t)
  (plaintext gpgme-data-t))

;;; Import.

(defbitfield (gpgme-import-flags-t :unsigned-int)
  "Flags used for the import status field."
  (:new #x0001)
  (:uid #x0002)
  (:sig #x0004)
  (:subkey #x0008)
  (:secret #x0010))

(defctype gpgme-import-status-t
  (:wrapper :pointer
   :from-c translate-gpgme-import-status-t-from-foreign)
  "An import status structure.")

(defcstruct gpgme-import-status
  "New import status structure."
  (next gpgme-import-status-t)
  (fpr :string)
  (result gpgme-error-no-signal-t)
  (status :unsigned-int))

(defcstruct gpgme-op-import-result
  "Import result structure."

```

```

(considered :int)
(no-user-id :int)
(imported :int)
(imported-rsa :int)
(unchanged :int)
(new-user-ids :int)
(new-sub-keys :int)
(new-signatures :int)
(new-revocations :int)
(secret-read :int)
(secret-imported :int)
(secret-unchanged :int)
(skipped-new-keys :int)
(not-imported :int)
(imports gpgme-import-status-t))

(defctype gpgme-op-import-result-t
  (:wrapper :pointer
   :from-c translate-gpgme-op-import-result-t-from-foreign)
  "An import status result structure.")

(defcfun ("gpgme_op_import_result" c-gpgme-op-import-result)
  gpgme-op-import-result-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_op_import_start" c-gpgme-op-import-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (keydata gpgme-data-t))

(defcfun ("gpgme_op_import" c-gpgme-op-import) gpgme-error-t
  (ctx gpgme-ctx-t)
  (keydata gpgme-data-t))

;;; Export.

(defcfun ("gpgme_op_export_start" c-gpgme-op-export-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (pattern :string)
  (reserved :unsigned-int)
  (keydata gpgme-data-t))

(defcfun ("gpgme_op_export" c-gpgme-op-export) gpgme-error-t
  (ctx gpgme-ctx-t)
  (pattern :string)
  (reserved :unsigned-int)
  (keydata gpgme-data-t))

;;; FIXME: Extended export interfaces require array handling.

```

::: Key generation.

```
(defbitfield (gpgme-genkey-flags-t :unsigned-int)
  "Flags used for the key generation result bitfield."
  (:primary #x0001)
  (:sub #x0002)
  (:uid #x0004))
```

```
(defcstruct gpgme-op-genkey-result
  "Key generation result structure."
  (bitfield gpgme-genkey-flags-t)
  (fpr :string))
```

```
(defctype gpgme-op-genkey-result-t :pointer
  "A key generation result structure.")
```

```
(defcfun ("gpgme_op_genkey_result" c-gpgme-op-genkey-result)
  gpgme-op-genkey-result-t
  (ctx gpgme-ctx-t))
```

```
(defcfun ("gpgme_op_genkey_start" c-gpgme-op-genkey-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (parms :string)
  (pubkey gpgme-data-t)
  (seckey gpgme-data-t))
```

```
(defcfun ("gpgme_op_genkey" c-gpgme-op-genkey) gpgme-error-t
  (ctx gpgme-ctx-t)
  (parms :string)
  (pubkey gpgme-data-t)
  (seckey gpgme-data-t))
```

::: Key deletion.

```
(defcfun ("gpgme_op_delete_start" c-gpgme-op-delete-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (key gpgme-key-t)
  (allow-secret :int))
```

```
(defcfun ("gpgme_op_delete" c-gpgme-op-delete) gpgme-error-t
  (ctx gpgme-ctx-t)
  (key gpgme-key-t)
  (allow-secret :int))
```

::: FIXME: Add edit interfaces.

::: Keylist interface.

```

(defbitfield (gpgme-keylist-flags-t :unsigned-int)
  "Flags used for the key listing result bitfield."
  (:truncated #x0001))

(defcstruct gpgme-op-keylist-result
  "Key listing result structure."
  (bitfield gpgme-keylist-flags-t))

(defctype gpgme-op-keylist-result-t :pointer
  "A key listing result structure.")

(defcfun ("gpgme_op_keylist_result" c-gpgme-op-keylist-result)
  gpgme-op-keylist-result-t
  (ctx gpgme-ctx-t))

(defcfun ("gpgme_op_keylist_start" c-gpgme-op-keylist-start) gpgme-error-t
  (ctx gpgme-ctx-t)
  (pattern :string)
  (secret_only :boolean))

;;; FIXME: Extended keylisting requires array handling.

(defcfun ("gpgme_op_keylist_next" c-gpgme-op-keylist-next) gpgme-error-t
  (ctx gpgme-ctx-t)
  (r-key :pointer))

(defcfun ("gpgme_op_keylist_end" c-gpgme-op-keylist-end) gpgme-error-t
  (ctx gpgme-ctx-t))

;;; Various functions.

(defcfun ("gpgme_check_version" c-gpgme-check-version) :string
  (req-version string-or-nil-t))

(defcfun ("gpgme_get_engine_info" c-gpgme-get-engine-info) gpgme-error-t
  (engine-info-p :pointer))

(defcfun ("gpgme_set_engine_info" c-gpgme-set-engine-info) gpgme-error-t
  (proto gpgme-protocol-t)
  (file-name string-or-nil-t)
  (home-dir string-or-nil-t))

(defcfun ("gpgme_engine_check_version" c-gpgme-engine-check-version)
  gpgme-error-t
  (proto gpgme-protocol-t))

;;;

```

```
;;; L I S P I N T E R F A C E
```

```
;;;
```

```
;;;
```

```
;;; Lisp type translators.
```

```
;;;
```

```
;;; Both directions.
```

```
;;; cert-int-t is a helper type that takes care of representing the
```

```
;;; default number of certs as NIL.
```

```
(defun translate-cert-int-t-from-foreign (value)
```

```
(cond
```

```
((eql value +include-certs-default+) nil)
```

```
(t value)))
```

```
(defun translate-cert-int-t-to-foreign (value)
```

```
(cond
```

```
(value value)
```

```
(t +include-certs-default+)))
```

```
;;; string-or-nil-t translates a null pointer to NIL and vice versa.
```

```
;;; Translation from foreign null pointer already works as expected.
```

```
(defun translate-string-or-nil-t-to-foreign (value)
```

```
(cond
```

```
(value value)
```

```
(t (null-pointer))))
```

```
;;; Output only.
```

```
;;; These type translators only convert from foreign type, because we
```

```
;;; never use these types in the other direction.
```

```
;;; Convert gpgme-engine-info-t linked lists into a list of property
```

```
;;; lists. Note that this converter will automatically be invoked
```

```
;;; recursively.
```

```
;;;
```

```
;;; FIXME: Should we use a hash table (or struct, or clos) instead of
```

```
;;; property list, as recommended by the Lisp FAQ?
```

```
(defun translate-gpgme-engine-info-t-from-foreign (value)
```

```
(cond
```

```
((null-pointer-p value) nil)
```

```
(t (with-foreign-slots
```

```
((next protocol file-name version req-version home-dir
```

```
value (:struct gpgme-engine-info))
```

```
(append (list protocol (list
  :file-name file-name
  :version version
  :req-version req-version
  :home-dir home-dir))
next))))
```

```
(defun translate-gpgme-invalid-key-t-from-foreign (value)
(cond
((null-pointer-p value) nil)
(t (with-foreign-slots
((next fpr reason)
value (:struct gpgme-invalid-key))
(append (list (list :fpr fpr
:reason reason))
next))))))
```

```
(defun translate-gpgme-op-encrypt-result-t-from-foreign (value)
(cond
((null-pointer-p value) nil)
(t (with-foreign-slots
((invalid-recipients)
value (:struct gpgme-op-encrypt-result))
(list :encrypt
(list :invalid-recipients invalid-recipients))))))
```

```
(defun translate-gpgme-recipient-t-from-foreign (value)
(cond
((null-pointer-p value) nil)
(t (with-foreign-slots
((next keyid pubkey-algo status)
value (:struct gpgme-recipient))
(append (list (list :keyid keyid
:pubkey-algo pubkey-algo
:status status))
next))))))
```

```
(defun translate-gpgme-op-decrypt-result-t-from-foreign (value)
(cond
((null-pointer-p value) nil)
(t (with-foreign-slots
((unsupported-algorithm bitfield recipients file-name)
value (:struct gpgme-op-decrypt-result))
(list :decrypt (list :unsupported-algorithm unsupported-algorithm
:bitfield bitfield
:recipients recipients
:file-name file-name))))))
```

```
(defun translate-gpgme-new-signature-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((next type pubkey-algo hash-algo timestamp fpr sig-class)
         value (:struct gpgme-new-signature))
        (append (list (list :type type
                           :pubkey-algo pubkey-algo
                           :hash-algo hash-algo
                           :timestamp timestamp
                           :fpr fpr
                           :sig-class sig-class))
                next))))))
```

```
(defun translate-gpgme-op-sign-result-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((invalid-signers signatures)
         value (:struct gpgme-op-sign-result))
        (list :sign (list :invalid-signers invalid-signers
                          :signatures signatures))))))
```

```
(defun translate-gpgme-signature-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((next summary fpr status notations timestamp
         exp-timestamp bitfield validity validity-reason
         pubkey-algo hash-algo)
         value (:struct gpgme-signature))
        (append (list (list :summary summary
                           :fpr fpr
                           :status status
                           :notations notations
                           :timestamp timestamp
                           :exp-timestamp exp-timestamp
                           :bitfield bitfield
                           :validity validity
                           :validity-reason validity-reason
                           :pubkey-algo pubkey-algo)
                next))))))
```

```
(defun translate-gpgme-op-verify-result-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
        ((signatures file-name)
```



```

value (:struct gpgme-op-verify-result))
(list :verify (list :signatures signatures
                  :file-name file-name))))))

(defun translate-gpgme-import-status-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
         ((next fpr result status)
          value (:struct gpgme-import-status))
         (append (list (list :fpr fpr
                             :result result
                             :status status))
                  next))))))

(defun translate-gpgme-op-import-result-t-from-foreign (value)
  (cond
    ((null-pointer-p value) nil)
    (t (with-foreign-slots
         ((considered no-user-id imported imported-rsa unchanged
          new-user-ids new-sub-keys new-signatures
          new-revocations secret-read secret-imported
          secret-unchanged skipped-new-keys not-imported
          imports)
          value (:struct gpgme-op-import-result))
         (list :verify (list :considered considered
                             :no-user-id no-user-id
                             :imported imported
                             :imported-rsa imported-rsa
                             :unchanged unchanged
                             :new-user-ids new-user-ids
                             :new-sub-keys new-sub-keys
                             :new-signatures new-signatures
                             :new-revocations new-revocations
                             :secret-read secret-read
                             :secret-imported secret-imported
                             :secret-unchanged secret-unchanged
                             :skipped-new-keys skipped-new-keys
                             :not-imported not-imported
                             :imports imports))))))

```

;;; Error handling.

;;; Use gpgme-error-no-signal-t to suppress automatic error handling

;;; at translation time.

;;;

;;; FIXME: Part of this probably should be in gpg-error!

```
(define-condition gpgme-error (error)
  ((value :initarg :gpgme-error :reader gpgme-error-value))
  (:report (lambda (c stream)
             (format stream "GPGME returned error: ~A (~A)"
                      (gpgme-strerror (gpgme-error-value c))
                      (gpgme-strsource (gpgme-error-value c))))))
  (:documentation "Signalled when a GPGME function returns an error."))
```

```
(defun translate-gpgme-error-t-from-foreign (value)
  "Raise a GPGME-ERROR if VALUE is non-zero."
  (when (not (eql (gpgme-err-code value) :gpg-err-no-error))
    (error 'gpgme-error :gpgme-error value))
  (gpg-err-canonicalize value))
```

```
(defun translate-gpgme-error-t-to-foreign (value)
  "Canonicalize the error value."
  (if (eql (gpgme-err-code value) :gpg-err-no-error)
      0
      (gpg-err-as-value value)))
```

```
(defun translate-gpgme-error-no-signal-t-from-foreign (value)
  "Canonicalize the error value."
  (gpg-err-canonicalize value))
```

```
;;; *INTERNAL* Lispy Function Interface that is still close to the C
;;; interface.
```

```
;;; Passphrase callback management.
```

```
;;; Maybe: Instead, use subclassing, and provide a customizable
;;; default implementation for ease-of-use.
```

```
(defvar *passphrase-handles* (make-hash-table)
  "Hash table with GPGME context address as key and the corresponding
  passphrase callback object as value.")
```

```
(defcallback passphrase-cb gpgme-error-t ((handle :pointer)
      (uid-hint :string)
      (passphrase-info :string)
      (prev-was-bad :boolean)
      (fd :int))
  (handler-case
    (let* ((passphrase-cb
            (gethash (pointer-address handle) *passphrase-handles*))
          (passphrase
            (cond
             ((functionp passphrase-cb)
```

```

(concatenate 'string
  (funcall passphrase-cb uid-hint passphrase-info
    prev-was-bad)
  '(#\Newline)))
(t (concatenate 'string passphrase-cb '(#\Newline))))
  (passphrase-len (length passphrase))
  ;; FIXME: Could be more robust.
  (res (system-write fd passphrase passphrase-len)))
(cond
  ((< res passphrase-len) ; FIXME: Blech. A weak attempt to be robust.
    (gpgme-error :gpg-err-ival))
  (t (gpgme-error :gpg-err-no-error)))
  (gpgme-error (err) (gpgme-error-value err))
  (system-error (err) (gpgme-error-from-errno (system-error-errno err)))
  ;; FIXME: The original error gets lost here.
  (condition (err) (progn
    (when *debug*
      (format t "DEBUG: passphrase-cb: Unexpressable: ~A~%"
        err))
    (gpgme-error :gpg-err-general))))))

```

;;; CTX is a C-pointer to the context.

```

(defun gpgme-set-passphrase-cb (ctx cb)
  "Set the passphrase callback for CTX."
  (let ((handle (pointer-address ctx)))
    (cond
      (cb (setf (gethash handle *passphrase-handles*) cb)
        (c-gpgme-set-passphrase-cb ctx (callback passphrase-cb) ctx))
      (t (c-gpgme-set-passphrase-cb ctx (null-pointer) (null-pointer))
        (remhash handle *passphrase-handles*))))))

```

;;; Progress callback management.

;;; Maybe: Instead, use subclassing, and provide a customizable  
 ;;; default implementation for ease-of-use.

```

(defvar *progress-handles* (make-hash-table)
  "Hash table with GPGME context address as key and the corresponding  

  progress callback object as value.")

```

```

(defcallback progress-cb :void ((handle :pointer)
  (what :string)
  (type :int)
  (current :int)
  (total :int))
  (handler-case
    (let* ((progress-cb
      (gethash (pointer-address handle) *progress-handles*)))

```

```

(funcall progress-cb what type current total)
;; FIXME: The original error gets lost here.
(condition (err) (when *debug*
  (format t "DEBUG: progress-cb: Unexpressable: ~A~%"
    err))))

;;; CTX is a C-pointer to the context.
(defun gpgme-set-progress-cb (ctx cb)
  "Set the progress callback for CTX."
  (let ((handle (pointer-address ctx)))
    (cond
      (cb (setf (gethash handle *progress-handles*) cb)
        (c-gpgme-set-progress-cb ctx (callback progress-cb) ctx))
      (t (c-gpgme-set-progress-cb ctx (null-pointer) (null-pointer))
        (remhash handle *progress-handles*))))))

;;; Context management.

(defun gpgme-new (&key (protocol :openpgp) armor textmode include-certs
  keylist-mode passphrase progress file-name home-dir)
  "Allocate a new GPGME context."
  (with-foreign-object (ctx-p 'gpgme-ctx-t)
    (c-gpgme-new ctx-p)
    (let ((ctx (mem-ref ctx-p 'gpgme-ctx-t)))
      ;; Set locale?
      (gpgme-set-protocol ctx protocol)
      (gpgme-set-armor ctx armor)
      (gpgme-set-textmode ctx textmode)
      (when include-certs (gpgme-set-include-certs ctx include-certs))
      (when keylist-mode (gpgme-set-keylist-mode ctx keylist-mode))
      (gpgme-set-passphrase-cb ctx passphrase)
      (gpgme-set-progress-cb ctx progress)
      (gpgme-set-engine-info ctx protocol
        :file-name file-name :home-dir home-dir)
      (when *debug* (format t "DEBUG: gpgme-new: ~A~%" ctx)
        ctx)))

(defun gpgme-release (ctx)
  "Release a GPGME context."
  (when *debug* (format t "DEBUG: gpgme-release: ~A~%" ctx))
  (c-gpgme-release ctx))

(defun gpgme-set-protocol (ctx proto)
  "Set the protocol to be used by CTX to PROTO."
  (c-gpgme-set-protocol ctx proto))

(defun gpgme-get-protocol (ctx)
  "Get the protocol used with CTX."

```

```
(c-gpgme-get-protocol ctx))
```

```
;;; FIXME: How to do pretty printing?
```

```
;;;
```

```
;;; gpgme-get-protocol-name
```

```
(defun gpgme-set-armor (ctx armor)
```

```
  "If ARMOR is true, enable armor mode in CTX, disable it otherwise."
```

```
(c-gpgme-set-armor ctx armor))
```

```
(defun gpgme-armor-p (ctx)
```

```
  "Return true if armor mode is set for CTX."
```

```
(c-gpgme-get-armor ctx))
```

```
(defun gpgme-set-textmode (ctx textmode)
```

```
  "If TEXTMODE is true, enable text mode mode in CTX, disable it otherwise."
```

```
(c-gpgme-set-textmode ctx textmode))
```

```
(defun gpgme-textmode-p (ctx)
```

```
  "Return true if text mode mode is set for CTX."
```

```
(c-gpgme-get-textmode ctx))
```

```
(defun gpgme-set-include-certs (ctx &optional certs)
```

```
  "Include up to CERTS certificates in an S/MIME message."
```

```
(c-gpgme-set-include-certs ctx certs))
```

```
(defun gpgme-get-include-certs (ctx)
```

```
  "Return the number of certs to include in an S/MIME message,  
  or NIL if the default is used."
```

```
(c-gpgme-get-include-certs ctx))
```

```
(defun gpgme-get-keylist-mode (ctx)
```

```
  "Get the keylist mode in CTX."
```

```
(c-gpgme-get-keylist-mode ctx))
```

```
(defun gpgme-set-keylist-mode (ctx mode)
```

```
  "Set the keylist mode in CTX."
```

```
(c-gpgme-set-keylist-mode ctx mode))
```

```
;;; FIXME: How to handle locale? cffi-grovel?
```

```
(defun gpgme-get-engine-info (&optional ctx)
```

```
  "Retrieve the engine info for CTX, or the default if CTX is omitted."
```

```
(cond
```

```
  (ctx (c-gpgme-ctx-get-engine-info ctx))
```

```
  (t (with-foreign-object (info-p 'gpgme-engine-info-t)
```

```
    (c-gpgme-get-engine-info info-p)
```

```

(mem-ref info-p 'gpgme-engine-info-t))))))

(defun gpgme-set-engine-info (ctx proto &key file-name home-dir)
  "Set the engine info for CTX, or the default if CTX is NIL."
  (cond
   (ctx (c-gpgme-ctx-set-engine-info ctx proto file-name home-dir))
   (t (c-gpgme-set-engine-info proto file-name home-dir))))

;;; FIXME: How to do pretty printing?
;;;
;;; gpgme_pubkey_algo_name, gpgme_hash_algo_name

(defun gpgme-set-signers (ctx keys)
  "Set the signers for the context CTX."
  (c-gpgme-signers-clear ctx)
  (dolist (key keys) (c-gpgme-signers-add ctx key)))

;;;

(defun gpgme-set-sig-notation (ctx notations)
  "Set the sig notation for the context CTX."
  (c-gpgme-sig-notation-clear ctx)
  (dolist (notation notations)
   (c-gpgme-sig-notation-add
    ctx (first notation) (second notation) (third notation))))

(defun gpgme-get-sig-notation (ctx)
  "Get the signature notation data for the context CTX."
  (c-gpgme-sig-notation-get ctx))

;;; FIXME: Add I/O callback interface, for integration with clg.

;;; FIXME: Add gpgme_wait?

;;; Streams
;;; -----
;;;
;;; GPGME uses standard streams. You can define your own streams, or
;;; use the existing file or string streams.
;;;
;;; A stream-spec is either a stream, or a list with a stream as its
;;; first argument followed by keyword parameters: encoding,
;;; file-name.
;;;
;;; FIXME: Eventually, we should provide a class that can be mixed
;;; into stream classes and which provides accessors for encoding and
;;; file-names. This interface should be provided in addition to the
;;; above sleazy interface, because the sleazy interface is easier to

```



```

(set-errno +ebadf+
-1))))

(defcallback data-write-cb ssize-t ((handle :pointer) (buffer :pointer)
                                   (size size-t))
  (when *debug* (format t "DEBUG: gpgme-data-write-cb: want ~A~%" size))
  (let ((stream (gethash (pointer-address handle) *data-handles*)))
    (cond
     (stream
      (let* ((stream-type (stream-element-type stream))
             (seq (make-array size :element-type stream-type)))
        (cond
         ((equal stream-type '(unsigned-byte 8))
          (dotimes (i size)
            (setf (aref (the byte-array seq) i)
                  (mem-aref buffer :unsigned-char i))))
         ((eql stream-type 'character)
          (dotimes (i size)
            (setf (aref (the character-array seq) i)
                  (code-char (mem-aref buffer :unsigned-char i)))))
         (t
          (dotimes (i size)
            (setf (aref seq i)
                  (coerce (mem-aref buffer :unsigned-char i) stream-type))))))
        (write-sequence seq stream)
        size))
     (t
      (set-errno +ebadf+
-1))))

```

;;; This little helper macro allows us to swallow the cbs structure by  
 ;;; simply setting it to a null pointer, but still protect against  
 ;;; conditions.

```

(defmacro with-cbs-swallowed ((cbs) &body body)
  `(let ((,cbs (foreign-alloc '(:struct gpgme-data-cbs))))
    (unwind-protect (progn ,@body)
      (when (not (null-pointer-p ,cbs)) (foreign-free ,cbs))))))

```

```

(defun gpgme-data-new (stream &key encoding file-name)
  "Allocate a new GPGME data object for STREAM."
  (with-foreign-object (dh-p 'gpgme-data-t)
    ;; We allocate one CBS structure for each stream we wrap in a
    ;; data object. Although we could also share all these
    ;; structures, as they contain the very same callbacks, we need a
    ;; unique C pointer as handle anyway to look up the stream in the
    ;; callback. This is a convenient one to use.
    (with-cbs-swallowed (cbs)
      (setf (foreign-slot-value cbs '(:struct gpgme-data-cbs) 'read)
            stream)

```



```

    (callback data-read-cb))
  (setf (foreign-slot-value cbs '(:struct gpgme-data-cbs) 'write)
        (callback data-write-cb))
  (setf (foreign-slot-value cbs '(:struct gpgme-data-cbs) 'seek)
        (null-pointer))
  (setf (foreign-slot-value cbs '(:struct gpgme-data-cbs) 'release)
        (callback data-release-cb))
  (c-gpgme-data-new-from-cbs dh-p cbs cbs)
  (let ((dh (mem-ref dh-p 'gpgme-data-t)))
    (when encoding (gpgme-data-set-encoding dh encoding))
    (when file-name (gpgme-data-set-file-name dh file-name))
    ;; Install the stream into the hash table and swallow the cbs
    ;; structure while protecting against any errors.
    (unwind-protect
      (progn
        (setf (gethash (pointer-address cbs) *data-handles*) stream)
              (setf cbs (null-pointer)))
        (when (not (null-pointer-p cbs)) (c-gpgme-data-release dh))
        (when *debug* (format t "DEBUG: gpgme-data-new: ~A~%" dh)
          dh))))

    ;; This function releases a GPGME data object. It implicitly
    ;; invokes the data-release-cb function to clean up associated junk.
    (defun gpgme-data-release (dh)
      "Release a GPGME data object."
      (when *debug* (format t "DEBUG: gpgme-data-release: ~A~%" dh))
      (c-gpgme-data-release dh))

    (defclass data ()
      (c-data) ; The C data object pointer
      (:documentation "The GPGME data type.))

    (defmethod initialize-instance :after ((data data) &key streamspec
                                          &allow-other-keys)
      (let ((c-data (if (listp streamspec)
                        (apply #'gpgme-data-new streamspec)
                        (gpgme-data-new streamspec)))
            (cleanup t))
        (unwind-protect
          (progn
            (setf (slot-value data 'c-data) c-data)
            (finalize data (lambda () (gpgme-data-release c-data)))
            (setf cleanup nil))
          (if cleanup (gpgme-data-release c-data))))))

    (defun translate-gpgme-data-t-to-foreign (value)
      ;; Allow a pointer to be passed directly for the finalizer to work.
      (cond

```

```

((null value) (null-pointer))
((pointerp value) value)
(t (slot-value value 'c-data))))

(defmacro with-gpgme-data ((dh streamspec) &body body)
  `(let ((,dh (make-instance 'data :streamspec ,streamspec)))
    ,@body))

(defun gpgme-data-get-encoding (dh)
  "Get the encoding associated with the data object DH."
  (c-gpgme-data-get-encoding dh))

(defun gpgme-data-set-encoding (dh encoding)
  "Set the encoding associated with the data object DH to ENCODING."
  (c-gpgme-data-set-encoding dh encoding))

(defun gpgme-data-get-file-name (dh)
  "Get the file name associated with the data object DH."
  (c-gpgme-data-get-file-name dh))

(defun gpgme-data-set-file-name (dh file-name)
  "Set the file name associated with the data object DH to FILE-NAME."
  (c-gpgme-data-set-file-name dh file-name))

;;; FIXME: Add key accessor interfaces.

(defun gpgme-get-key (ctx fpr &optional secret)
  "Get the key with the fingerprint FPR from the context CTX."
  (with-foreign-object (key-p 'gpgme-key-t)
    (c-gpgme-get-key ctx fpr key-p secret)
    (mem-ref key-p 'gpgme-key-t)))

(defun gpgme-key-ref (key)
  "Acquire an additional reference to the key KEY."
  (when *debug* (format t "DEBUG: gpgme-key-ref: ~A~%" key))
  (c-gpgme-key-ref key))

(defun gpgme-key-unref (key)
  "Release a reference to the key KEY."
  (when *debug* (format t "DEBUG: gpgme-key-unref: ~A~%" key))
  (c-gpgme-key-unref key))

;;; FIXME: We REALLY need pretty printing for keys and all the other
;;; big structs.

;;; Various interfaces.

(defun gpgme-check-version (&optional req-version)

```

```

(c-gpgme-check-version req-version))

;;;
;;; The *EXPORTED* CLOS interface.
;;;

;;; The context type.

;;; We wrap the C context pointer into a class object to be able to
;;; stick a finalizer on it.

(defclass context ()
  (c-ctx ; The C context object pointer.
    signers ; The list of signers.
    sig-notation) ; The list of signers.
  (:documentation "The GPGME context type.))

(defmethod initialize-instance :after ((ctx context) &rest rest
  &key &allow-other-keys)
  (let ((c-ctx (apply #'gpgme-new rest))
        (cleanup t))
    (unwind-protect
      (progn (setf (slot-value ctx 'c-ctx) c-ctx)
              (finalize ctx (lambda () (gpgme-release c-ctx))))
      (setf cleanup nil)
        (if cleanup (gpgme-release c-ctx))))))

(defun translate-gpgme-ctx-t-to-foreign (value)
  ;; Allow a pointer to be passed directly for the finalizer to work.
  (if (pointerp value) value (slot-value value 'c-ctx)))

(defmacro context (&rest rest)
  "Create a new GPGME context."
  `(make-instance 'context ,@rest))

;;; The context type: Accessor functions.

;;; The context type: Accessor functions: Protocol.

(defgeneric protocol (ctx)
  (:documentation "Get the protocol of CONTEXT.))

(defmethod protocol ((ctx context))
  (gpgme-get-protocol ctx))

(defgeneric (setf protocol) (protocol ctx)
  (:documentation "Set the protocol of CONTEXT to PROTOCOL.))

```

;;; FIXME: Adjust translator to reject invalid protocols. Currently,  
;;; specifying an invalid protocol throws a "NIL is not 32 signed int"  
;;; error. This is suboptimal.

```
(defmethod (setf protocol) (protocol (ctx context))  
  (gpgme-set-protocol ctx protocol))
```

;;; The context type: Accessor functions: Armor.  
;;; FIXME: Is it good style to make foop setf-able? Or should it be  
;;; foo/foop for set/get?

```
(defgeneric armorp (ctx)  
  (:documentation "Get the armor flag of CONTEXT."))
```

```
(defmethod armorp ((ctx context))  
  (gpgme-armor-p ctx))
```

```
(defgeneric (setf armorp) (armor ctx)  
  (:documentation "Set the armor flag of CONTEXT to ARMOR."))
```

```
(defmethod (setf armorp) (armor (ctx context))  
  (gpgme-set-armor ctx armor))
```

;;; The context type: Accessor functions: Textmode.  
;;; FIXME: Is it good style to make foop setf-able? Or should it be  
;;; foo/foop for set/get?

```
(defgeneric textmodep (ctx)  
  (:documentation "Get the text mode flag of CONTEXT."))
```

```
(defmethod textmodep ((ctx context))  
  (gpgme-textmode-p ctx))
```

```
(defgeneric (setf textmodep) (textmode ctx)  
  (:documentation "Set the text mode flag of CONTEXT to TEXTMODE."))
```

```
(defmethod (setf textmodep) (textmode (ctx context))  
  (gpgme-set-textmode ctx textmode))
```

;;; The context type: Accessor functions: Include Certs.

```
(defgeneric include-certs (ctx)  
  (:documentation "Get the number of included certificates in an  
  S/MIME message, or NIL if the default is used."))
```

```
(defmethod include-certs ((ctx context))  
  (gpgme-get-include-certs ctx))
```

```
(defgeneric (setf include-certs) (certs ctx)
```

```
(:documentation "Return the number of certificates to include in an
S/MIME message, or NIL if the default is used.")
```

```
(defmethod (setf include-certs) (certs (ctx context))
  (gpgme-set-include-certs ctx certs))
```

;;; The context type: Accessor functions: Engine info.

```
(defgeneric engine-info (ctx)
  (:documentation "Retrieve the engine info for CTX."))
```

```
(defmethod engine-info ((ctx context))
  (gpgme-get-engine-info ctx))
```

```
(defgeneric (setf engine-info) (info ctx)
  (:documentation "Set the engine info for CTX."))
```

```
(defmethod (setf engine-info) (info (ctx context))
  (dolist (proto '(:openpgp :cms))
    (let ((pinfo (getf info proto)))
      (when pinfo
        (gpgme-set-engine-info ctx proto :file-name (getf pinfo :file-name)
          :home-dir (getf pinfo :home-dir))))))
```

;;; The context type: Accessor functions: Keylist mode.

```
(defgeneric keylist-mode (ctx)
  (:documentation "Get the keylist mode of CTX."))
```

```
(defmethod keylist-mode ((ctx context))
  (gpgme-get-keylist-mode ctx))
```

```
(defgeneric (setf keylist-mode) (mode ctx)
  (:documentation "Set the keylist mode of CTX to MODE."))
```

```
(defmethod (setf keylist-mode) (mode (ctx context))
  (gpgme-set-keylist-mode ctx mode))
```

;;; The context type: Accessor functions: Signers.

```
(defgeneric signers (ctx)
  (:documentation "Get the signers of CTX."))
```

```
(defmethod signers ((ctx context))
  (slot-value ctx 'signers))
```

```
(defgeneric (setf signers) (signers ctx)
  (:documentation "Set the signers of CTX to SIGNERS."))
```

```
(defmethod (setf keylist-mode) (signers (ctx context))
  (gpgme-set-signers ctx signers)
  (setf (slot-value ctx 'signers) signers))
```

;;; The context type: Accessor functions: Sig notations.

```
(defgeneric sig-notations (ctx)
  (:documentation "Get the signature notations of CTX."))
```

```
(defmethod sig-notations ((ctx context))
  (slot-value ctx 'signers))
```

```
(defgeneric (setf sig-notations) (notations ctx)
  (:documentation "Set the signature notations of CTX to NOTATIONS."))
```

```
(defmethod (setf sig-notations) (notations (ctx context))
  (gpgme-set-signers ctx notations)
  (setf (slot-value ctx 'notations) notations))
```

;;; The context type: Support macros.

```
(defmacro with-context ((ctx &rest rest) &body body)
  `(let ((,ctx (make-instance 'context ,@rest)))
    ,@body))
```

;;; The key type.

```
(defclass key ()
  (c-key) ; The C key object pointer.
  (:documentation "The GPGME key type."))
```

;;; In the initializer, we swallow the c-key argument.

```
(defmethod initialize-instance :after ((key key) &key c-key
  &allow-other-keys)
  (setf (slot-value key 'c-key) c-key)
  (finalize key (lambda () (gpgme-key-unref c-key))))
```

```
(defun translate-gpgme-key-t-from-foreign (value)
  (when *debug* (format t "DEBUG: import key: ~A~%" value))
  (make-instance 'key :c-key value))
```

```
(defun translate-gpgme-key-t-to-foreign (value)
  ;; Allow a pointer to be passed directly for the finalizer to work.
  (if (pointerp value) value (slot-value value 'c-key)))
```

```
(defmethod print-object ((key key) stream)
  (print-unreadable-object (key stream :type t :identity t))
```

```
(format stream "~s" (fpr key)))
```

```
::: The key type: Accessor functions.
```

```
::: FIXME: The bitfield and flags contain redundant information at  
::: this point. FIXME: Deal nicer with zero-length name (policy url)  
::: and zero length value (omit?) and human-readable (convert to string).  
::: FIXME: Turn binary data into sequence or vector or what it should be.  
::: FIXME: Turn the whole thing into a hash?
```

```
(defun translate-gpgme-sig-notation-t-from-foreign (value)  
  (cond  
    ((null-pointer-p value) nil)  
    (t (with-foreign-slots  
        ((next name value name-len value-len flags bitfield)  
         value (:struct gpgme-sig-notation))  
      (append (list (list  
                    :name name  
                    :value value  
                    :name-len name-len  
                    :value-len value-len  
                    :flags flags  
                    :bitfield bitfield))  
              next))))))
```

```
::: FIXME: Deal nicer with timestamps. bitfield field name?
```

```
(defun translate-gpgme-subkey-t-from-foreign (value)  
  (cond  
    ((null-pointer-p value) nil)  
    (t (with-foreign-slots  
        ((next bitfield pubkey-algo length keyid fpr timestamp expires)  
         value (:struct gpgme-subkey))  
      (append (list (list  
                    :bitfield bitfield  
                    :pubkey-algo pubkey-algo  
                    :length length  
                    :keyid keyid  
                    :fpr fpr  
                    :timestamp timestamp  
                    :expires expires))  
              next))))))
```

```
(defun translate-gpgme-key-sig-t-from-foreign (value)  
  (cond  
    ((null-pointer-p value) nil)  
    (t (with-foreign-slots  
        ((next bitfield pubkey-algo keyid timestamp expires status  
         uid name email comment sig-class)  
         value (:struct gpgme-key-sig))
```

```
(append (list (list
:bitfield bitfield
:pubkey-algo pubkey-algo
:keyid keyid
:timestamp timestamp
:expires expires
:status status
:uid uid
:name name
:email email
:comment comment
:sig-class sig-class))
next))))
```

```
(defun translate-gpgme-user-id-t-from-foreign (value)
(cond
((null-pointer-p value) nil)
(t (with-foreign-slots
((next bitfield validity uid name email comment signatures)
value (:struct gpgme-user-id))
(append (list (list
:bitfield bitfield
:validity validity
:uid uid
:name name
:email email
:comment comment
:signatures signatures))
next))))))
```

```
(defun key-data (key)
(with-slots (c-key) key
(with-foreign-slots
((bitfield protocol issuer-serial issuer-name chain-id
owner-trust subkeys uids keylist-mode)
c-key (:struct gpgme-key))
(list
:bitfield bitfield
:protocol protocol
:issuer-serial issuer-serial
:issuer-name issuer-name
:chain-id chain-id
:owner-trust owner-trust
:subkeys subkeys
:uids uids
:keylist-mode keylist-mode))
))
```



```
(defgeneric fpr (key)
  (:documentation "Get the primary fingerprint of the key."))
```

```
(defmethod fpr ((key key))
  (getf (car (getf (key-data key) :subkeys)) :fpr))
```

```
::; The context type: Crypto-Operations.
```

```
(defgeneric get-key (ctx fpr &optional secret)
  (:documentation "Get the (secret) key FPR from CTX."))
```

```
(defmethod get-key ((ctx context) fpr &optional secret)
  (gpgme-get-key ctx fpr secret))
```

```
::; Encrypt.
```

```
(defgeneric op-encrypt (ctx recp plain cipher &key always-trust sign)
  (:documentation "Encrypt."))
```

```
(defmethod op-encrypt ((ctx context) recp plain cipher
  &key always-trust sign)
  (with-foreign-object (c-recp :pointer (+ 1 (length recp)))
    (dotimes (i (length recp))
      (setf (mem-aref c-recp 'gpgme-key-t i) (elt recp i)))
      (setf (mem-aref c-recp :pointer (length recp)) (null-pointer))
      (with-gpgme-data (in plain)
        (with-gpgme-data (out cipher)
          (let ((flags))
            (if always-trust (push :always-trust flags))
            (cond
              (sign
               (c-gpgme-op-encrypt-sign ctx c-recp flags in out)
               (append (c-gpgme-op-encrypt-result ctx)
                       (c-gpgme-op-sign-result ctx)))
              (t
               (c-gpgme-op-encrypt ctx c-recp flags in out)
               (c-gpgme-op-encrypt-result ctx))))))))))
```

```
::; Decrypt.
```

```
(defgeneric op-decrypt (ctx cipher plain &key verify)
  (:documentation "Decrypt."))
```

```
(defmethod op-decrypt ((ctx context) cipher plain &key verify)
  (with-gpgme-data (in cipher)
    (with-gpgme-data (out plain)
```

```
(cond
  (verify
    (c-gpgme-op-decrypt-verify ctx in out)
    (append (c-gpgme-op-decrypt-result ctx)
      (c-gpgme-op-verify-result ctx)))
  (t
    (c-gpgme-op-decrypt ctx in out)
    (c-gpgme-op-decrypt-result ctx))))))
```

::: Signing.

```
(defgeneric op-sign (ctx plain sig &optional mode)
  (:documentation "Sign."))
```

```
(defmethod op-sign ((ctx context) plain sig &optional (mode :none))
  (with-gpgme-data (in plain)
    (with-gpgme-data (out sig)
      (c-gpgme-op-sign ctx in out mode)
      (c-gpgme-op-sign-result ctx))))
```

::: Verify.

```
(defgeneric op-verify (ctx sig text &key detached)
  (:documentation "Verify."))
```

```
(defmethod op-verify ((ctx context) sig text &key detached)
  (with-gpgme-data (in sig)
    (with-gpgme-data (on text)
      (c-gpgme-op-verify ctx in (if detached on nil)
        (if detached nil on))
      (c-gpgme-op-verify-result ctx))))
```

::: Import.

```
(defgeneric op-import (ctx keydata)
  (:documentation "Import."))
```

```
(defmethod op-import ((ctx context) keydata)
  (with-gpgme-data (in keydata)
    (c-gpgme-op-import ctx in)
    (c-gpgme-op-import-result ctx)))
```

::: Export.

```
(defgeneric op-export (ctx pattern keydata)
  (:documentation "Export public key data matching PATTERN to the
  stream KEYDATA."))
```

```
(defmethod op-export ((ctx context) pattern keydata)
  (with-gpgme-data (dh keydata)
    (c-gpgme-op-export ctx pattern 0 dh)))
```

;;; Key generation.

```
;;;
;;; Initialization
;;;
```

```
(defun check-version (&optional req-version)
  "Check that the GPGME version requirement is satisfied."
  (gpgme-check-version req-version))
```

```
(defparameter *version* (check-version)
  "The version number of GPGME used.")
(21:protected-private-key(3:elg(1:p193:5*n^f"Q'R0_6<y mec \=c7S8u[5
ZF'xf5yi9F@T=KhZdU0(k5nZEI/ R]njVITPU$W<xs-Yx)(1:g1:)(1:y192:O9GNR{ ?]Y_W[FD*zurmk%'R\>>e9pe
eU)uS% VJ!5F)yH*O
]l'7{ @wJmQP^jurx'V2H2j[G{q_ "8()(9:protected25:openpgp-s2k3-sha1-aes-cbc((4:sha18:o"%7:5242880)16:Hs* }u
)256:Gzk3%\Kb2=ooo@, )eBBI3F|OQP3eD%n,;~L-6UH^=64i);l
e+sG"(mlH_2sn_BBO7hRcZUt(p6,{5|37C3m8EY9=gQ )(12:protected-at15:20101008T070148)))
00~0
 *H
0k10 UDE10U
Dsseldorf10U
```

```
g10 Code GmbH10UAegypten Project10Utest cert 10
011203093638Z
021203093638Z0k10 UDE10U
Dsseldorf10U
```

```
g10 Code GmbH10UAegypten Project10Utest cert 100
 *H
0l+Pu.\-ZT$e'nE&h4<}BePm[%j-/7PcHKi@FKy~npcd${}K~Q00U37Tq8_eK40U#037Tq8_eK4om0k10 UDE10U
Dsseldorf10U
```

```
g10 Code GmbH10UAegypten Project10Utest cert 10U00
 *H
l8gD Z
wYL,M'j
pk2pf[L ;Rl}#h$~O!9;3e\A'v&P^$'Oc.-TS~A>:fQY<
-----BEGIN PGP PUBLIC KEY BLOCK-----
```

```
mQENBFsMHecBCACqdJgqa+CeNYwPCK+MpOwAV6uFVjDyO2LmOs6+XfDWRBU/Zjtz
8zdYNKSbLjkWN4ujV5aiyA7MtEofszzYLEoKUtlwiDScHMPW8qmEFDv19g26MeAV
rTno9D5KodHvEIs8wnrQBs8ix0WLbh6J1Dtt8HQgIbN+v3gaRQrgBFe6z2ZYpHHx
```

ZfOu3iFKIm2WE/NekRkvvFio3ApGvRhGIYw6JMmugBlo7s5xosJK0I9dkPGIEEtt  
aF1RkcMj8sWG9vHAXcJgGfFXSN9YLppyXpkuZGm4+gJLB2a3rbQCZVFnxCyG4O  
ybjkP8Jw6Udm89bK2ucYFfdmYn/nJqRxeNABEBAAG0I1Rlc3QgTm9Qcm12S2V5  
IDxub2JvZHIhZlZhbXBsZS5vcmc+iQFOBBMBCAA4FiEE4Fmh4IZtMa4TEXCITZou  
EzBBU9EFAIsMHecCGwMFCwkIBwIGFQoJCAaCBBYCAwECHgECF4AACgkQTZouEzBB  
U9F+qwf/SHJ4uRnTWgyJ71FBxQDYCBq3jbi6e7hMkRPbJyJdnPIMAb2p0PJjBgjW  
0pp4+kDPZans3UDHbma1u/SFI4/y6isJiK94Bk5xp5YliLGNuUceTjgDFe6lBhfQ1  
zVWZC/NF3tPgbziXxQTNt34nS+9dbV/QFDLW0POcN7C0jR/hgkBjMEH2PezWhSj  
mL/yLflUYAoXVpXjfC5aPJKqw0tR7m5ibznjCphE+FUMRg8EOmJcg6soeJ5QspU  
k2dPN3+Y0zCTNRgAHEI+yIQbM6pio6v2c+UCtT1QhW4xSI38/kcEG8QiM55r1TUy  
FcWAY5n5t1nNztMxxse3LqEon3rKiLkBDQRbDB3nAQgAqfAjSjengERTM+ZYOWN0  
QF2v2FuEuMe8mhu7Met7SN2zGv1LnhTNshEa9IABEfjZirE2Tqx4xCWDwDedK4  
u1ToFvcnuAMnq2O47Sh+eTypsf6WPFtPBWf6ctKY31hFXjgoyDBULBvl43XU/D9C  
Mt7nsKDPYHVrrnge/qWPYVcb+cO0sSwNIImMcwQSdTQ3VBq7MeNS9ZeBcXi+XCjHN  
kjNum2AQQpkHHDQV7871yQ8RIILvZSSfkLb0/SNDU+bGaw2G3lcyKdIfZi2EWWZT  
oCbH38I+LV7nAEe4zFpHwW8X0Dkx2aLgxe6UszDH9L3eGhTLpJhOSiaanG+zZKm  
+QARAQABiQE2BBgBCAAgFiEE4Fmh4IZtMa4TEXCITZouEzBBU9EFAIsMHecCGwwA  
CgkQTZouEzBBU9H5TQgAolWvIsez/WW8N2tmZENX0LOFNb+1S4L4X983njwNdoVI  
w19pbj+8RIHF/H9kcPGi7jK96gvlykQn3uez/95D2AiRfW5KYdOouFisKgHpv8Ay  
BrhclHv11yK+X/0iTD0scYaG7np5162xLkaxSO9hsz2fGv20RKaXCWki69fWw0BR  
XII5pZh2YFei2ZhH/tIMIw65h3w0gtgaZBBdpZTOOW4zvghyN+0MSObqkI1BvUJu  
caDFI4d6ZTmP5SY+pZyktZ4bg/vMH5VFxdIKgbLx9uVeTvOupvbAW0TnULYGUBQE  
nm+S0zr3W18t64e4sS3oHse8zCqo1iiImpba6F1Oaw==

=y6DD

-----END PGP PUBLIC KEY BLOCK-----

```
from __future__ import absolute_import
```

```
import cython
```

```
import gpg
```

```
c = gpg.Context()
```

```
seckeys = c.keylist(pattern=None, secret=True)
```

```
pubkeys = c.keylist(pattern=None, secret=False)
```

```
seclist = list(seckeys)
```

```
secnum = len(seclist)
```

```
publist = list(pubkeys)
```

```
pubnum = len(publist)
```

```
if cython.compiled is True:
```

```
    cc = "Powered by Cython compiled C code."
```

```
else:
```

```
    cc = "Powered by Python."
```

```
print("""
```

```
    Number of secret keys: {0}
```

```
    Number of public keys: {1}
```

{2}

"".format(secnum, pubnum, cc))

This is gpgme.info, produced by makeinfo version 6.3 from gpgme.texi.

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INFO-DIR-SECTION GNU Libraries

START-INFO-DIR-ENTRY

\* GPGME: (gpgme). Adding support for cryptography to your program.

END-INFO-DIR-ENTRY

This file documents the GPGME library.

This is Edition 1.12.1-beta100, last updated 3 December 2018, of The GnuPG Made Easy Reference Manual, for Version 1.12.1-beta100.

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Indirect:

gpgme.info-1: 1689

gpgme.info-2: 301885

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(Indirect)

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End Tag Table

Local Variables:

coding: utf-8

End:

# -\*- mode: org -\*-

#+TITLE: A Short History of the GPGME bindings for Python

#+LATEX\_COMPILER: xelatex

#+LATEX\_CLASS: article

#+LATEX\_CLASS\_OPTIONS: [12pt]

#+LATEX\_HEADER: \usepackage{xltextra}

#+LATEX\_HEADER: \usepackage[margin=1in]{geometry}

#+LATEX\_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}

\* Overview

:PROPERTIES:

:CUSTOM\_ID: overview

:END:

Version:	0.0.1
GPGME Version:	1.13.0
Author:	Ben McGinnes <ben@gnupg.org>



| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |

| Language: | Australian English, British English |

| xml:lang: | en-AU, en-GB, en |

The GPGME Python bindings passed through many hands and numerous phases before, after a fifteen year journey, coming full circle to return to the source. This is a short explanation of that journey.

\*\* In the beginning

:PROPERTIES:

:CUSTOM\_ID: in-the-begining

:END:

In 2002 John Goerzen released PyME; Python bindings for the GPGME module which utilised the current release of Python of the time and SWIG.<sup>[fn:1]</sup> Shortly after creating it and ensuring it worked he stopped supporting it, though he left his work available on his Gopher site.

\*\* Keeping the flame alive

:PROPERTIES:

:CUSTOM\_ID: keeping-the-flame-alive

:END:

A couple of years later the project was picked up by Igor Belyi and actively developed and maintained by him from 2004 to 2008. Igor's whereabouts at the time of this document's creation are unknown, but the current authors do hope he is well. We're assuming (or hoping) that life did what life does and made continuing untenable.

\*\* Passing the torch

:PROPERTIES:

:CUSTOM\_ID: passing-the-torch

:END:

In 2014 Martin Albrecht wanted to patch a bug in the PyME code and discovered the absence of Igor. Following a discussion on the PyME mailing list he became the new maintainer for PyME, releasing version 0.9.0 in May of that year. He remains the maintainer of the original PyME release in Python 2.6 and 2.7 (available via PyPI).

\*\* Coming full circle

:PROPERTIES:

:CUSTOM\_ID: ouroboros

:END:

In 2015 Ben McGinnes approached Martin about a Python 3 version, while investigating how complex a task this would be the task ended up being completed. A subsequent discussion with Werner Koch led to the decision to fold the Python 3 port back into the original GPGME release in the languages subdirectory for non-C bindings under the module name of `=pyme3=`.

In 2016 this PyME module was integrated back into the GPGME project by Justus Winter. During the course of this work Justus adjusted the port to restore limited support for Python 2, but not as many minor point releases as the original PyME package supports. During the course of this integration the package was renamed to more accurately reflect its status as a component of GPGME. The `=pyme3=` module was renamed to `=gpg=` and adopted by the upstream GnuPG team.

In 2017 Justus departed G10code and the GnuPG team. Following this Ben returned to maintain of `gpgme` Python bindings and continue building them from that point.

\* Relics of the past

:PROPERTIES:

:CUSTOM\_ID: relics-past

:END:

There are a few things, in addition to code specific factors, such as SWIG itself, which are worth noting here.

\*\* The Annoyances of Git

:PROPERTIES:

:CUSTOM\_ID: the-annoyances-of-git

:END:

As anyone who has ever worked with git knows, submodules are horrible way to deal with pretty much anything. In the interests of avoiding migraines, that was skipped with addition of the PyME code to GPGME.

Instead the files were added to a subdirectory of the `=lang/=` directory, along with a copy of the entire git log up to that point as a separate file within the `=lang/python/docs/=` directory.<sup>[fn:2]</sup> As the log for PyME is nearly 100KB and the log for GPGME is approximately 1MB, this would cause considerable bloat, as well as some confusion, should the two be merged.

Hence the unfortunate, but necessary, step to simply move the

files. A regular repository version has been maintained should it be possible to implement this better in the future.

\*\* The Perils of PyPI

:PROPERTIES:

:CUSTOM\_ID: the-perils-of-pypi

:END:

The early port of the Python 2 `pyme` module as `pyme3` was never added to PyPI while the focus remained on development and testing during 2015 and early 2016. Later in 2016, however, when Justus completed his major integration work and subsequently renamed the module from `pyme3` to `gpg`, some prior releases were also provided through PyPI.

Since these bindings require a matching release of the GPGME libraries in order to function, it was determined that there was little benefit in also providing a copy through PyPI since anyone obtaining the GPGME source code would obtain the Python bindings source code at the same time. Whereas there was the potential to sew confusion amongst Python users installing the module from PyPI, only to discover that without the relevant C files, header files or SWIG compiled binaries, the Python module did them little good.

There are only two files on PyPI which might turn up in a search for this module or a sample of its content:

1. `gpg` (1.8.0) - Python bindings for GPGME GnuPG cryptography library
2. `pyme` (0.9.0) - Python support for GPGME GnuPG cryptography library

\*\*\* GPG 180 - Python bindings for GPGME GnuPG cryptography library

:PROPERTIES:

:CUSTOM\_ID: pypi-gpgme-180

:END:

This is the most recent version to reach PyPI and is the version of the official Python bindings which shipped with GPGME 1.8.0. If you have GPGME 1.8.0 installed and `/only/` 1.8.0 installed, then it is probably safe to use this copy from PyPI.

As there have been a lot of changes since the release of GPGME 1.8.0, the GnuPG Project recommends not using this version of the module and instead installing the current version of GPGME along with the Python bindings included with that package.

\*\*\* PyME 090 - Python support for GPGME GnuPG cryptography library

:PROPERTIES:  
:CUSTOM\_ID: pypi-gpgme-90  
:END:

This is the last release of the PyME bindings maintained by Martin Albrecht and is only compatible with Python 2, it will not work with Python 3. This is the version of the software from which the port from Python 2 to Python 3 code was made in 2015.

Users of the more recent Python bindings will recognise numerous points of similarity, but also significant differences. It is likely that the more recent official bindings will feel "more pythonic."

For those using Python 2, there is essentially no harm in using this module, but it may lack a number of more recent features added to GPGME.

\* Footnotes

[fn:1] In all likelihood this would have been Python 2.2 or possibly Python 2.3.

[fn:2] The entire PyME git log and other preceding VCS logs are located in the =gpgme/lang/python/docs/old-commits.log= file.  
2011-12-02 Werner Koch <wk@g10code.com>

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2008-11-08 Moritz <moritz@gnu.org>

\* gpgme.lisp (size-t): Wrong call to defctype: function accepts optional, not keyword argument.

(ssize-t): Likewise.

(off-t): Likewise.

(gpgme-data-t, gpgme-ctx-t): Likewise.

(gpgme-error-t): Likewise.

(gpgme-error-no-signal-t): Likewise.

(gpgme-err-code-t): Likewise.

(gpgme-err-source-t): Likewise.

(gpgme-sig-notation-t, gpgme-engine-info-t): Likewise.

(gpgme-subkey-t): Likewise.

(gpgme-key-sig-t): Likewise.

(gpgme-user-id-t): Likewise.

(gpgme-key-t): Likewise.  
(gpgme-data-cbs-t): Likewise.  
(gpgme-invalid-key-t): Likewise.  
(gpgme-op-encrypt-result-t): Likewise.  
(gpgme-recipient-t): Likewise.  
(gpgme-op-decrypt-result-t): Likewise.  
(gpgme-new-signature-t): Likewise.  
(gpgme-op-sign-result-t): Likewise.  
(gpgme-signature-t): Likewise.  
(gpgme-op-verify-result-t): Likewise.  
(gpgme-import-status-t): Likewise.  
(gpgme-op-import-result-t): Likewise.  
(gpgme-op-genkey-result-t): Likewise.  
(gpgme-op-keylist-result-t): Likewise.

2006-07-06 Marcus Brinkmann <marcus@g10code.de>

\* Initial release.

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# HACKING -\*- org -\*-

#+TITLE: Hacking notes for GPGME

#+STARTUP: showall

\* How to contribute

\*\* No more ChangeLog files

Do not modify any of the ChangeLog files in GPGME. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist" time. As such, there are strict requirements on the form of the commit log messages. The old ChangeLog files have all be renamed to ChangeLog-2011

\*\* Commit log requirements

Your commit log should always start with a one-line summary, the second line should be blank, and the remaining lines are usually ChangeLog-style entries for all affected files. However, it's fine

-- even recommended -- to write a few lines of prose describing the change, when the summary and ChangeLog entries don't give enough of the big picture. Omit the leading TABs that you're used to seeing in a "real" ChangeLog file, but keep the maximum line length at 72 or smaller, so that the generated ChangeLog lines, each with its leading TAB, will not exceed 80 columns. If you want to add text which shall not be copied to the ChangeLog, separate it by a line consisting of two dashes at the begin of a line.

Note that ./autogen.sh installs a git hook to do some basic syntax checking on the commit log message.

Typo fixes and documentation updates don't need a ChangeLog entry; thus you would use a commit message like

```
#+begin_example
Fix typo in a comment

--
#+end_example
```

The marker line here is important; without it the first line would appear in the ChangeLog.

If you exceptionally need to have longer lines in a commit log you may do this after this scissor line:

```
#+begin_example
# ----- >8 -----
#+end_example
```

(hash, blank, 24 dashes, blank, scissor, blank, 24 dashes).

Note that such a comment will be removed if the git commit option `--cleanup-scissor=` is used.

## \*\* License policy

GPGME is currently licensed under the LGPLv2.1+ with tools and the manual being under the GPLv3+. We may eventually update to a newer version of the licenses or a combination of them. It is thus important, that all contributed code allows for an update of the license; for example we can't accept code under the LGPLv2(only).

If you want to contribute code or documentation to GPGME you are asked to assert that the contribution is in accordance to the "GPGME Developer's Certificate of Origin" as found in the file "DCO".

Except for a slight wording change, this DCO is identical to the one used by the Linux kernel. Please take these simple steps:

- Decide which mail address you want to use. Please have your real

name in the address and not a pseudonym. Anonymous contributions can only be done if you find a proxy who certifies for you.

- If your employer or school might claim ownership of code written by you; you need to talk to them to make sure that you have the right to contribute under the DCO.
- Send an OpenPGP signed mail to the `gnupg-devel@gnupg.org` public mailing list from your mail address. Include a copy of the DCO as found in the official master branch. Insert your name and email address into the DCO in the same way you want to use it later.

Example:

```
Signed-off-by: Joe R. Hacker <joe@example.org>
```

If you need it, you may perform simple transformations on the mail address: Replacing "@" by " at " or "." by " dot ".)

- That's it. From now on you only need to add a "Signed-off-by:" line with your name and mail address to the GIT commit message. It is recommended to send the patches using a PGP/MIME signed mail.

#### \*\* Coding standards

Please follow the GNU coding standards. If you are in doubt consult the existing code as an example. Do no re-indent code without a need. If you really need to do it, use a separate commit for such a change.

- C99 syntax should not be used; stick to C90.
- Please do not use C++ `///  
//` style comments.
- Try to fit lines into 80 columns.
- Ignore signed/unsigned pointer mismatches
- No arithmetic on void pointers; cast to `char*` first.

#### \*\* Commit log keywords

- GnuPG-bug-id :: Values are comma or space delimited bug numbers from `bug.gnupg.org` pertaining to this commit.
- Debian-bug-id :: Same as above but from the Debian bug tracker.
- CVE-id :: CVE id number pertaining to this commit.
- Regression-due-to :: Commit id of the regression fixed by this commit.
- Fixes-commit :: Commit id this commit fixes.
- Reported-by :: Value is a name or mail address of a bug reporte.
- Suggested-by :: Value is a name or mail address of someone how suggested this change.
- Co-authored-by :: Name or mail address of a co-author

- Some-comments-by :: Name or mail address of the author of additional comments (commit log or code).
- Proofread-by :: Sometimes used by translation commits.
- Signed-off-by :: Name or mail address of the developer

\* Debug hints

- Use gpgme-tool for manual tests.
- The envvar GPGME\_DEBUG enables debugging; see debug.[ch] for details.

2011-12-02 Werner Koch <wk@g10code.com>

NB: ChangeLog files are no longer manually maintained. Starting on December 1st, 2011 we put change information only in the GIT commit log, and generate a top-level ChangeLog file from logs at "make dist". See doc/HACKING for details.

2011-04-06 Werner Koch <wk@g10code.com>

- \* gpg-error.m4: Update from current libgpg-error repo.

2010-05-07 Werner Koch <wk@g10code.com>

- \* libassuan.m4: Update from libassuan svn.

2009-11-10 Marcus Brinkmann <marcus@g10code.de>

- \* libassuan.m4: Fix LIBASSUAN\_VERSION.

2006-06-08 Marcus Brinkmann <marcus@g10code.de>

- \* pth.m4: Add --all to pth-config invocation.

2006-02-22 Marcus Brinkmann <marcus@g10code.de>

- \* pth.m4: Fix code generation (required for Max OS X). Submitted by Emanuele Giaquinta <exg@gentoo.org>.

2005-11-17 Marcus Brinkmann <marcus@g10code.de>

- \* glib-2.0.m4: New file.

2004-12-28 Werner Koch <wk@g10code.com>

- \* pth.m4: Changed quoting for use with automake 1.9.

2004-09-14 Marcus Brinkmann <marcus@g10code.de>



\* pth.m4: Disable \_ac\_pth\_line, and don't fail if Pth is not found.

\* glibc21.m4: New file.

\* gpg-error.m4: New file.

\* pth.m4: New file.

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Configuration files may go here. Note that config.h.in is auto-generated so that this file is not in git.

```
(11:private-key(3:dsa(1:p129:eC_L&$2,6tx.gh1VirlqI9
,^g3.$DveUvX1'oIj)(1:q21: #UfK2z(tuVG)(1:g128:zu^Rab;qeQQA B?/6/aspfE/
gx!Mr0YY*oMrJc2xWG:.r6)(1:y128:Ufj^@oEn4j#QrRq" RcEa E/}4C{3A
5+~~.#!+
)W&5d)j)(1:x21:` )))
```

GPGME Developer's Certificate of Origin. Version 1.0

=====

By making a contribution to the GPGME project, I certify that:

(a) The contribution was created in whole or in part by me and I have the right to submit it under the free software license indicated in the file; or

(b) The contribution is based upon previous work that, to the best of my knowledge, is covered under an appropriate free software license and I have the right under that license to submit that work with modifications, whether created in whole or in part by me, under the same free software license (unless I am permitted to submit under a different license), as indicated in the file; or

(c) The contribution was provided directly to me by some other person who certified (a), (b) or (c) and I have not modified it.

(d) I understand and agree that this project and the contribution are public and that a record of the contribution (including all personal information I submit with it, including my

sign-off) is maintained indefinitely and may be redistributed consistent with this project or the free software license(s) involved.

Signed-off-by: [Your name and mail address]

```
\input texinfo @c -*- texinfo -*-
```

```
@c %**start of header
```

```
@setfilename gpgme-python-howto.info
```

```
@settitle GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO (English)
```

```
@documentencoding utf-8
```

```
@documentlanguage en
```

```
@c %**end of header
```

```
@finalout
```

```
@titlepage
```

```
@title GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO (English)
```

```
@author Ben McGinnes
```

```
@end titlepage
```

```
@contents
```

```
@ifnottex
```

```
@node Top
```

```
@top GNU Privacy Guard (GnuPG) Made Easy Python Bindings HOWTO (English)
```

```
@end ifnottex
```

```
@menu
```

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## Difference between the Python bindings and other GnuPG Python packages

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- \* License GPL compatible::

@end detailmenu

@end menu

@node Introduction

@chapter Introduction

@multitable {aaaaaaaaaaaaaaaa} {aa}

@item Version:

@tab 0.1.5

@item GPGME Version:

@tab 1.13.0

@item Author:

@tab Ben McGinnes <ben@@gnupg.org>

@item Author GPG Key:

@tab DB4724E6FA4286C92B4E55C4321E4E2373590E5D

@item Language:

@tab Australian English, British English

@item Language codes:

@tab en-AU, en-GB, en

@end multitable

This document provides basic instruction in how to use the GPGME Python bindings to programmatically leverage the GPGME library.

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\* Python 2 versus Python 3::

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@end menu

@node Python 2 versus Python 3

@section Python 2 versus Python 3

Though the GPGME Python bindings themselves provide support for both Python 2 and 3, the focus is unequivocally on Python 3 and specifically from Python 3.4 and above. As a consequence all the examples and instructions in this guide use Python 3 code.

Much of it will work with Python 2, but much of it also deals with Python 3 byte literals, particularly when reading and writing data. Developers concentrating on Python 2.7, and possibly even 2.6, will need to make the appropriate modifications to support the older string and unicode types as opposed to bytes.

There are multiple reasons for concentrating on Python 3; some of which relate to the immediate integration of these bindings, some of which relate to longer term plans for both GPGME and the python bindings and some of which relate to the impending EOL period for Python 2.7. Essentially, though, there is little value in tying the bindings to a version of the language which is a dead end and the advantages offered by Python 3 over Python 2 make handling the data types with which GPGME deals considerably easier.

@node Examples

@section Examples

All of the examples found in this document can be found as Python 3 scripts in the @samp{lang/python/examples/howto} directory.

@node Unofficial Drafts

@section Unofficial Drafts

In addition to shipping with each release of GPGME, there is a section on locations to read or download @ref{Draft Editions of this HOWTO, , draft editions} of this document from at the end of it. These are unofficial versions produced in between major releases.

@node What's New  
@section What's New

Full details of what is new are now available in the @uref{what-is-new.org, What's New} file and archives of the preceding @emph{What's New} sections are available in the @uref{what-was-new, What Was New} file.

@menu  
\* New in GPGME 1130::  
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@end menu

@node New in GPGME 1130  
@subsection New in GPGME 1130

See the @uref{what-is-new#new-stuff-1-13-0, What's New} document for what is new in version 1.13.0.

@node New in GPGME 1120  
@subsection New in GPGME 1120

See the @uref{what-was-new#new-stuff-1-12-0, What Was New} document for what was new in version 1.12.0.

@node GPGME Concepts  
@chapter GPGME Concepts

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\* A C API::  
\* Python bindings::  
\* Difference between the Python bindings and other GnuPG Python packages::  
@end menu

@node A C API  
@section A C API

Unlike many modern APIs with which programmers will be more familiar with these days, the GPGME API is a C API. The API is intended for use by C coders who would be able to access its features by including the @samp{gpgme.h} header file with their own C source code and then access its functions just as they would any other C headers.

This is a very effective method of gaining complete access to the API and in the most efficient manner possible. It does, however, have the drawback that it cannot be directly used by other languages without some means of providing an interface to those languages. This is where the need for bindings in various languages stems.

@node Python bindings

@section Python bindings

The Python bindings for GPGME provide a higher level means of accessing the complete feature set of GPGME itself. It also provides a more pythonic means of calling these API functions.

The bindings are generated dynamically with SWIG and the copy of @samp{gpgme.h} generated when GPGME is compiled.

This means that a version of the Python bindings is fundamentally tied to the exact same version of GPGME used to generate that copy of @samp{gpgme.h}.

@node Difference between the Python bindings and other GnuPG Python packages  
@section Difference between the Python bindings and other GnuPG Python packages

There have been numerous attempts to add GnuPG support to Python over the years. Some of the most well known are listed here, along with what differentiates them.

@menu

- \* The python-gnupg package maintained by Vinay Sajip::
- \* The gnupg package created and maintained by Isis Lovecruft::
- \* The PyME package maintained by Martin Albrecht::

@end menu

@node The python-gnupg package maintained by Vinay Sajip  
@subsection The python-gnupg package maintained by Vinay Sajip

This is arguably the most popular means of integrating GPG with Python. The package utilises the @samp{subprocess} module to implement wrappers for the @samp{gpg} and @samp{gpg2} executables normally invoked on the command line (@samp{gpg.exe} and @samp{gpg2.exe} on Windows).

The popularity of this package stemmed from its ease of use and capability in providing the most commonly required features.

Unfortunately it has been beset by a number of security issues in the past; most of which stemmed from using unsafe methods of accessing the command line via the @samp{subprocess} calls. While some effort has been made over the last two to three years (as of 2018) to mitigate this, particularly by no longer providing shell access through those subprocess calls, the wrapper is still somewhat limited in the scope of its GnuPG features coverage.

The python-gnupg package is available under the MIT license.

@node The gnupg package created and maintained by Isis Lovecruft



@subsection The gnupg package created and maintained by Isis Lovecruft

In 2015 Isis Lovecruft from the Tor Project forked and then re-implemented the python-gnupg package as just gnupg. This new package also relied on subprocess to call the @samp{gpg} or @samp{gpg2} binaries, but did so somewhat more securely.

The naming and version numbering selected for this package, however, resulted in conflicts with the original python-gnupg and since its functions were called in a different manner to python-gnupg, the release of this package also resulted in a great deal of consternation when people installed what they thought was an upgrade that subsequently broke the code relying on it.

The gnupg package is available under the GNU General Public License version 3.0 (or any later version).

@node The PyME package maintained by Martin Albrecht

@subsection The PyME package maintained by Martin Albrecht

This package is the origin of these bindings, though they are somewhat different now. For details of when and how the PyME package was folded back into GPGME itself see the @uref{short-history.org, Short History} document.@footnote{ @samp{short-history} and/or @samp{short-history.html}.}

The PyME package was first released in 2002 and was also the first attempt to implement a low level binding to GPGME. In doing so it provided access to considerably more functionality than either the @samp{python-gnupg} or @samp{gnupg} packages.

The PyME package is only available for Python 2.6 and 2.7.

Porting the PyME package to Python 3.4 in 2015 is what resulted in it being folded into the GPGME project and the current bindings are the end result of that effort.

The PyME package is available under the same dual licensing as GPGME itself: the GNU General Public License version 2.0 (or any later version) and the GNU Lesser General Public License version 2.1 (or any later version).

@node GPGME Python bindings installation

@chapter GPGME Python bindings installation

@menu

\* No PyPI::

\* Requirements::

\* Installation::

\* Known Issues::

@end menu

@node No PyPI

@section No PyPI

Most third-party Python packages and modules are available and distributed through the Python Package Installer, known as PyPI.

Due to the nature of what these bindings are and how they work, it is infeasible to install the GPGME Python bindings in the same way.

This is because the bindings use SWIG to dynamically generate C bindings against @samp{gpgme.h} and @samp{gpgme.h} is generated from @samp{gpgme.h.in} at compile time when GPGME is built from source. Thus to include a package in PyPI which actually built correctly would require either statically built libraries for every architecture bundled with it or a full implementation of C for each architecture.

See the additional notes regarding @ref{CFFI is the Best and GPGME should use it instead of SWIG, , CFFI and SWIG} at the end of this section for further details.

@node Requirements

@section Requirements

The GPGME Python bindings only have three requirements:

@enumerate

@item

A suitable version of Python 2 or Python 3. With Python 2 that means CPython 2.7 and with Python 3 that means CPython 3.4 or higher.

@item

@uref{https://www.swig.org, SWIG}.

@item

GPGME itself. Which also means that all of GPGME's dependencies must be installed too.

@end enumerate

@menu

\* Recommended Additions::

@end menu

@node Recommended Additions

@subsection Recommended Additions

Though none of the following are absolute requirements, they are all

recommended for use with the Python bindings. In some cases these recommendations refer to which version(s) of CPython to use the bindings with, while others refer to third party modules which provide a significant advantage in some way.

@enumerate

@item

If possible, use Python 3 instead of 2.

@item

Favour a more recent version of Python since even 3.4 is due to reach EOL soon. In production systems and services, Python 3.6 should be robust enough to be relied on.

@item

If possible add the following Python modules which are not part of the standard library: @uref{http://docs.python-requests.org/en/latest/index.html, Requests}, @uref{https://cython.org/, Cython}, @uref{https://pendulum.eustace.io/, Pendulum} and @uref{https://github.com/Selfnet/hkp4py, hkp4py}.

@end enumerate

Chances are quite high that at least the first one and maybe two of those will already be installed.

Note that, as with Cython, some of advanced use case scenarios will bring with them additional requirements. Most of these will be fairly well known and commonly installed ones, however, which are in many cases likely to have already been installed on many systems or be familiar to Python programmers.

@node Installation

@section Installation

Installing the Python bindings is effectively achieved by compiling and installing GPGME itself.

Once SWIG is installed with Python and all the dependencies for GPGME are installed you only need to confirm that the version(s) of Python you want the bindings installed for are in your @samp{\$PATH}.

By default GPGME will attempt to install the bindings for the most recent or highest version number of Python 2 and Python 3 it detects in @samp{\$PATH}. It specifically checks for the @samp{python} and @samp{python3} executables first and then checks for specific version numbers.

For Python 2 it checks for these executables in this order: @samp{python}, @samp{python2} and @samp{python2.7}.

For Python 3 it checks for these executables in this order: @samp{python3}, @samp{python3.7}, @samp{python3.6}, @samp{python3.5} and @samp{python3.4}.@footnote{With no issues

reported specific to Python 3.7, the release of Python 3.7.1 at around the same time as GPGME 1.12.0 and the testing with Python 3.7.1rc1, there is no reason to delay moving 3.7 ahead of 3.6 now. Production environments with more conservative requirements will always enforce their own policies anyway and installation to each supported minor release is quite possible too.)

On systems where @samp{python} is actually @samp{python3} and not @samp{python2} it may be possible that @samp{python2} may be overlooked, but there have been no reports of that actually occurring as yet.

In the three months or so since the release of Python 3.7.0 there has been extensive testing and work with these bindings with no issues specifically relating to the new version of Python or any of the new features of either the language or the bindings. This has also been the case with Python 3.7.1rc1. With that in mind and given the release of Python 3.7.1 is scheduled for around the same time as GPGME 1.12.0, the order of preferred Python versions has been changed to move Python 3.7 ahead of Python 3.6.

@menu

\* Installing GPGME::

@end menu

@node Installing GPGME

@subsection Installing GPGME

See the GPGME @samp{README} file for details of how to install GPGME from source.

@node Known Issues

@section Known Issues

There are a few known issues with the current build process and the Python bindings. For the most part these are easily addressed should they be encountered.

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\* Reinstalling Responsibly::

\* Multiple installations::

\* Won't Work With Windows::

\* CFFI is the Best and GPGME should use it instead of SWIG::

\* Virtualised Environments::

\* Post installation::

@end menu

@node Breaking Builds

## @subsection Breaking Builds

Occasionally when installing GPGME with the Python bindings included it may be observed that the @samp{make} portion of that process induces a large very number of warnings and, eventually errors which end that part of the build process. Yet following that with @samp{make check} and @samp{make install} appears to work seamlessly.

The cause of this is related to the way SWIG needs to be called to dynamically generate the C bindings for GPGME in the first place. So the entire process will always produce @samp{lang/python/python2-gpg/} and @samp{lang/python/python3-gpg/} directories. These should contain the build output generated during compilation, including the complete bindings and module installed into @samp{site-packages}.

Occasionally the errors in the early part or some other conflict (e.g. not installing as @strong{@emph{root}} or @strong{@emph{su}}) may result in nothing being installed to the relevant @samp{site-packages} directory and the build directory missing a lot of expected files. Even when this occurs, the solution is actually quite simple and will always work.

That solution is simply to run the following commands as either the @strong{root} user or prepended with @samp{sudo -H} @footnote{Yes, even if you use virtualenv with everything you do in

Python. If you want to install this module as just your user account then you will need to manually configure, compile and install the @emph{entire} GnuPG stack as that user as well. This includes libraries which are not often installed that way. It can be done and there are circumstances under which it is worthwhile, but generally only on POSIX systems which utilise single user mode (some even require it.) in the @samp{lang/python/} directory:

@example

```
/path/to/pythonX.Y setup.py build
/path/to/pythonX.Y setup.py build
/path/to/pythonX.Y setup.py install
```

@end example

Yes, the build command does need to be run twice. Yes, you still need to run the potentially failing or incomplete steps during the @samp{configure}, @samp{make} and @samp{make install} steps with installing GPGME. This is because those steps generate a lot of essential files needed, both by and in order to create, the bindings (including both the @samp{setup.py} and @samp{gpgme.h} files).

@enumerate

@item

IMPORTANT Note

If specifying a selected number of languages to create bindings for, try to leave Python last. Currently the majority of the other language bindings are also preceding Python of either version when listed alphabetically (not counting the Qt bindings).

If Python is set to precede one of the other languages then it is possible that the errors described here may interrupt the build process before generating bindings for those other languages. In these cases it may be preferable to configure all preferred language bindings separately with alternative `@samp{configure}` steps for GPGME using the `@samp{--enable-languages=$LANGUAGE}` option.

Alternatively `@samp{make}` (or `@samp{gmake}`, depending on your platform) may be run with the `@samp{-k}` option, which tells make to keep going even if errors are encountered. In that case the failure of one language's set of bindings to build should not hamper another language's bindings to build.

@end enumerate

@node Reinstalling Responsibly

@subsection Reinstalling Responsibly

Regardless of whether you're installing for one version of Python or several, there will come a point where reinstallation is required. With most Python module installations, the installed files go into the relevant site-packages directory and are then forgotten about. Then the module is upgraded, the new files are copied over the old and that's the end of the matter.

While the same is true of these bindings, there have been intermittent issues observed on some platforms which have benefited significantly from removing all the previous installations of the bindings before installing the updated versions.

Removing the previous version(s) is simply a matter of changing to the relevant `@samp{site-packages}` directory for the version of Python in question and removing the `@samp{gpg/}` directory and any accompanying egg-info files for that module.

In most cases this will require root or administration privileges on the system, but the same is true of installing the module in the first place.

@node Multiple installations

@subsection Multiple installations

For a variety of reasons it may be either necessary or just preferable to install the bindings to alternative installed Python versions which meet the requirements of these bindings.

On POSIX systems this will generally be most simply achieved by running the manual installation commands (build, build, install) as described in the previous section for each Python installation the bindings need to be installed to.

As per the SWIG documentation: the compilers, libraries and runtime used to build GPGME and the Python Bindings `@strong{must}` match those used to compile Python itself, including the version number(s) (at least going by major version numbers and probably minor numbers too).

On most POSIX systems, including OS X, this will very likely be the case in most, if not all, cases.

Note that from GPGME `@uref{https://dev.gnupg.org/rMff6ff616aea6f59b7f2ce1176492850ecdf3851e, 1.12.1}` the default installation installs to each version of Python it can find first. That is that it will currently install for the first copies of Python versions 2.7, 3.4, 3.5, 3.6, 3.7 and 3.8 (dev branch) that it finds. Usually this will be in the same prefix as GPGME itself, but is dictated by the `@samp{$PATH}` when the installation is performed. The above instructions can still be performed on other python installations which the installer does not find, including alternative prefixes.

`@node` Won't Work With Windows

`@subsection` Won't Work With Windows

There are semi-regular reports of Windows users having considerable difficulty in installing and using the Python bindings at all. Very often, possibly even always, these reports come from Cygwin users and/or MinGW users and/or Msys2 users. Though not all of them have been confirmed, it appears that these reports have also come from people who installed Python using the Windows installer files from the `@uref{https://python.org, Python website}` (i.e. mostly MSI installers, sometimes self-extracting `@samp{.exe}` files).

The Windows versions of Python are not built using Cygwin, MinGW or Msys2; they're built using Microsoft Visual Studio. Furthermore the version used is `@emph{considerably}` more advanced than the version which MinGW obtained a small number of files from many years ago in order to be able to compile anything at all. Not only that, but there are changes to the version of Visual Studio between some micro releases, though that is particularly the case with Python 2.7, since it has been kept around far longer than it should have been.

There are two theoretical solutions to this issue:

@enumerate

@item

Compile and install the GnuPG stack, including GPGME and the Python bindings using the same version of Microsoft Visual Studio used by the Python Foundation to compile the version of Python installed.

If there are multiple versions of Python then this will need to be done with each different version of Visual Studio used for those versions of Python.

@item

Compile and install Python using the same tools used by choice, such as MinGW or Msys2.

@end enumerate

Do @strong{not} use the official Windows installer for Python unless following the first method.

In this type of situation it may even be for the best to accept that there are less limitations on permissive software than free software and simply opt to use a recent version of the Community Edition of Microsoft Visual Studio to compile and build all of it, no matter what.

Investigations into the extent or the limitations of this issue are ongoing.

The following table lists the version of Microsoft Visual Studio which needs to be used when compiling GPGME and the Python bindings with each version of the CPython binary released @uref{<https://www.python.org/downloads/windows/>, for Windows}:

@multitable {aaaaaa} {aaaaaaaaaaaaaaaaaaaaaa} {aaaaaaaaaaaaaaaa}

@item CPython

@tab Microsoft product name

@tab runtime filename

@item 2.7.6

@tab Visual Studio 2008

@tab MSVCR90.DLL

@item 3.4.0

@tab Visual Studio 2010

@tab MSVCR100.DLL

@item 3.5.0

@tab Visual Studio 2015

@tab @strong{see below}

@item 3.6.0



@tab Visual Studio 2015  
@tab @strong{see below}  
@item 3.7.0  
@tab Visual Studio 2017\*  
@tab @strong{see below}  
@end multitable

It is important to note that MingW and Msys2 ship with the Visual C runtime from Microsoft Visual Studio 2005 and are thus @strong{incompatible} with all the versions of CPython which can be used with the GPGME Python bindings.

It is also important to note that from CPython 3.5 onwards, the Python Foundation has adopted the reworking of the Visual C runtime which was performed for Visual Studio 2015 and aimed at resolving many of these kinds of issues. Much greater detail on these issues and the correct file(s) to link to are available from Matthew Brett's invaluable page, @uref{https://matthew-brett.github.io/pydagogue/python\_msvc.html, Using Microsoft Visual C with Python}. It is also worth reading the Microsoft Developer Network blog post on @uref{http://blogs.msdn.com/b/vcblog/archive/2015/03/03/introducing-the-universal-crt.aspx, the universal CRT} and Steve Dower's blog posts on Python extensions (@uref{http://stevedower.id.au/blog/building-for-python-3-5, part 1} and @uref{http://stevedower.id.au/blog/building-for-python-3-5-part-two, part 2}).

The second of those two posts by Steve Dower contains the details of specific configuration options required for compiling anything to be used with official CPython releases. In addition to those configuration and compiler settings to use, the versions of Visual Studio prior to Visual Studio 2015 did not support 64-bit systems by default. So compiling a 64-bit version of these bindings for a 64-bit version of CPython 2.7 or 3.4 requires additional work.

In addition to the blog posts, the @uref{https://wiki.python.org/moin/WindowsCompilers, Windows compilers} wiki page on the CPython wiki is another essential reference on the relevant versions of Visual Studio to use and the degree of compatibility with CPython releases.

Eventually someone will ask why there isn't an installable binary for Windows, which the GPGME of the licenses do not preclude as long as the source code is available in conjunction with such a release.

The sheer number of versions of Visual Studio in conjunction with differing configuration options depending on the target Windows version and whether the architecture is 64-bit or 32-bit makes it difficult to provide a correct binary installer for Windows users. At the bare minimum doing so would require the GnuPG project compile ten different versions of the bindings with each release; both 32-bit and

64-bit versions for CPython 2.7 and 3.4, with 64-bit versions for both x86-64 (i.e. Intel and AMD) and ARM architectures for CPython 3.5, 3.6, 3.7 and later releases. That's the bare @strong{minimum}, it'd probably be higher.

Additionally, with only a binary installation used in conjunction with the CPython installer from @samp{python.org} the advanced options available which utilise @ref{C plus Python plus SWIG plus Cython, , Cython} will not be able to be used at all. Cython depends on being able to compile the C code it generates and that too would need to utilise a matching runtime to both the installed version of CPython and these bindings in order to work with the bindings.

Considering all of that, what do we recommend?

@enumerate

@item

Use a recent version of CPython; at least 3.5, but ideally 3.6 or later.

@item

Use Visual Studio 2015 or the standalone build tools for Visual Studio 2017 (or later).

@item

Compile both CPython and GPGME with these bindings using the tools selected in step 2.

@item

Ignore MingW, Msys2 and the official CPython binary installers.

@item

Be thankful the answer to this question wasn't simply to say something like, install Linux or install FreeBSD (or even Apple's OS X).

@end enumerate

@node CFFI is the Best and GPGME should use it instead of SWIG

@subsection CFFI is the Best and GPGME should use it instead of SWIG

There are many reasons for favouring @uref{https://cffi.readthedocs.io/en/latest/overview.html, CFFI} and proponents of it are quite happy to repeat these things as if all it would take to switch from SWIG to CFFI is repeating that list as if it were a new concept.

The fact is that there are things which Python's CFFI implementation cannot handle in the GPGME C code. Beyond that there are features of SWIG which are simply not available with CFFI at all. SWIG generates the bindings to Python using the @samp{gpgme.h} file, but that file is not

a single version shipped with each release, it too is generated when GPGME is compiled.

CFFI is currently unable to adapt to such a potentially mutable codebase. If there were some means of applying SWIG's dynamic code generation to produce the Python/CFFI API modes of accessing the GPGME libraries (or the source source code directly), but such a thing does not exist yet either and it currently appears that work is needed in at least one of CFFI's dependencies before any of this can be addressed.

So if you're a massive fan of CFFI; that's great, but if you want this project to switch to CFFI then rather than just insisting that it should, I'd suggest you volunteer to bring CFFI up to the level this project needs.

If you're actually seriously considering doing so, then I'd suggest taking the `@samp{gpgme-tool.c}` file in the GPGME `@samp{src/}` directory and getting that to work with any of the CFFI API methods (not the ABI methods, they'll work with pretty much anything). When you start running into trouble with "ifdefs" then you'll know what sort of things are lacking. That doesn't even take into account the amount of work saved via SWIG's code generation techniques either.

@node Virtualised Environments

@subsection Virtualised Environments

It is fairly common practice amongst Python developers to, as much as possible, use packages like `virtualenv` to keep various things that are to be installed from interfering with each other. Given how much of the GPGME bindings is often at odds with the usual pythonic way of doing things, it stands to reason that this would be called into question too.

As it happens the answer as to whether or not the bindings can be used with `virtualenv`, the answer is both yes and no.

In general we recommend installing to the relevant path and matching prefix of GPGME itself. Which means that when GPGME, and ideally the rest of the GnuPG stack, is installed to a prefix like `@samp{/usr/local}` or `@samp{/opt/local}` then the bindings would need to be installed to the main Python installation and not a virtualised abstraction. Attempts to separate the two in the past have been known to cause weird and intermittent errors ranging from minor annoyances to complete failures in the build process.

As a consequence we only recommend building with and installing to the main Python installations within the same prefix as GPGME is installed

to or which are found by GPGME's configuration stage immediately prior to running the make commands. Which is exactly what the compiling and installing process of GPGME does by default.

Once that is done, however, it appears that a copy of the compiled module may be installed into a virtualenv of the same major and minor version matching the build. Alternatively it is possible to utilise a `@samp{sites.pth}` file in the `@samp{site-packages/}` directory of a virtualenv installation, which links back to the system installations corresponding directory in order to import anything installed system wide. This may or may not be appropriate on a case by case basis.

Though extensive testing of either of these options is not yet complete, preliminary testing of them indicates that both are viable as long as the main installation is complete. Which means that certain other options normally restricted to virtual environments are also available, including integration with pythonic test suites (e.g. [@uref{https://docs.pytest.org/en/latest/index.html}](https://docs.pytest.org/en/latest/index.html), `pytest`) and other large projects.

That said, it is worth reiterating the warning regarding non-standard installations. If one were to attempt to install the bindings only to a virtual environment without somehow also including the full GnuPG stack (or enough of it as to include GPGME) then it is highly likely that errors would be encountered at some point and more than a little likely that the build process itself would break.

If a degree of separation from the main operating system is still required in spite of these warnings, then consider other forms of virtualisation. Either a virtual machine (e.g. [@uref{https://www.virtualbox.org/}](https://www.virtualbox.org/), `VirtualBox`), a hardware emulation layer (e.g. [@uref{https://www.qemu.org/}](https://www.qemu.org/), `QEMU`) or an application container (e.g. [@uref{https://www.docker.com/why-docker}](https://www.docker.com/why-docker), `Docker`).

Finally it should be noted that the limited tests conducted thus far have been using the `@samp{virtualenv}` command in a new directory to create the virtual python environment. As opposed to the standard `@samp{python3 -m venv}` and it is possible that this will make a difference depending on the system and version of Python in use. Another option is to run the command `@samp{python3 -m virtualenv /path/to/install/virtual/thingy}` instead.

@node Post installation

@subsection Post installation

Following installation it is recommended to move the `@samp{post_installer.py}` script from the `@samp{lang/python/examples/howto/}` directory to the `@samp{lang/python/}` directory and run it. This will fix or restore files needed by Sphinx which may be removed during a distribution build for release. It will also generate reST files from

Org mode files with Pandoc and generate Texinfo files from Org mode files with GNU Emacs and Org mode (in batch mode). Additionally it will fix the UTF-8 declaration line in the Texinfo files (Emacs expects "UTF-8" to be "utf-8").

@node Fundamentals  
@chapter Fundamentals

Before we can get to the fun stuff, there are a few matters regarding GPGME's design which hold true whether you're dealing with the C code directly or these Python bindings.

@menu  
\* No REST::  
\* Context::  
@end menu

@node No REST  
@section No REST

The first part of which is or will be fairly blatantly obvious upon viewing the first example, but it's worth reiterating anyway. That being that this API is **not** a REST API. Nor indeed could it ever be one.

Most, if not all, Python programmers (and not just Python programmers) know how easy it is to work with a RESTful API. In fact they've become so popular that many other APIs attempt to emulate REST-like behaviour as much as they are able. Right down to the use of JSON formatted output to facilitate the use of their API without having to retrain developers.

This API does not do that. It would not be able to do that and also provide access to the entire C API on which it's built. It does, however, provide a very pythonic interface on top of the direct bindings and it's this pythonic layer that this HOWTO deals with.

@node Context  
@section Context

One of the reasons which prevents this API from being RESTful is that most operations require more than one instruction to the API to perform the task. Sure, there are certain functions which can be performed simultaneously, particularly if the result known or strongly anticipated (e.g. selecting and encrypting to a key known to be in the public keybox).

There are many more, however, which cannot be manipulated so readily:

they must be performed in a specific sequence and the result of one operation has a direct bearing on the outcome of subsequent operations. Not merely by generating an error either.

When dealing with this type of persistent state on the web, full of both the RESTful and REST-like, it's most commonly referred to as a session. In GPGME, however, it is called a context and every operation type has one.

```
@node Working with keys
@chapter Working with keys
```

```
@menu
* Key selection::
* Get key::
* Importing keys::
* Exporting keys::
@end menu
```

```
@node Key selection
@section Key selection
```

Selecting keys to encrypt to or to sign with will be a common occurrence when working with GPGMe and the means available for doing so are quite simple.

They do depend on utilising a Context; however once the data is recorded in another variable, that Context does not need to be the same one which subsequent operations are performed.

The easiest way to select a specific key is by searching for that key's key ID or fingerprint, preferably the full fingerprint without any spaces in it. A long key ID will probably be okay, but is not advised and short key IDs are already a problem with some being generated to match specific patterns. It does not matter whether the pattern is upper or lower case.

So this is the best method:

```
@example
import gpg

k = gpg.Context().keylist(pattern="258E88DCBD3CD44D8E7AB43F6ECB6AF0DEADBEEF")
keys = list(k)
@end example
```

This is passable and very likely to be common:

```
@example
import gpg

k = gpg.Context().keylist(pattern="0x6ECB6AF0DEADBEEF")
keys = list(k)
@end example
```

And this is a really bad idea:

```
@example
import gpg

k = gpg.Context().keylist(pattern="0xDEADBEEF")
keys = list(k)
@end example
```

Alternatively it may be that the intention is to create a list of keys which all match a particular search string. For instance all the addresses at a particular domain, like this:

```
@example
import gpg

ncsc = gpg.Context().keylist(pattern="ncsc.mil")
nsa = list(ncsc)
@end example
```

```
@menu
* Counting keys::
@end menu
```

```
@node Counting keys
@subsection Counting keys
```

Counting the number of keys in your public keybox (`@samp{pubring.kbx}`), the format which has superseded the old keyring format (`@samp{pubring.gpg}` and `@samp{secring.gpg}`), or the number of secret keys is a very simple task.

```
@example
import gpg

c = gpg.Context()
seckey = c.keylist(pattern=None, secret=True)
pubkey = c.keylist(pattern=None, secret=False)

seclist = list(seckey)
secnum = len(seclist)
```

```
publist = list(pubkeys)
pubnum = len(publist)
```

```
print("""
Number of secret keys: @ {0@ }
Number of public keys: @ {1@ }
""").format(secnum, pubnum)
@end example
```

NOTE: The @ref{C plus Python plus SWIG plus Cython, , Cython} introduction in the @ref{Advanced or Experimental Use Cases, , Advanced and Experimental} section uses this same key counting code with Cython to demonstrate some areas where Cython can improve performance even with the bindings. Users with large public keyrings or keyboxes, for instance, should consider these options if they are comfortable with using Cython.

```
@node Get key
@section Get key
```

An alternative method of getting a single key via its fingerprint is available directly within a Context with @samp{Context().get\_key}. This is the preferred method of selecting a key in order to modify it, sign or certify it and for obtaining relevant data about a single key as a part of other functions; when verifying a signature made by that key, for instance.

By default this method will select public keys, but it can select secret keys as well.

This first example demonstrates selecting the current key of Werner Koch, which is due to expire at the end of 2018:

```
@example
import gpg

fingerprint = "80615870F5BAD690333686D0F2AD85AC1E42B367"
key = gpg.Context().get_key(fingerprint)
@end example
```

Whereas this example demonstrates selecting the author's current key with the @samp{secret} key word argument set to @samp{True}:

```
@example
import gpg

fingerprint = "DB4724E6FA4286C92B4E55C4321E4E2373590E5D"
key = gpg.Context().get_key(fingerprint, secret=True)
```



@end example

It is, of course, quite possible to select expired, disabled and revoked keys with this function, but only to effectively display information about those keys.

It is also possible to use both unicode or string literals and byte literals with the fingerprint when getting a key in this way.

@node Importing keys

@section Importing keys

Importing keys is possible with the `@samp{key_import()}` method and takes one argument which is a bytes literal object containing either the binary or ASCII armoured key data for one or more keys.

The following example retrieves one or more keys from the SKS key servers via the web using the `requests` module. Since `requests` returns the content as a bytes literal object, we can then use that directly to import the resulting data into our keybox.

@example

```
import gpg
```

```
import os.path
```

```
import requests
```

```
c = gpg.Context()
```

```
url = "https://sks-key servers.net/pks/lookup"
```

```
pattern = input("Enter the pattern to search for key or user IDs: ")
```

```
payload = @{"op": "get", "search": pattern@ }
```

```
r = requests.get(url, verify=True, params=payload)
```

```
result = c.key_import(r.content)
```

```
if result is not None and hasattr(result, "considered") is False:
```

```
    print(result)
```

```
elif result is not None and hasattr(result, "considered") is True:
```

```
    num_keys = len(result.imports)
```

```
    new_revs = result.new_revocations
```

```
    new_sigs = result.new_signatures
```

```
    new_subs = result.new_sub_keys
```

```
    new_uids = result.new_user_ids
```

```
    new_scr = result.secret_imported
```

```
    nochange = result.unchanged
```

```
    print("""
```

```
The total number of keys considered for import was: @ {0@ }
```

```
Number of keys revoked: @ {1@ }
```

Number of new signatures: @{2@}  
Number of new subkeys: @{3@}  
Number of new user IDs: @{4@}  
Number of new secret keys: @{5@}  
Number of unchanged keys: @{6@}

The key IDs for all considered keys were:

```
"""  
.format(num_keys, new_revs, new_sigs, new_subs, new_uids, new_scert,  
        nochange))  
for i in range(num_keys):  
    print("@{0@}\n".format(result.imports[i].fpr))  
else:  
    pass  
@end example
```

NOTE: When searching for a key ID of any length or a fingerprint (without spaces), the SKS servers require the the leading @samp{0x} indicative of hexadecimal be included. Also note that the old short key IDs (e.g. @samp{0xDEADBEEF}) should no longer be used due to the relative ease by which such key IDs can be reproduced, as demonstrated by the Evil32 Project in 2014 (which was subsequently exploited in 2016).

Testing for whether a string in any given search is or may be a hexadecimal value which may be missing the leading @samp{0x} is a simple matter of using a try/except statement which attempts to convert the string as hex to an integer and then back to hex; then using that to search with. Raising a ValueError simply results in treating the string as a string. This is the method and logic utilised in the @samp{import-keys-hkp.py} script (see below).

```
@menu  
* Working with ProtonMail::  
* Importing with HKP for Python::  
* Importing from ProtonMail with HKP for Python::  
@end menu
```

```
@node Working with ProtonMail  
@subsection Working with ProtonMail
```

Here is a variation on the example above which checks the constrained ProtonMail keyserver for ProtonMail public keys.

```
@example  
import gpg  
import requests  
import sys
```

```

print("""
This script searches the ProtonMail key server for the specified key and
imports it.
""")

c = gpg.Context(armor=True)
url = "https://api.protonmail.ch/pks/lookup"
ksearch = []

if len(sys.argv) >= 2:
    keyterm = sys.argv[1]
else:
    keyterm = input("Enter the key ID, UID or search string: ")

if keyterm.count("@@") == 2 and keyterm.startswith("@@") is True:
    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
    ksearch.append(keyterm[1:])
elif keyterm.count("@@") == 1 and keyterm.startswith("@@") is True:
    ksearch.append("@{0}@@protonmail.com".format(keyterm[1:]))
    ksearch.append("@{0}@@protonmail.ch".format(keyterm[1:]))
    ksearch.append("@{0}@@pm.me".format(keyterm[1:]))
elif keyterm.count("@@") == 0:
    ksearch.append("@{0}@@protonmail.com".format(keyterm))
    ksearch.append("@{0}@@protonmail.ch".format(keyterm))
    ksearch.append("@{0}@@pm.me".format(keyterm))
elif keyterm.count("@@") == 2 and keyterm.startswith("@@") is False:
    uidlist = keyterm.split("@@")
    for uid in uidlist:
        ksearch.append("@{0}@@protonmail.com".format(uid))
        ksearch.append("@{0}@@protonmail.ch".format(uid))
        ksearch.append("@{0}@@pm.me".format(uid))
elif keyterm.count("@@") > 2:
    uidlist = keyterm.split("@@")
    for uid in uidlist:
        ksearch.append("@{0}@@protonmail.com".format(uid))
        ksearch.append("@{0}@@protonmail.ch".format(uid))
        ksearch.append("@{0}@@pm.me".format(uid))
else:
    ksearch.append(keyterm)

for k in ksearch:
    payload = @{"op": "get", "search": k@}
    try:
        r = requests.get(url, verify=True, params=payload)
        if r.ok is True:
            result = c.key_import(r.content)
        elif r.ok is False:

```

```
    result = r.content
except Exception as e:
    result = None
```

if result is not None and hasattr(result, "considered") is False:

```
    print("@{0@} for @{1@}".format(result.decode(), k))
```

elif result is not None and hasattr(result, "considered") is True:

```
    num_keys = len(result.imports)
    new_revs = result.new_revocations
    new_sigs = result.new_signatures
    new_subs = result.new_sub_keys
    new_uids = result.new_user_ids
    new_scert = result.secret_imported
    nochange = result.unchanged
    print("""
```

The total number of keys considered for import was: @{0@}

With UIDs wholly or partially matching the following string:

```
@{1@}
```

```
Number of keys revoked: @{2@}
```

```
Number of new signatures: @{3@}
```

```
Number of new subkeys: @{4@}
```

```
Number of new user IDs: @{5@}
```

```
Number of new secret keys: @{6@}
```

```
Number of unchanged keys: @{7@}
```

The key IDs for all considered keys were:

```
"".format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,
    nochange))
    for i in range(num_keys):
        print(result.imports[i].fpr)
    print("")
elif result is None:
    print(e)
```

@end example

Both the above example, [@uref{../examples/howto/pmkey-import.py, pmkey-import.py}](#), and a version which prompts

for an alternative GnuPG home directory, [@uref{../examples/howto/pmkey-import-alt.py, pmkey-import-alt.py}](#), are

available with the other examples and are executable scripts.

Note that while the ProtonMail servers are based on the SKS servers, their server is related more to their API and is not feature complete by comparison to the servers in the SKS pool. One notable difference being that the ProtonMail server does not permit non ProtonMail users

to update their own keys, which could be a vector for attacking ProtonMail users who may not receive a key's revocation if it had been compromised.

@node Importing with HKP for Python

@subsection Importing with HKP for Python

Performing the same tasks with the [@uref{https://github.com/Selfnet/hkp4py, hkp4py module}](https://github.com/Selfnet/hkp4py) (available via PyPI) is not too much different, but does provide a number of options of benefit to end users. Not least of which being the ability to perform some checks on a key before importing it or not. For instance it may be the policy of a site or project to only import keys which have not been revoked. The hkp4py module permits such checks prior to the importing of the keys found.

@example

```
import gpg
import hkp4py
import sys
```

```
c = gpg.Context()
server = hkp4py.KeyServer("hkps://hkps.pool.sks-keyservers.net")
results = []
keys = []
```

```
if len(sys.argv) > 2:
    pattern = " ".join(sys.argv[1:])
elif len(sys.argv) == 2:
    pattern = sys.argv[1]
else:
    pattern = input("Enter the pattern to search for keys or user IDs: ")
```

```
if pattern is not None:
    try:
        key = server.search(hex(int(pattern, 16)))
        keyed = True
    except ValueError as ve:
        key = server.search(pattern)
        keyed = False
```

```
if key is not None:
    keys.append(key[0])
    if keyed is True:
        try:
            fob = server.search(pattern)
        except:
            fob = None
```

```

        if fob is not None:
            keys.append(fob[0])
        else:
            pass
    else:
        pass

for logrus in pattern.split():
    try:
        key = server.search(hex(int(logrus, 16)))
        hexed = True
    except ValueError as ve:
        key = server.search(logrus)
        hexed = False

    if key is not None:
        keys.append(key[0])
        if hexed is True:
            try:
                fob = server.search(logrus)
            except:
                fob = None
            if fob is not None:
                keys.append(fob[0])
        else:
            pass
    else:
        pass

if len(keys) > 0:
    for key in keys:
        import_result = c.key_import(key.key_blob)
        results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print(result)
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_scert = result.secret_imported
        nochange = result.unchanged
        print("""
The total number of keys considered for import was: @ {0@ }

```

Number of keys revoked: @{1@}  
Number of new signatures: @{2@}  
Number of new subkeys: @{3@}  
Number of new user IDs: @{4@}  
Number of new secret keys: @{5@}  
Number of unchanged keys: @{6@}

The key IDs for all considered keys were:

```
"".format(num_keys, new_revs, new_sigs, new_subs, new_uids, new_scert,  
         nochange))  
for i in range(num_keys):  
    print(result.imports[i].fpr)  
    print("")  
else:  
    pass  
@end example
```

Since the `hkp4py` module handles multiple keys just as effectively as one (`@samp{keys}` is a list of responses per matching key), the example above is able to do a little bit more with the returned data before anything is actually imported.

@node Importing from ProtonMail with HKP for Python  
@subsection Importing from ProtonMail with HKP for Python

Though this can provide certain benefits even when working with ProtonMail, the scope is somewhat constrained there due to the limitations of the ProtonMail keyserver.

For instance, searching the SKS keyserver pool for the term "gnupg" produces hundreds of results from any time the word appears in any part of a user ID. Performing the same search on the ProtonMail keyserver returns zero results, even though there are at least two test accounts which include it as part of the username.

The cause of this discrepancy is the deliberate configuration of that server by ProtonMail to require an exact match of the full email address of the ProtonMail user whose key is being requested. Presumably this is intended to reduce breaches of privacy of their users as an email address must already be known before a key for that address can be obtained.

@enumerate  
@item

Import from ProtonMail via HKP for Python Example no. 1

The following script is available with the rest of the examples under the somewhat less than original name, @samp{pmkey-import-hkp.py}.

```
@example
import gpg
import hkp4py
import os.path
import sys

print("""
This script searches the ProtonMail key server for the specified key and
imports it.

Usage: pmkey-import-hkp.py [search strings]
""")

c = gpg.Context(armor=True)
server = hkp4py.KeyServer("hkps://api.protonmail.ch")
keyterms = []
ksearch = []
allkeys = []
results = []
paradox = []
homeless = None

if len(sys.argv) > 2:
    keyterms = sys.argv[1:]
elif len(sys.argv) == 2:
    keyterm = sys.argv[1]
    keyterms.append(keyterm)
else:
    key_term = input("Enter the key ID, UID or search string: ")
    keyterms = key_term.split()

for keyterm in keyterms:
    if keyterm.count("@@") == 2 and keyterm.startswith("@@") is True:
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
    elif keyterm.count("@@") == 1 and keyterm.startswith("@@") is True:
        ksearch.append("@{0@}@protonmail.com".format(keyterm[1:]))
        ksearch.append("@{0@}@protonmail.ch".format(keyterm[1:]))
        ksearch.append("@{0@}@pm.me".format(keyterm[1:]))
    elif keyterm.count("@@") == 0:
        ksearch.append("@{0@}@protonmail.com".format(keyterm))
        ksearch.append("@{0@}@protonmail.ch".format(keyterm))
        ksearch.append("@{0@}@pm.me".format(keyterm))
    elif keyterm.count("@@") == 2 and keyterm.startswith("@@") is False:
```



```

uidlist = keyterm.split("@@")
for uid in uidlist:
    ksearch.append("@{0@}@@protonmail.com".format(uid))
    ksearch.append("@{0@}@@protonmail.ch".format(uid))
    ksearch.append("@{0@}@@pm.me".format(uid))
elif keyterm.count("@@") > 2:
    uidlist = keyterm.split("@@")
    for uid in uidlist:
        ksearch.append("@{0@}@@protonmail.com".format(uid))
        ksearch.append("@{0@}@@protonmail.ch".format(uid))
        ksearch.append("@{0@}@@pm.me".format(uid))
else:
    ksearch.append(keyterm)

for k in ksearch:
    print("Checking for key for: @{0@}".format(k))
    try:
        keys = server.search(k)
        if isinstance(keys, list) is True:
            for key in keys:
                allkeys.append(key)
                try:
                    import_result = c.key_import(key.key_blob)
                except Exception as e:
                    import_result = c.key_import(key.key)
            else:
                paradox.append(keys)
                import_result = None
        except Exception as e:
            import_result = None
    results.append(import_result)

for result in results:
    if result is not None and hasattr(result, "considered") is False:
        print("@{0@} for @{1@}".format(result.decode(), k))
    elif result is not None and hasattr(result, "considered") is True:
        num_keys = len(result.imports)
        new_revs = result.new_revocations
        new_sigs = result.new_signatures
        new_subs = result.new_sub_keys
        new_uids = result.new_user_ids
        new_scert = result.secret_imported
        nochange = result.unchanged
        print("""
The total number of keys considered for import was: @{0@}

With UIDs wholly or partially matching the following string:

```

@{1@}

Number of keys revoked: @{2@}  
Number of new signatures: @{3@}  
Number of new subkeys: @{4@}  
Number of new user IDs: @{5@}  
Number of new secret keys: @{6@}  
Number of unchanged keys: @{7@}

The key IDs for all considered keys were:

```
"""format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_sctr,
         nochange))
for i in range(num_keys):
    print(result.imports[i].fpr)
print("")
elif result is None:
    pass
@end example
```

@item

Import from ProtonMail via HKP for Python Example no. 2

Like its counterpart above, this script can also be found with the rest of the examples, by the name pmkey-import-hkp-alt.py.

With this script a modicum of effort has been made to treat anything passed as a @samp{homedir} which either does not exist or which is not a directory, as also being a possible user ID to check for. It's not guaranteed to pick up on all such cases, but it should cover most of them.

@example

```
import gpg
import hkp4py
import os.path
import sys
```

```
print("""
```

```
This script searches the ProtonMail key server for the specified key and imports it. Optionally enables specifying a different GnuPG home directory.
```

```
Usage: pmkey-import-hkp.py [homedir] [search string]
```

```
or: pmkey-import-hkp.py [search string]
```

```
""")
```

```
c = gpg.Context(armor=True)
```

```
server = hkp4py.KeyServer("hkps://api.protonmail.ch")
```

```

keyterms = []
ksearch = []
allkeys = []
results = []
paradox = []
homeless = None

if len(sys.argv) > 3:
    homedir = sys.argv[1]
    keyterms = sys.argv[2:]
elif len(sys.argv) == 3:
    homedir = sys.argv[1]
    keyterm = sys.argv[2]
    keyterms.append(keyterm)
elif len(sys.argv) == 2:
    homedir = ""
    keyterm = sys.argv[1]
    keyterms.append(keyterm)
else:
    keyterm = input("Enter the key ID, UID or search string: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
    keyterms.append(keyterm)

if len(homedir) == 0:
    homedir = None
    homeless = False

if homedir is not None:
    if homedir.startswith("~"):
        if os.path.exists(os.path.expanduser(homedir)) is True:
            if os.path.isdir(os.path.expanduser(homedir)) is True:
                c.home_dir = os.path.realpath(os.path.expanduser(homedir))
            else:
                homeless = True
        else:
            homeless = True
    elif os.path.exists(os.path.realpath(homedir)) is True:
        if os.path.isdir(os.path.realpath(homedir)) is True:
            c.home_dir = os.path.realpath(homedir)
        else:
            homeless = True
    else:
        homeless = True

# First check to see if the homedir really is a homedir and if not, treat it as
# a search string.
if homeless is True:
    keyterms.append(homedir)

```

```

c.home_dir = None
else:
    pass

for keyterm in keyterms:
    if keyterm.count("@@") == 2 and keyterm.startswith("@@") is True:
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
        ksearch.append(keyterm[1:])
    elif keyterm.count("@@") == 1 and keyterm.startswith("@@") is True:
        ksearch.append("@{0@}@@protonmail.com".format(keyterm[1:]))
        ksearch.append("@{0@}@@protonmail.ch".format(keyterm[1:]))
        ksearch.append("@{0@}@@pm.me".format(keyterm[1:]))
    elif keyterm.count("@@") == 0:
        ksearch.append("@{0@}@@protonmail.com".format(keyterm))
        ksearch.append("@{0@}@@protonmail.ch".format(keyterm))
        ksearch.append("@{0@}@@pm.me".format(keyterm))
    elif keyterm.count("@@") == 2 and keyterm.startswith("@@") is False:
        uidlist = keyterm.split("@@")
        for uid in uidlist:
            ksearch.append("@{0@}@@protonmail.com".format(uid))
            ksearch.append("@{0@}@@protonmail.ch".format(uid))
            ksearch.append("@{0@}@@pm.me".format(uid))
        elif keyterm.count("@@") > 2:
            uidlist = keyterm.split("@@")
            for uid in uidlist:
                ksearch.append("@{0@}@@protonmail.com".format(uid))
                ksearch.append("@{0@}@@protonmail.ch".format(uid))
                ksearch.append("@{0@}@@pm.me".format(uid))
    else:
        ksearch.append(keyterm)

for k in ksearch:
    print("Checking for key for: @{0@}".format(k))
    try:
        keys = server.search(k)
        if isinstance(keys, list) is True:
            for key in keys:
                allkeys.append(key)
                try:
                    import_result = c.key_import(key.key_blob)
                except Exception as e:
                    import_result = c.key_import(key.key)
            else:
                paradox.append(keys)
                import_result = None
        except Exception as e:
            import_result = None

```

```
results.append(import_result)
```

for result in results:

```
if result is not None and hasattr(result, "considered") is False:
```

```
    print("@{0@} for @{1@}".format(result.decode(), k))
```

```
elif result is not None and hasattr(result, "considered") is True:
```

```
    num_keys = len(result.imports)
```

```
    new_revs = result.new_revocations
```

```
    new_sigs = result.new_signatures
```

```
    new_subs = result.new_sub_keys
```

```
    new_uids = result.new_user_ids
```

```
    new_scert = result.secret_imported
```

```
    nochange = result.unchanged
```

```
    print("""
```

```
The total number of keys considered for import was: @{0@}
```

With UIDs wholly or partially matching the following string:

```
    @{1@}
```

```
    Number of keys revoked: @{2@}
```

```
    Number of new signatures: @{3@}
```

```
    Number of new subkeys: @{4@}
```

```
    Number of new user IDs: @{5@}
```

```
    Number of new secret keys: @{6@}
```

```
    Number of unchanged keys: @{7@}
```

The key IDs for all considered keys were:

```
""").format(num_keys, k, new_revs, new_sigs, new_subs, new_uids, new_scert,  
            nochange))
```

```
    for i in range(num_keys):
```

```
        print(result.imports[i].fpr)
```

```
    print("")
```

```
elif result is None:
```

```
    pass
```

```
@end example
```

```
@end enumerate
```

```
@node Exporting keys
```

```
@section Exporting keys
```

Exporting keys remains a reasonably simple task, but has been separated into three different functions for the OpenPGP cryptographic engine. Two of those functions are for exporting public keys and the third is for exporting secret keys.

```
@menu
```

```
* Exporting public keys::
```

```
* Exporting secret keys::
* Sending public keys to the SKS Keyserver::
@end menu
```

```
@node Exporting public keys
@subsection Exporting public keys
```

There are two methods of exporting public keys, both of which are very similar to the other. The default method, `@samp{key_export()}`, will export a public key or keys matching a specified pattern as normal. The alternative, the `@samp{key_export_minimal()}` method, will do the same thing except producing a minimised output with extra signatures and third party signatures or certifications removed.

```
@example
import gpg
import os.path
import sys

print("""
This script exports one or more public keys.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if homedir.startswith("~"):
    if os.path.exists(os.path.expanduser(homedir)) is True:
        c.home_dir = os.path.expanduser(homedir)
    else:
        pass
elif os.path.exists(homedir) is True:
```

```

    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export(pattern=logrus)
except:
    result = c.key_export(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
else:
    pass
@end example

```

It should be noted that the result will only return @samp{None} when a search pattern has been entered, but has not matched any keys. When the search pattern itself is set to @samp{None} this triggers the exporting of the entire public keybox.

```

@example
import gpg
import os.path
import sys

print("""
This script exports one or more public keys in minimised form.
""")

c = gpg.Context(armor=True)

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

```

```

if homedir.startswith("~"):
    if os.path.exists(os.path.expanduser(homedir)) is True:
        c.home_dir = os.path.expanduser(homedir)
    else:
        pass
elif os.path.exists(homedir) is True:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export_minimal(pattern=logrus)
except:
    result = c.key_export_minimal(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:
        f.write(result)
else:
    pass
@end example

```

@node Exporting secret keys

@subsection Exporting secret keys

Exporting secret keys is, functionally, very similar to exporting public keys; save for the invocation of @samp{pinentry} via @samp{gpg-agent} in order to securely enter the key's passphrase and authorise the export.

The following example exports the secret key to a file which is then set with the same permissions as the output files created by the command line secret key export options.

@example

```

import gpg
import os
import os.path
import sys

```

```

print("""
This script exports one or more secret keys.

```

```

The gpg-agent and pinentry are invoked to authorise the export.
""")

```

```

c = gpg.Context(armor=True)

```



```

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")
else:
    keyfile = input("Enter the path and filename to save the secret key to: ")
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if len(homedir) == 0:
    homedir = None
elif homedir.startswith("~"):
    userdir = os.path.expanduser(homedir)
    if os.path.exists(userdir) is True:
        homedir = os.path.realpath(userdir)
    else:
        homedir = None
else:
    homedir = os.path.realpath(homedir)

if os.path.exists(homedir) is False:
    homedir = None
else:
    if os.path.isdir(homedir) is False:
        homedir = None
    else:
        pass

if homedir is not None:
    c.home_dir = homedir
else:
    pass

try:
    result = c.key_export_secret(pattern=logrus)
except:
    result = c.key_export_secret(pattern=None)

if result is not None:
    with open(keyfile, "wb") as f:

```

```

        f.write(result)
    os.chmod(keyfile, 0o600)
else:
    pass
@end example

```

Alternatively the approach of the following script can be used. This longer example saves the exported secret key(s) in files in the GnuPG home directory, in addition to setting the file permissions as only readable and writable by the user. It also exports the secret key(s) twice in order to output both GPG binary (@samp{.gpg}) and ASCII armoured (@samp{.asc}) files.

```

@example
import gpg
import os
import os.path
import subprocess
import sys

print("""
This script exports one or more secret keys as both ASCII armored and binary
file formats, saved in files within the user's GPG home directory.

The gpg-agent and pinentry are invoked to authorise the export.
""")

if sys.platform == "win32":
    gpgconfcmd = "gpgconf.exe --list-dirs homedir"
else:
    gpgconfcmd = "gpgconf --list-dirs homedir"

a = gpg.Context(armor=True)
b = gpg.Context()
c = gpg.Context()

if len(sys.argv) >= 4:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = sys.argv[3]
elif len(sys.argv) == 3:
    keyfile = sys.argv[1]
    logrus = sys.argv[2]
    homedir = input("Enter the GPG configuration directory path (optional): ")
elif len(sys.argv) == 2:
    keyfile = sys.argv[1]
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

```

```

else:
    keyfile = input("Enter the filename to save the secret key to: ")
    logrus = input("Enter the UID matching the secret key(s) to export: ")
    homedir = input("Enter the GPG configuration directory path (optional): ")

if len(homedir) == 0:
    homedir = None
elif homedir.startswith("~"):
    userdir = os.path.expanduser(homedir)
    if os.path.exists(userdir) is True:
        homedir = os.path.realpath(userdir)
    else:
        homedir = None
else:
    homedir = os.path.realpath(homedir)

if os.path.exists(homedir) is False:
    homedir = None
else:
    if os.path.isdir(homedir) is False:
        homedir = None
    else:
        pass

if homedir is not None:
    c.home_dir = homedir
else:
    pass

if c.home_dir is not None:
    if c.home_dir.endswith("/"):
        gpgfile = "@{0@}@{1@}.gpg".format(c.home_dir, keyfile)
        ascfile = "@{0@}@{1@}.asc".format(c.home_dir, keyfile)
    else:
        gpgfile = "@{0@}/@{1@}.gpg".format(c.home_dir, keyfile)
        ascfile = "@{0@}/@{1@}.asc".format(c.home_dir, keyfile)
else:
    if os.path.exists(os.environ["GNUPGHOME"]) is True:
        hd = os.environ["GNUPGHOME"]
    else:
        try:
            hd = subprocess.getoutput(gpgconfcmd)
        except:
            process = subprocess.Popen(gpgconfcmd.split(),
                                       stdout=subprocess.PIPE)
            procom = process.communicate()
            if sys.version_info[0] == 2:
                hd = procom[0].strip()

```

```

    else:
        hd = procom[0].decode().strip()
        gpgfile = "@{0@}/{1@}.gpg".format(hd, keyfile)
        ascfile = "@{0@}/{1@}.asc".format(hd, keyfile)

try:
    a_result = a.key_export_secret(pattern=logrus)
    b_result = b.key_export_secret(pattern=logrus)
except:
    a_result = a.key_export_secret(pattern=None)
    b_result = b.key_export_secret(pattern=None)

if a_result is not None:
    with open(ascfile, "wb") as f:
        f.write(a_result)
    os.chmod(ascfile, 0o600)
else:
    pass

if b_result is not None:
    with open(gpgfile, "wb") as f:
        f.write(b_result)
    os.chmod(gpgfile, 0o600)
else:
    pass
@end example

```

@node Sending public keys to the SKS Keyservers

@subsection Sending public keys to the SKS Keyservers

As with the previous section on importing keys, the @samp{hkp4py} module adds another option with exporting keys in order to send them to the public keyservers.

The following example demonstrates how this may be done.

```

@example
import gpg
import hkp4py
import os.path
import sys

print("""
This script sends one or more public keys to the SKS keyservers and is
essentially a slight variation on the export-key.py script.
""")

c = gpg.Context(armor=True)

```

```

server = hkp4py.KeyServer("hkps://hkps.pool.sks-keyservers.net")

if len(sys.argv) > 2:
    logrus = " ".join(sys.argv[1:])
elif len(sys.argv) == 2:
    logrus = sys.argv[1]
else:
    logrus = input("Enter the UID matching the key(s) to send: ")

if len(logrus) > 0:
    try:
        export_result = c.key_export(pattern=logrus)
    except Exception as e:
        print(e)
        export_result = None
    else:
        export_result = c.key_export(pattern=None)

if export_result is not None:
    try:
        try:
            send_result = server.add(export_result)
        except:
            send_result = server.add(export_result.decode())
        if send_result is not None:
            print(send_result)
        else:
            pass
    except Exception as e:
        print(e)
    else:
        pass
@end example

```

An expanded version of this script with additional functions for specifying an alternative homedir location is in the examples directory as @samp{send-key-to-keyserver.py}.

The @samp{hkp4py} module appears to handle both string and byte literal text data equally well, but the GPGME bindings deal primarily with byte literal data only and so this script sends in that format first, then tries the string literal form.

@node Basic Functions

@chapter Basic Functions

The most frequently called features of any cryptographic library will be the most fundamental tasks for encryption software. In this

section we will look at how to programmatically encrypt data, decrypt it, sign it and verify signatures.

```
@menu
* Encryption::
* Decryption::
* Signing text and files::
* Signature verification::
@end menu
```

```
@node Encryption
@section Encryption
```

Encrypting is very straight forward. In the first example below the message, @samp{text}, is encrypted to a single recipient's key. In the second example the message will be encrypted to multiple recipients.

```
@menu
* Encrypting to one key::
* Encrypting to multiple keys::
@end menu
```

```
@node Encrypting to one key
@subsection Encrypting to one key
```

Once the the Context is set the main issues with encrypting data is essentially reduced to key selection and the keyword arguments specified in the @samp{gpg.Context().encrypt()} method.

Those keyword arguments are: @samp{recipients}, a list of keys encrypted to (covered in greater detail in the following section); @samp{sign}, whether or not to sign the plaintext data, see subsequent sections on signing and verifying signatures below (defaults to @samp{True}); @samp{sink}, to write results or partial results to a secure sink instead of returning it (defaults to @samp{None}); @samp{passphrase}, only used when utilising symmetric encryption (defaults to @samp{None}); @samp{always\_trust}, used to override the trust model settings for recipient keys (defaults to @samp{False}); @samp{add\_encrypt\_to}, utilises any preconfigured @samp{encrypt-to} or @samp{default-key} settings in the user's @samp{gpg.conf} file (defaults to @samp{False}); @samp{prepare}, prepare for encryption (defaults to @samp{False}); @samp{expect\_sign}, prepare for signing (defaults to @samp{False}); @samp{compress}, compresses the plaintext prior to encryption (defaults to @samp{True}).

```
@example
import gpg

a_key = "0x12345678DEADBEEF"
text = b""Some text to test with.
```

Since the text in this case must be bytes, it is most likely that the input form will be a separate file which is opened with "rb" as this is the simplest method of obtaining the correct data format.

"""

```
c = gpg.Context(armor=True)
rkey = list(c.keylist(pattern=a_key, secret=False))
ciphertext, result, sign_result = c.encrypt(text, recipients=rkey, sign=False)

with open("secret_plans.txt.asc", "wb") as afile:
    afile.write(ciphertext)
@end example
```

Though this is even more likely to be used like this; with the plaintext input read from a file, the recipient keys used for encryption regardless of key trust status and the encrypted output also encrypted to any preconfigured keys set in the @samp{gpg.conf} file:

```
@example
import gpg

a_key = "0x12345678DEADBEEF"

with open("secret_plans.txt", "rb") as afile:
    text = afile.read()

c = gpg.Context(armor=True)
rkey = list(c.keylist(pattern=a_key, secret=False))
ciphertext, result, sign_result = c.encrypt(text, recipients=rkey, sign=True,
                                           always_trust=True,
                                           add_encrypt_to=True)

with open("secret_plans.txt.asc", "wb") as afile:
    afile.write(ciphertext)
@end example
```

If the @samp{recipients} parameter is empty then the plaintext is encrypted symmetrically. If no @samp{passphrase} is supplied as a parameter or via a callback registered with the @samp{Context()} then an out-of-band prompt for the passphrase via pinentry will be invoked.

```
@node Encrypting to multiple keys
@subsection Encrypting to multiple keys
```

Encrypting to multiple keys essentially just expands upon the key selection process and the recipients from the previous examples.

The following example encrypts a message (@samp{text}) to everyone with an email address on the @samp{gnupg.org} domain, @footnote{You probably don't really want to do this. Searching the keyservers for "gnupg.org" produces over 400 results, the majority of which aren't actually at the gnupg.org domain, but just included a comment regarding the project in their key somewhere.} but does @emph{not} encrypt to a default key or other key which is configured to normally encrypt to.

```
@example
import gpg
```

```
text = b""Oh look, another test message.
```

The same rules apply as with the previous example and more likely than not, the message will actually be drawn from reading the contents of a file or, maybe, from entering data at an input() prompt.

Since the text in this case must be bytes, it is most likely that the input form will be a separate file which is opened with "rb" as this is the simplest method of obtaining the correct data format.

```
"""
```

```
c = gpg.Context(armor=True)
rpattern = list(c.keylist(pattern="@gnupg.org", secret=False))
logrus = []
```

```
for i in range(len(rpattern)):
    if rpattern[i].can_encrypt == 1:
        logrus.append(rpattern[i])
```

```
ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                             sign=False, always_trust=True)
```

```
with open("secret_plans.txt.asc", "wb") as afile:
    afile.write(ciphertext)
@end example
```

All it would take to change the above example to sign the message and also encrypt the message to any configured default keys would be to change the @samp{c.encrypt} line to this:

```
@example
ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,
                                             always_trust=True,
                                             add_encrypt_to=True)
```



@end example

The only keyword arguments requiring modification are those for which the default values are changing. The default value of @samp{sign} is @samp{True}, the default of @samp{always\_trust} is @samp{False}, the default of @samp{add\_encrypt\_to} is @samp{False}.

If @samp{always\_trust} is not set to @samp{True} and any of the recipient keys are not trusted (e.g. not signed or locally signed) then the encryption will raise an error. It is possible to mitigate this somewhat with something more like this:

@example

```
import gpg
```

```
with open("secret_plans.txt.asc", "rb") as afile:
```

```
    text = afile.read()
```

```
c = gpg.Context(armor=True)
```

```
rpattern = list(c.keylist(pattern="@gnupg.org", secret=False))
```

```
logrus = []
```

```
for i in range(len(rpattern)):
```

```
    if rpattern[i].can_encrypt == 1:
```

```
        logrus.append(rpattern[i])
```

```
try:
```

```
    ciphertext, result, sign_result = c.encrypt(text, recipients=logrus,  
                                                add_encrypt_to=True)
```

```
except gpg.errors.InvalidRecipients as e:
```

```
    for i in range(len(e.recipients)):
```

```
        for n in range(len(logrus)):
```

```
            if logrus[n].fpr == e.recipients[i].fpr:
```

```
                logrus.remove(logrus[n])
```

```
            else:
```

```
                pass
```

```
try:
```

```
    ciphertext, result, sign_result = c.encrypt(text,  
                                                recipients=logrus,  
                                                add_encrypt_to=True)
```

```
with open("secret_plans.txt.asc", "wb") as afile:
```

```
    afile.write(ciphertext)
```

```
except:
```

```
    pass
```

@end example

This will attempt to encrypt to all the keys searched for, then remove invalid recipients if it fails and try again.

@node Decryption  
@section Decryption

Decrypting something encrypted to a key in one's secret keyring is fairly straight forward.

In this example code, however, preconfiguring either @samp{gpg.Context()} or @samp{gpg.core.Context()} as @samp{c} is unnecessary because there is no need to modify the Context prior to conducting the decryption and since the Context is only used once, setting it to @samp{c} simply adds lines for no gain.

@example  
import gpg

```
ciphertext = input("Enter path and filename of encrypted file: ")  
newfile = input("Enter path and filename of file to save decrypted data to: ")
```

```
with open(ciphertext, "rb") as cfile:  
    try:  
        plaintext, result, verify_result = gpg.Context().decrypt(cfile)  
    except gpg.errors.GPGMEError as e:  
        plaintext = None  
        print(e)
```

```
if plaintext is not None:  
    with open(newfile, "wb") as nfile:  
        nfile.write(plaintext)  
else:  
    pass  
@end example
```

The data available in @samp{plaintext} in this example is the decrypted content as a byte object, the recipient key IDs and algorithms in @samp{result} and the results of verifying any signatures of the data in @samp{verify\_result}.

If @samp{gpg.Context().decrypt(cfile, verify=False)} is called instead, then @samp{verify\_result} will be returned as @samp{None} and the rest remains as described here.

@node Signing text and files  
@section Signing text and files

The following sections demonstrate how to specify keys to sign with.

@menu

- \* Signing key selection::
- \* Normal or default signing messages or files::
- \* Detached signing messages and files::
- \* Clearsigning messages or text::

@end menu

@node Signing key selection

@subsection Signing key selection

By default GPGME and the Python bindings will use the default key configured for the user invoking the GPGME API. If there is no default key specified and there is more than one secret key available it may be necessary to specify the key or keys with which to sign messages and files.

@example

```
import gpg
```

```
logrus = input("Enter the email address or string to match signing keys to: ")
hancock = gpg.Context().keylist(pattern=logrus, secret=True)
sig_src = list(hancock)
@end example
```

The signing examples in the following sections include the explicitly designated @samp{signers} parameter in two of the five examples; once where the resulting signature would be ASCII armoured and once where it would not be armoured.

While it would be possible to enter a key ID or fingerprint here to match a specific key, it is not possible to enter two fingerprints and match two keys since the patten expects a string, bytes or None and not a list. A string with two fingerprints won't match any single key.

@node Normal or default signing messages or files

@subsection Normal or default signing messages or files

The normal or default signing process is essentially the same as is most often invoked when also encrypting a message or file. So when the encryption component is not utilised, the result is to produce an encoded and signed output which may or may not be ASCII armoured and which may or may not also be compressed.

By default compression will be used unless GnuPG detects that the plaintext is already compressed. ASCII armouring will be determined according to the value of @samp{gpg.Context().armor}.

The compression algorithm is selected in much the same way as the

symmetric encryption algorithm or the hash digest algorithm is when multiple keys are involved; from the preferences saved into the key itself or by comparison with the preferences with all other keys involved.

@example

```
import gpg
```

```
text0 = """Declaration of ... something.
```

```
"""
```

```
text = text0.encode()
```

```
c = gpg.Context(armor=True, signers=sig_src)
```

```
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.NORMAL)
```

```
with open("/path/to/statement.txt.asc", "w") as afile:
```

```
    afile.write(signed_data.decode())
```

@end example

Though everything in this example is accurate, it is more likely that reading the input data from another file and writing the result to a new file will be performed more like the way it is done in the next example. Even if the output format is ASCII armoured.

@example

```
import gpg
```

```
with open("/path/to/statement.txt", "rb") as tfile:
```

```
    text = tfile.read()
```

```
c = gpg.Context()
```

```
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.NORMAL)
```

```
with open("/path/to/statement.txt.sig", "wb") as afile:
```

```
    afile.write(signed_data)
```

@end example

@node Detached signing messages and files

@subsection Detached signing messages and files

Detached signatures will often be needed in programmatic uses of GPGME, either for signing files (e.g. tarballs of code releases) or as a component of message signing (e.g. PGP/MIME encoded email).

@example

```
import gpg
```

```

text0 = """Declaration of ... something.

"""
text = text0.encode()

c = gpg.Context(armor=True)
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.DETACH)

with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())
@end example

```

As with normal signatures, detached signatures are best handled as byte literals, even when the output is ASCII armoured.

```

@example
import gpg

with open("/path/to/statement.txt", "rb") as tfile:
    text = tfile.read()

c = gpg.Context(signers=sig_src)
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.DETACH)

with open("/path/to/statement.txt.sig", "wb") as afile:
    afile.write(signed_data)
@end example

```

```

@node Clearsigning messages or text
@subsection Clearsigning messages or text

```

Though PGP/in-line messages are no longer encouraged in favour of PGP/MIME, there is still sometimes value in utilising in-line signatures. This is where clear-signed messages or text is of value.

```

@example
import gpg

text0 = """Declaration of ... something.

"""
text = text0.encode()

c = gpg.Context()
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.CLEAR)

with open("/path/to/statement.txt.asc", "w") as afile:
    afile.write(signed_data.decode())

```

@end example

In spite of the appearance of a clear-signed message, the data handled by GPGME in signing it must still be byte literals.

@example

```
import gpg
```

```
with open("/path/to/statement.txt", "rb") as tfile:
```

```
    text = tfile.read()
```

```
c = gpg.Context()
```

```
signed_data, result = c.sign(text, mode=gpg.constants.sig.mode.CLEAR)
```

```
with open("/path/to/statement.txt.asc", "wb") as afile:
```

```
    afile.write(signed_data)
```

@end example

@node Signature verification

@section Signature verification

Essentially there are two principal methods of verification of a signature. The first of these is for use with the normal or default signing method and for clear-signed messages. The second is for use with files and data with detached signatures.

The following example is intended for use with the default signing method where the file was not ASCII armoured:

@example

```
import gpg
```

```
import time
```

```
filename = "statement.txt"
```

```
gpg_file = "statement.txt.gpg"
```

```
c = gpg.Context()
```

```
try:
```

```
    data, result = c.verify(open(gpg_file))
```

```
    verified = True
```

```
except gpg.errors.BadSignatures as e:
```

```
    verified = False
```

```
    print(e)
```

```
if verified is True:
```

```
    for i in range(len(result.signatures)):
```

```
        sign = result.signatures[i]
```

```

    print("""Good signature from:
@{0@}
with key @{1@}
made at @{2@}
""").format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp))
else:
    pass
@end example

```

Whereas this next example, which is almost identical would work with normal ASCII armoured files and with clear-signed files:

```

@example
import gpg
import time

filename = "statement.txt"
asc_file = "statement.txt.asc"

c = gpg.Context()

try:
    data, result = c.verify(open(asc_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
@{0@}
with key @{1@}
made at @{2@}
""").format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp))
else:
    pass
@end example

```

In both of the previous examples it is also possible to compare the original data that was signed against the signed data in @samp{data} to see if it matches with something like this:

```

@example
with open(filename, "rb") as afile:

```

```

text = afile.read()

if text == data:
    print("Good signature.")
else:
    pass
@end example

```

The following two examples, however, deal with detached signatures. With his method of verification the data that was signed does not get returned since it is already being explicitly referenced in the first argument of `@samp{c.verify}`. So `@samp{data}` is `@samp{None}` and only the information in `@samp{result}` is available.

```

@example
import gpg
import time

filename = "statement.txt"
sig_file = "statement.txt.sig"

c = gpg.Context()

try:
    data, result = c.verify(open(filename), open(sig_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
@{0@ }
with key @{1@ }
made at @{2@ }
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))
    else:
        pass
@end example

```

```

@example
import gpg
import time

filename = "statement.txt"

```



```

asc_file = "statement.txt.asc"

c = gpg.Context()

try:
    data, result = c.verify(open(filename), open(asc_file))
    verified = True
except gpg.errors.BadSignatures as e:
    verified = False
    print(e)

if verified is True:
    for i in range(len(result.signatures)):
        sign = result.signatures[i]
        print("""Good signature from:
@{0@}
with key @{1@}
made at @{2@}
""".format(c.get_key(sign.fpr).uids[0].uid, sign.fpr,
            time.ctime(sign.timestamp)))
    else:
        pass
@end example

```

@node Creating keys and subkeys

@chapter Creating keys and subkeys

The one thing, aside from GnuPG itself, that GPGME depends on, of course, is the keys themselves. So it is necessary to be able to generate them and modify them by adding subkeys, revoking or disabling them, sometimes deleting them and doing the same for user IDs.

In the following examples a key will be created for the world's greatest secret agent, Danger Mouse. Since Danger Mouse is a secret agent he needs to be able to protect information to @samp{SECRET} level clearance, so his keys will be 3072-bit keys.

The pre-configured @samp{gpg.conf} file which sets cipher, digest and other preferences contains the following configuration parameters:

```

@example
expert
allow-freeform-uid
allow-secret-key-import
trust-model tofu+pgp
tofu-default-policy unknown
enable-large-rsa
enable-dsa2

```

```

cert-digest-algo SHA512
default-preference-list TWOFISH CAMELLIA256 AES256 CAMELLIA192 AES192 CAMELLIA128 AES
BLOWFISH IDEA CAST5 3DES SHA512 SHA384 SHA256 SHA224 RIPEMD160 SHA1 ZLIB BZIP2 ZIP
Uncompressed
personal-cipher-preferences TWOFISH CAMELLIA256 AES256 CAMELLIA192 AES192 CAMELLIA128 AES
BLOWFISH IDEA CAST5 3DES
personal-digest-preferences SHA512 SHA384 SHA256 SHA224 RIPEMD160 SHA1
personal-compress-preferences ZLIB BZIP2 ZIP Uncompressed
@end example

```

```

@menu
* Primary key::
* Subkeys::
* User IDs::
* Key certification::
@end menu

```

```

@node Primary key
@section Primary key

```

Generating a primary key uses the `@samp{create_key}` method in a Context.

It contains multiple arguments and keyword arguments, including:

`@samp{userid}`, `@samp{algorithm}`, `@samp{expires_in}`, `@samp{expires}`, `@samp{sign}`, `@samp{encrypt}`, `@samp{certify}`, `@samp{authenticate}`, `@samp{passphrase}` and `@samp{force}`. The defaults for all of those except `@samp{userid}`, `@samp{algorithm}`, `@samp{expires_in}`, `@samp{expires}` and `@samp{passphrase}` is `@samp{False}`. The defaults for `@samp{algorithm}` and `@samp{passphrase}` is `@samp{None}`. The default for `@samp{expires_in}` is `@samp{0}`. The default for `@samp{expires}` is `@samp{True}`. There is no default for `@samp{userid}`.

If `@samp{passphrase}` is left as `@samp{None}` then the key will not be generated with a passphrase, if `@samp{passphrase}` is set to a string then that will be the passphrase and if `@samp{passphrase}` is set to `@samp{True}` then `gpg-agent` will launch `pinentry` to prompt for a passphrase. For the sake of convenience, these examples will keep `@samp{passphrase}` set to `@samp{None}`.

```

@example
import gpg

c = gpg.Context()

c.home_dir = "~/gnupg-dm"
userid = "Danger Mouse <dm@@secret.example.net>"

dmkey = c.create_key(userid, algorithm="rsa3072", expires_in=31536000,
                    sign=True, certify=True)
@end example

```

One thing to note here is the use of setting the `@samp{c.home_dir}`

parameter. This enables generating the key or keys in a different location. In this case to keep the new key data created for this example in a separate location rather than adding it to existing and active key store data. As with the default directory, @samp{ ~/.gnupg }, any temporary or separate directory needs the permissions set to only permit access by the directory owner. On posix systems this means setting the directory permissions to 700.

The @samp{temp-homedir-config.py} script in the HOWTO examples directory will create an alternative homedir with these configuration options already set and the correct directory and file permissions.

The successful generation of the key can be confirmed via the returned @samp{GenkeyResult} object, which includes the following data:

```
@example
print("""
Fingerprint: @ {0@ }
Primary Key: @ {1@ }
Public Key: @ {2@ }
Secret Key: @ {3@ }
Sub Key: @ {4@ }
User IDs: @ {5@ }
""").format(dmkey.fpr, dmkey.primary, dmkey.pubkey, dmkey.seckey, dmkey.sub,
            dmkey.uid)
@end example
```

Alternatively the information can be confirmed using the command line program:

```
@example
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/.gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
    177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid      [ultimate] Danger Mouse <dm@@secret.example.net>

bash-4.4$
@end example
```

As with generating keys manually, to preconfigure expanded preferences for the cipher, digest and compression algorithms, the @samp{gpg.conf} file must contain those details in the home directory in which the new key is being generated. I used a cut down version of my own @samp{gpg.conf} file in order to be able to generate this:

```
@example
```

```
bash-4.4$ gpg --homedir ~/.gnupg-dm --edit-key 177B7C25DB99745EE2EE13ED026D2F19E99E63AA showpref
quit
Secret key is available.
```

```
sec rsa3072/026D2F19E99E63AA
  created: 2018-03-15  expires: 2019-03-15  usage: SC
  trust: ultimate    validity: ultimate
[ultimate] (1). Danger Mouse <dm@@secret.example.net>
```

```
[ultimate] (1). Danger Mouse <dm@@secret.example.net>
  Cipher: TWOFISH, CAMELLIA256, AES256, CAMELLIA192, AES192, CAMELLIA128, AES, BLOWFISH,
  IDEA, CAST5, 3DES
  Digest: SHA512, SHA384, SHA256, SHA224, RIPEMD160, SHA1
  Compression: ZLIB, BZIP2, ZIP, Uncompressed
  Features: MDC, Keyserver no-modify
```

```
bash-4.4$
@end example
```

```
@node Subkeys
@section Subkeys
```

Adding subkeys to a primary key is fairly similar to creating the primary key with the `@samp{create_subkey}` method. Most of the arguments are the same, but not quite all. Instead of the `@samp{userid}` argument there is now a `@samp{key}` argument for selecting which primary key to add the subkey to.

In the following example an encryption subkey will be added to the primary key. Since Danger Mouse is a security conscious secret agent, this subkey will only be valid for about six months, half the length of the primary key.

```
@example
import gpg

c = gpg.Context()
c.home_dir = "~/.gnupg-dm"

key = c.get_key(dmkey.fpr, secret=True)
dmsub = c.create_subkey(key, algorithm="rsa3072", expires_in=15768000,
                        encrypt=True)
@end example
```

As with the primary key, the results here can be checked with:

```
@example
print("""
```

```

Fingerprint: @ {0@}
Primary Key: @ {1@}
Public Key: @ {2@}
Secret Key: @ {3@}
Sub Key: @ {4@}
User IDs: @ {5@}
""".format(dmsub.fpr, dmsub.primary, dmsub.pubkey, dmsub.seckey, dmsub.sub,
           dmsub.uid))
@end example

```

As well as on the command line with:

```

@example
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/.gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
     177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid    [ultimate] Danger Mouse <dm@@secret.example.net>
ssb  rsa3072 2018-03-15 [E] [expires: 2018-09-13]

bash-4.4$
@end example

```

```

@node User IDs
@section User IDs

```

```

@menu
* Adding User IDs::
* Revoking User IDs::
@end menu

```

```

@node Adding User IDs
@subsection Adding User IDs

```

By comparison to creating primary keys and subkeys, adding a new user ID to an existing key is much simpler. The method used to do this is `@samp{key_add_uid}` and the only arguments it takes are for the `@samp{key}` and the new `@samp{uid}`.

```

@example
import gpg

c = gpg.Context()
c.home_dir = "~/.gnupg-dm"

dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
key = c.get_key(dmfpr, secret=True)

```

```
uid = "Danger Mouse <danger.mouse@@secret.example.net>"
```

```
c.key_add_uid(key, uid)
@end example
```

Unsurprisingly the result of this is:

```
@example
bash-4.4$ gpg --homedir ~/.gnupg-dm -K
~/.gnupg-dm/pubring.kbx
-----
sec  rsa3072 2018-03-15 [SC] [expires: 2019-03-15]
     177B7C25DB99745EE2EE13ED026D2F19E99E63AA
uid    [ultimate] Danger Mouse <danger.mouse@@secret.example.net>
uid    [ultimate] Danger Mouse <dm@@secret.example.net>
ssb  rsa3072 2018-03-15 [E] [expires: 2018-09-13]

bash-4.4$
@end example
```

```
@node Revoking User IDs
@subsection Revoking User IDs
```

Revoking a user ID is a fairly similar process, except that it uses the `@samp{key_revoke_uid}` method.

```
@example
import gpg

c = gpg.Context()
c.home_dir = "~/.gnupg-dm"

dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
key = c.get_key(dmfpr, secret=True)
uid = "Danger Mouse <danger.mouse@@secret.example.net>"

c.key_revoke_uid(key, uid)
@end example
```

```
@node Key certification
@section Key certification
```

Since key certification is more frequently referred to as key signing, the method used to perform this function is `@samp{key_sign}`.

The `@samp{key_sign}` method takes four arguments: `@samp{key}`, `@samp{uids}`, `@samp{expires_in}` and `@samp{local}`. The default value of `@samp{uids}` is `@samp{None}` and which results in all user IDs being selected. The default value of

both @samp{expires\_in} and @samp{local} is @samp{False}; which results in the signature never expiring and being able to be exported.

The @samp{key} is the key being signed rather than the key doing the signing. To change the key doing the signing refer to the signing key selection above for signing messages and files.

If the @samp{uids} value is not @samp{None} then it must either be a string to match a single user ID or a list of strings to match multiple user IDs. In this case the matching of those strings must be precise and it is case sensitive.

To sign Danger Mouse's key for just the initial user ID with a signature which will last a little over a month, do this:

```
@example
import gpg

c = gpg.Context()
uid = "Danger Mouse <dm@secret.example.net>"

dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
key = c.get_key(dmfpr, secret=True)
c.key_sign(key, uids=uid, expires_in=2764800)
@end example

@menu
* Verifying key certifications::
@end menu

@node Verifying key certifications
@subsection Verifying key certifications

@example
import gpg
import time

c = gpg.Context()
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
keys = list(c.keylist(pattern=dmuid, mode=gpg.constants.keylist.mode.SIGS))
key = keys[0]

for user in key.uids:
    for sig in user.signatures:
        print("0x@{0@}".format(sig.keyid), "", time.ctime(sig.timestamp), "",
              sig.uid)
@end example
```

Which for Danger Mouse displays the following:

```
@example
0x92E3F6115435C65A Thu Mar 15 13:17:44 2018 Danger Mouse <dm@@secret.example.net>
0x321E4E2373590E5D Mon Nov 26 12:46:05 2018 Ben McGinnes <ben@@adversary.org>
@end example
```

The two key signatures listed are for the self-certification of Danger Mouse's key made when the key was created in March, 2018; and the second is a signature made by the author and set to expire at the end of the year. Note that the second signature was made with the following code (including the preceding code to display the output of the certifications or key signatures):

```
@example
import gpg
import math
import pendulum
import time

hd = "/home/dm/.gnupg"
c = gpg.Context()
d = gpg.Context(home_dir=hd)
dmfpr = "177B7C25DB99745EE2EE13ED026D2F19E99E63AA"
dmuid = "Danger Mouse <dm@@secret.example.net>"
dkeys = list(c.keylist(pattern=dmuid))
dmkey = dkeys[0]

c.key_import(d.key_export(pattern=None))

tp = pendulum.period(pendulum.now(tz="local"), pendulum.datetime(2019, 1, 1))
ts = tp.total_seconds()
total_secs = math.ceil(ts)
c.key_sign(dmkey, uids=dmuid, expires_in=total_secs)

d.key_import(c.key_export(pattern=dmuid))
keys = list(c.keylist(pattern=dmuid, mode=gpg.constants.keylist.mode.SIGS))
key = keys[0]

for user in key.uids:
    for sig in user.signatures:
        print("0x@{0@}".format(sig.keyid), "", time.ctime(sig.timestamp), "",
              sig.uid)
@end example
```

Note that this final code block includes the use of a module which is `@emph{not}` part of Python's standard library, the `@uref{https://pendulum.eustace.io/, pendulum module}`. Unlike the standard datetime module, pendulum makes working with dates and



times significantly easier in Python; just as the requests module makes working with HTTP and HTTPS easier than the builtin modules do.

Though neither requests nor pendulum are required modules for using the GPGME Python bindings, they are both highly recommended more generally.

```
@node Advanced or Experimental Use Cases
@chapter Advanced or Experimental Use Cases
```

```
@menu
* C plus Python plus SWIG plus Cython::
@end menu
```

```
@node C plus Python plus SWIG plus Cython
@section C plus Python plus SWIG plus Cython
```

In spite of the apparent incongruence of using Python bindings to a C interface only to generate more C from the Python; it is in fact quite possible to use the GPGME bindings with [@uref{http://docs.cython.org/en/latest/index.html, Cython}](http://docs.cython.org/en/latest/index.html). Though in many cases the benefits may not be obvious since the most computationally intensive work never leaves the level of the C code with which GPGME itself is interacting with.

Nevertheless, there are some situations where the benefits are demonstrable. One of the better and easier examples being the one of the early examples in this HOWTO, the [@ref{Counting keys, , key counting}](#) code. Running that example as an executable Python script, `@samp{keycount.py}` (available in the `@samp{examples/howto/}` directory), will take a noticeable amount of time to run on most systems where the public keybox or keyring contains a few thousand public keys.

Earlier in the evening, prior to starting this section, I ran that script on my laptop; as I tend to do periodically and timed it using `@samp{time}` utility, with the following results:

```
@example
bash-4.4$ time keycount.py
```

```
Number of secret keys: 23
Number of public keys: 12112
```

```
real    11m52.945s
user    0m0.913s
sys     0m0.752s
```

```
bash-4.4$  
@end example
```

Sometime after that I imported another key and followed it with a little test of Cython. This test was kept fairly basic, essentially lifting the material from the [@uref{http://docs.cython.org/en/latest/src/tutorial/cython\\_tutorial.html}](http://docs.cython.org/en/latest/src/tutorial/cython_tutorial.html), Cython Basic Tutorial} to demonstrate compiling Python code to C. The first step was to take the example key counting code quoted previously, essentially from the importing of the `gpg` module to the end of the script:

```
@example  
import gpg  
  
c = gpg.Context()  
seckeys = c.keylist(pattern=None, secret=True)  
pubkeys = c.keylist(pattern=None, secret=False)  
  
seclist = list(seckeys)  
secnum = len(seclist)  
  
publist = list(pubkeys)  
pubnum = len(publist)  
  
print("""  
    Number of secret keys: @ {0@}  
    Number of public keys: @ {1@}  
  
""").format(secnum, pubnum)  
@end example
```

Save that into a file called `keycount.pyx` and then create a `setup.py` file which contains this:

```
@example  
from distutils.core import setup  
from Cython.Build import cythonize  
  
setup(  
    ext_modules = cythonize("keycount.pyx")  
)  
@end example
```

Compile it:

```
@example  
bash-4.4$ python setup.py build_ext --inplace  
bash-4.4$
```

@end example

Then run it in a similar manner to @samp{keycount.py}:

@example

```
bash-4.4$ time python3.7 -c "import keycount"
```

```
Number of secret keys: 23
```

```
Number of public keys: 12113
```

```
real    6m47.905s
```

```
user    0m0.785s
```

```
sys     0m0.331s
```

```
bash-4.4$
```

@end example

Cython turned @samp{keycount.pyx} into an 81KB @samp{keycount.o} file in the @samp{build/} directory, a 24KB @samp{keycount.cpython-37m-darwin.so} file to be imported into Python 3.7 and a 113KB @samp{keycount.c} generated C source code file of nearly three thousand lines. Quite a bit bigger than the 314 bytes of the @samp{keycount.pyx} file or the full 1,452 bytes of the full executable @samp{keycount.py} example script.

On the other hand it ran in nearly half the time; taking 6 minutes and 47.905 seconds to run. As opposed to the 11 minutes and 52.945 seconds which the CPython script alone took.

The @samp{keycount.pyx} and @samp{setup.py} files used to generate this example have been added to the @samp{examples/howto/advanced/cython/} directory

The example versions include some additional options to annotate the existing code and to detect Cython's use. The latter comes from the

@uref{http://docs.cython.org/en/latest/src/tutorial/pure.html#magic-attributes-within-the-pxd, Magic Attributes} section of the Cython documentation.

@node Miscellaneous extras and work-arounds

@chapter Miscellaneous extras and work-arounds

Most of the things in the following sections are here simply because there was no better place to put them, even though some are only peripherally related to the GPGME Python bindings. Some are also workarounds for functions not integrated with GPGME as yet. This is especially true of the first of these, dealing with @ref{Group lines, , group lines}.

@menu

\* Group lines::

\* Keyserver access for Python::

\* GPGME version checking::

@end menu

@node Group lines

@section Group lines

There is not yet an easy way to access groups configured in the `gpg.conf` file from within GPGME. As a consequence these central groupings of keys cannot be shared amongst multiple programs, such as MUAs readily.

The following code, however, provides a work-around for obtaining this information in Python.

@example

```
import subprocess
```

```
import sys
```

```
if sys.platform == "win32":
```

```
    gpgconfcmd = "gpgconf.exe --list-options gpg"
```

```
else:
```

```
    gpgconfcmd = "gpgconf --list-options gpg"
```

```
process = subprocess.Popen(gpgconfcmd.split(), stdout=subprocess.PIPE)
```

```
procom = process.communicate()
```

```
if sys.version_info[0] == 2:
```

```
    lines = procom[0].splitlines()
```

```
else:
```

```
    lines = procom[0].decode().splitlines()
```

```
for line in lines:
```

```
    if line.startswith("group") is True:
```

```
        break
```

```
groups = line.split(":")[-1].replace("'", "").split(',')
```

```
group_lines = []
```

```
group_lists = []
```

```
for group in groups:
```

```
    group_lines.append(group.split("="))
```

```
    group_lists.append(group.split("="))
```

```
for glist in group_lists:
```

```
    glist[1] = glist[1].split()
```

```
@end example
```

The result of that code is that `@samp{group_lines}` is a list of lists where `@samp{group_lines[i][0]}` is the name of the group and `@samp{group_lines[i][1]}` is the key IDs of the group as a string.

The `@samp{group_lists}` result is very similar in that it is a list of lists. The first part, `@samp{group_lists[i][0]}` matches `@samp{group_lines[i][0]}` as the name of the group, but `@samp{group_lists[i][1]}` is the key IDs of the group as a list.

A demonstration of using the `@samp{groups.py}` module is also available in the form of the executable `@samp{mutt-groups.py}` script. This second script reads all the group entries in a user's `@samp{gpg.conf}` file and converts them into crypt-hooks suitable for use with the Mutt and Neomutt mail clients.

`@node` Keyserver access for Python  
`@section` Keyserver access for Python

The `@uref{https://github.com/Selfnet/hkp4py, hkp4py}` module by Marcel Fest was originally a port of the old `@uref{https://github.com/dgladkov/python-hkp, python-hkp}` module from Python 2 to Python 3 and updated to use the `@uref{http://docs.python-requests.org/en/latest/index.html, requests}` module instead. It has since been modified to provide support for Python 2.7 as well and is available via PyPI.

Since it rewrites the `@samp{hkp}` protocol prefix as `@samp{http}` and `@samp{hkps}` as `@samp{https}`, the module is able to be used even with servers which do not support the full scope of keyserver functions. `@footnote{Such as with ProtonMail servers. This also means that restricted servers which only advertise either HTTP or HTTPS end points and not HKP or HKPS end points must still be identified as HKP or HKPS within the Python Code. The @samp{hkp4py} module will rewrite these appropriately when the connection is made to the server.}` It also works quite readily when incorporated into a `@ref{C plus Python plus SWIG plus Cython, Cython}` generated and compiled version of any code.

`@menu`  
\* Key import format::  
`@end menu`

`@node` Key import format  
`@subsection` Key import format

The `hkp4py` module returns key data via requests as string literals (`@samp{r.text}`) instead of byte literals (`@samp{r.content}`). This means that the returned key data must be encoded to UTF-8 when importing that key material using a `@samp{gpg.Context().key_import()}` method.

For this reason an alternative method has been added to the `@samp{search}` function of `@samp{hkp4py.KeyServer()}` which returns the key in the correct format as expected by `@samp{key_import}`. When importing using this module, it is now possible to import with this:

```
@example
for key in keys:
    if key.revoked is False:
        gpg.Context().key_import(key.key_blob)
    else:
        pass
@end example
```

Without that recent addition it would have been necessary to encode the contents of each `@samp{hkp4py.KeyServer().search()[i].key}` in `@samp{hkp4py.KeyServer().search()}` before trying to import it.

An example of this is included in the `@ref{Importing keys, , Importing Keys}` section of this HOWTO and the corresponding executable version of that example is available in the `@samp{lang/python/examples/howto}` directory as normal; the executable version is the `@samp{import-keys-hkp.py}` file.

```
@node GPGME version checking
@section GPGME version checking
```

For various reasons it may be necessary to check which version of GPGME the bindings have been built against; including whether a minimum required version of GPGME is in use.

For the most part the `@samp{gpg.version.versionstr}` and `@samp{gpg.version.versionlist}` methods have been quite sufficient. The former returns the same string as `@samp{gpgme-config --version}`, while the latter returns the major, minor and patch values in a list.

To check if the installed bindings have actually been built against the current installed `libgpgme` version, this check can be performed:

```
@example
import gpg
import subprocess
import sys

gpgme_version_call = subprocess.Popen(["gpgme-config", "--version"],
                                       stdout=subprocess.PIPE,
                                       stderr=subprocess.PIPE)
gpgme_version_str = gpgme_version_call.communicate()

if sys.version_info[0] == 2:
```

```

    gpgme_version = gpgme_version_str[0].strip()
elif sys.version_info[0] >= 3:
    gpgme_version = gpgme_version_str[0].decode().strip()
else:
    gpgme_version = None

if gpgme_version is not None:
    if gpgme_version == gpg.version.versionstr:
        print("The GPGME Python bindings match libgpgme.")
    else:
        print("The GPGME Python bindings do NOT match libgpgme.")
else:
    print("Upgrade Python and reinstall the GPGME Python bindings.")
@end example

```

For many developers, however, the preferred checking means checking for a minimum version or point release. This is now readily available via the `@samp{gpg.version.versionintlist}` method (added in version `@samp{1.12.1-beta79}`). It is also now possible to easily check whether the installed GPGME Python bindings were built from a development or beta branch of the GPGME source code.

The following code demonstrates how both of those methods may be used:

```

@example
import gpg

try:
    if gpg.version.is_beta is True:
        print("The installed GPGME Python bindings were built from beta code.")
    else:
        print("The installed GPGME Python bindings are a released version.")
except Exception as e:
    print(e)

try:
    if gpg.version.versionintlist[0] == 1:
        if gpg.version.versionintlist[1] == 12:
            if gpg.version.versionintlist[2] == 1:
                print("This is the minimum version for using versionintlist.")
            elif gpg.version.versionintlist[2] > 1:
                print("The versionintlist method is available.")
            else:
                pass
        elif gpg.version.versionintlist[1] > 12:
            print("The versionintlist method is available.")
        else:
            pass

```

```

elif gpg.version.versionintlist[0] > 1:
    print("The versionintlist method is available.")
else:
    pass
except Exception as e:
    print(e)
@end example

```

The points where @samp{pass} is used in the above example will most likely also produce an @samp{Exception} error since those results should only occur in versions which do not have the @samp{gpgme.version.is\_beta} and @samp{gpgme.version.versionintlist} methods available.

```

@node Copyright and Licensing
@chapter Copyright and Licensing

```

```

@menu
* Copyright::
* Draft Editions of this HOWTO::
* License GPL compatible::
@end menu

```

```

@node Copyright
@section Copyright

```

Copyright The GnuPG Project, 2018.

```

@node Draft Editions of this HOWTO
@section Draft Editions of this HOWTO

```

Draft editions of this HOWTO may be periodically available directly from the author at any of the following URLs:

```

@itemize
@item
@uref{https://files.au.adversary.org/crypto/gpgme-python-howto.html, GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 SSL)}
@item
@uref{http://files.au.adversary.org/crypto/gpgme-python-howto.html, GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 no SSL)}
@item
@uref{https://files.au.adversary.org/crypto/gpgme-python-howto-split/index.html, GPGME Python Bindings HOWTO draft (HTML multiple files, AWS S3 SSL)}
@item
@uref{http://files.au.adversary.org/crypto/gpgme-python-howto/index.html, GPGME Python Bindings HOWTO draft (HTML multiple files, AWS S3 no SSL)}
@end itemize

```



These draft versions have been generated from this document via GNU Emacs @uref{https://orgmode.org/, Org mode} to @samp{.texi} and @uref{https://www.gnu.org/software/texinfo/, GNU Texinfo} to HTML. Though it is likely that the specific @uref{https://files.au.adversary.org/crypto/gpgme-python-howto, file} @uref{http://files.au.adversary.org/crypto/gpgme-python-howto.org, version} used will be on the same server with the generated output formats. Occasionally I may include the Org mode generated XHTML versions:

```
@itemize
@item
@uref{https://files.au.adversary.org/crypto/gpgme-python-howto.xhtml, GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 SSL)}
@item
@uref{http://files.au.adversary.org/crypto/gpgme-python-howto.xhtml, GPGME Python Bindings HOWTO draft (HTML single file, AWS S3 no SSL)}
@end itemize
```

That XHTML version, however, is exported in a way which inherits a colour scheme from @uref{https://github.com/holomorph/emacs-zenburn, the author's Emacs theme} (which is a higher contrast version of @uref{http://kippura.org/zenburnpage/, Zenburn} ported by @uref{https://github.com/holomorph, Holomorph}). So it's fine for people who prefer dark themed web pages, but not so great for everyone else.

The GNU Texinfo and reStructured Text versions ship with the software, while the GNU Emacs Info version is generated from the Texinfo version using GNU Texinfo or GNU Makeinfo. The Texinfo format is generated from the original Org mode source file in Org mode itself either within GNU Emacs or via the command line by invoking Emacs in batch mode:

```
@example
emacs gpgme-python-howto.org --batch -f org-texinfo-export-to-texinfo --kill
emacs gpgme-python-howto --batch -f org-texinfo-export-to-texinfo --kill
@end example
```

The reStructuredText format is also generated from the Org mode source file, except it is generated using @uref{https://pandoc.org, Pandoc} with either of the following commands (depending on the filename):

```
@example
pandoc -f org -t rst+smart -o gpgme-python-howto.rst gpgme-python-howto.org
pandoc -f org -t rst+smart -o gpgme-python-howto.rst gpgme-python-howto
@end example
```

Note that the Org mode source files are identified as such via a mode line at the top of each file and have had their @samp{.org} file extensions dropped in order to make scripted generation of output formats easier

and not require renaming files post-conversion.

Due to a bug in Org mode's texinfo conversion method, the recommended steps for generating the Texinfo files for all the files in the @samp{lang/python/doc/src/} directory are as follows:

```
@example
for x in * ; do
  emacs $x --batch -f org-texinfo-export-to-texinfo --kill
  cat $x.texi | sed -e 's/@@documentencoding UTF-8/@@documentencoding utf-8/g' > ../texinfo/$x.texi
  pandoc -f org -t rst+smart -o ../rst/$x.rst $x
done ;
rm -fv *.texi
cd ../texinfo
mkdir info
mkdir html
for x in *.texi ; do
  makeinfo -v $x
  makeinfo --html --no-split $x
done ;
mv *.info info/
mv *.html html/
@end example
```

This code snippet includes the generation of the reStructuredText files and would be expected to be run from the @samp{doc/src/} directory containing the Org mode source files. It also assumes that the commands are being run on POSIX compliant systems with basic tools like sed, the Bourne shell and GNU Emacs<sup>@footnote{Okay, Emacs might not necessarily qualify as a basic tool, but it is common enough that having it installed on a system isn't too great an expectation, nor is it difficult to add to most POSIX systems, even if the users of those systems do not personally use it.}</sup> available. The code snippet also includes the steps for generating the Emacs Info files and HTML files from the Texinfo files. Using reStructuredText files with Sphinx is best left for the documentation of that project.

In addition to these there is a significantly less frequently updated version as a HTML @uref{https://files.au.adversary.org/crypto/gpgme-python/dita/webhelp/index.html, WebHelp site} (AWS S3 SSL); generated from DITA XML source files, which can be found in @uref{https://dev.gnupg.org/source/gpgme/browse/ben%252Fhowto-dita/, an alternative branch} of the GPGME git repository.

Various generated output formats may occasionally be found in subdirectories of the @uref{https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python, gpgme-python} directory. In particular within the @uref{https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/dita, DITA}, @uref{https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/rst, reStructuredText} and

@uref{https://s3.amazonaws.com/files.au.adversary.org/crypto/gpgme-python/texinfo, Texinfo} subdirectories.

The @samp{rst}

directory contains output files generated with Sphinx and may include a considerable number of its possible output formats, but there are no guarantees as to how recent these are or even if they are present.

These draft editions are not official documents and the version of documentation in the master branch or which ships with released versions is the only official documentation. Nevertheless, these draft editions may occasionally be of use by providing more accessible web versions which are updated between releases. They are provided on the understanding that they may contain errors or may contain content subject to change prior to an official release.

@node License GPL compatible

@section License GPL compatible

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This file is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY, to the extent permitted by law; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

@bye

# -\*- mode: org -\*-

#+TITLE: What Was New in the GPGME Python Bindings and Documentation

#+AUTHOR: Ben McGinnes

#+LATEX\_COMPILER: xelatex

#+LATEX\_CLASS: article

#+LATEX\_CLASS\_OPTIONS: [12pt]

#+LATEX\_HEADER: \usepackage{xltextra}

#+LATEX\_HEADER: \usepackage[margin=1in]{geometry}

#+LATEX\_HEADER: \setmainfont[Ligatures={Common}]{Times New Roman}

#+LATEX\_HEADER: \author{Ben McGinnes <ben@gnupg.org>}

\* What Was New

:PROPERTIES:

:CUSTOM\_ID: new-stuff

:END:

| Version: | 0.0.1 |

| GPGME Version: | 1.13.0 |

| Author: | Ben McGinnes <ben@gnupg.org> |

| Author GPG Key: | DB4724E6FA4286C92B4E55C4321E4E2373590E5D |

| Language: | Australian English, British English |  
| xml:lang: | en-AU, en-GB, en |

The following are all the past /What's New/ sections for the Python Bindings HOWTO and other documentation.

\*\* What Was New in GPGME 1120

```
:PROPERTIES:  
:CUSTOM_ID: gpgme-1-12-0  
:END:
```

The most obviously new point for those reading this guide is this section on other new things, but that's hardly important. Not given all the other things which spurred the need for adding this section and its subsections.

\*\*\* New in GPGME 1120

```
:PROPERTIES:  
:CUSTOM_ID: new-stuff-1-12-0  
:END:
```

There have been quite a number of additions to GPGME and the Python bindings to it since the last release of GPGME with versions 1.11.0 and 1.11.1 in April, 2018.

The bullet points of new additions are:

- an expanded section on [\[\[file:gpgme-python-howto#installation\]\[installing\]\]](#) and [\[\[file:gpgme-python-howto#snafu\]\[troubleshooting\]\]](#) the Python bindings.
- The release of Python 3.7.0; which appears to be working just fine with our bindings, in spite of intermittent reports of problems for many other Python projects with that new release.
- Python 3.7 has been moved to the head of the specified python versions list in the build process.
- In order to fix some other issues, there are certain underlying functions which are more exposed through the [\[\[file:gpgme-python-howto#howto-get-context\]\[gpg.Context\(\)\]\]](#), but ongoing documentation ought to clarify that or otherwise provide the best means of using the bindings. Some additions to `=gpg.core=` and the `=Context()=`, however, were intended (see below).
- Continuing work in identifying and confirming the cause of oft-reported [\[\[file:gpgme-python-howto#snafu-runtime-not-funtime\]\[problems installing the Python bindings on Windows\]\]](#).
- GSOC: Google's Surreptitiously Ordered Conscriptio ... erm ... oh, right; Google's Summer of Code. Though there were two hopeful candidates this year; only one ended up involved with the GnuPG

Project directly, the other concentrated on an unrelated third party project with closer ties to one of the GNU/Linux distributions than to the GnuPG Project. Thus the Python bindings benefited from GSOC participant Jacob Adams, who added the `key_import` function; building on prior work by Tobias Mueller.

- Several new methods functions were added to the `gpg.Context()`, including: [\[\[file:gpgme-python-howto#howto-import-key\]\[key\\_import\]\]](#), [\[\[file:gpgme-python-howto#howto-export-key\]\[key\\_export\]\]](#), [\[\[file:gpgme-python-howto#howto-export-public-key\]\[key\\_export\\_minimal\]\]](#) and [\[\[file:gpgme-python-howto#howto-export-secret-key\]\[key\\_export\\_secret\]\]](#).
- Importing and exporting examples include versions integrated with Marcel Fest's recently released [\[\[https://github.com/Selfnet/hkp4py\]\[HKP for Python\]\]](https://github.com/Selfnet/hkp4py) module. Some [\[\[file:gpgme-python-howto#hkp4py\]\[additional notes on this module\]\]](#) are included at the end of the HOWTO.
- Instructions for dealing with semi-walled garden implementations like ProtonMail are also included. This is intended to make things a little easier when communicating with users of ProtonMail's services and should not be construed as an endorsement of said service. The GnuPG Project neither favours, nor disfavors ProtonMail and the majority of this deals with interacting with the ProtonMail keyserver.
- Semi-formalised the location where [\[\[file:gpgme-python-howto#draft-editions\]\[draft versions\]\]](#) of this HOWTO may periodically be accessible. This is both for the reference of others and testing the publishing of the document itself. Renamed this file at around the same time.
- The Texinfo documentation build configuration has been replicated from the parent project in order to make to maintain consistency with that project (and actually ship with each release).
- a reStructuredText (=rst=) version is also generated for Python developers more used to and comfortable with that format as it is the standard Python documentation format and Python developers may wish to use it with Sphinx. Please note that there has been no testing of the reStructuredText version with Sphinx at all. The reST file was generated by the simple expedient of using [\[\[https://pandoc.org/\]\[Pandoc\]\]](https://pandoc.org/).
- Added a new section for [\[\[file:gpgme-python-howto#advanced-use\]\[advanced or experimental use\]\]](#).
- Began the advanced use cases with [\[\[file:gpgme-python-howto#cython\]\[a section\]\]](#) on using the module with [\[\[https://cython.org/\]\[Cython\]\]](https://cython.org/).
- Added a number of new scripts to the `=example/howto/` directory; some of which may be in advance of their planned sections of the HOWTO (and some are just there because it seemed like a good idea at the time).
- Cleaned up a lot of things under the hood.

000

\*H

010 UDE1!0U

Deutsches Forschungsnetz10UDFN-PCA1.0,U%DFN Top Level Certification Authority1!0 \*H  
certify@pca.dfn.de0

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Deutsches Forschungsnetz10UDFN-PCA1.0,U%DFN Top Level Certification Authority1!0 \*H  
certify@pca.dfn.de0"0  
\*H  
0  
nsvS2r#iA4H|\*/  
:Sd;v  
tD}L+~IWWD|eP&qH)  
!1\p%,1.tlsmnQ,g-W)@\t<kvm5j(d)9M\_KGQJ0:qTE 00 `HB0) `HBhttps://mystic.pca.dfn.de/0A  
`HB42http://www.pca.dfn.de/dfnpca/policy/wwwpolicy.html08 `HB  
+)The DFN Top Level Certification Authority0! `HBcgi/check-rev.cgi?0 `HB  
dfnpca.crl0U00U0  
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OgGqjGVxl50%<`Pb18 z;t~r0U<A%3#l'8b"<iX"V!k"\*Q8&hAPI"3 00KUb&Qq'46\_{D[JZ!i<=T  
/OF  
1.13.1  
Wenn Sie dies lesen knnen, ist es wohl nicht  
geheim genug.

## 1.452 libxml2 2.9.7-13.el8\_6.1

### 1.452.1 Available under license :

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```
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Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

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```
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`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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# 1.456 tpm2-tss-tcti 2.3.2-4.el8

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## 1.457 openssl 1.1.1k-6.el8\_5

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```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en" dir="ltr">
<head>
<title>PostgreSQL JDBC License</title>
<meta http-equiv="Content-Type" content="text/xhtml; charset=utf-8" />
<meta name="description" content="The official site for the PostgreSQL JDBC Driver" />
<meta name="copyright" content="The PostgreSQL Global Development Group" />

<style type="text/css" media="screen" title="Normal Text">@import url("../media/css/base.css");</style>

<link rel="shortcut icon" href="../media/favicon.ico" />

<!--
<script type="text/javascript">
var _gaq = _gaq || [];
_gaq.push(['_setAccount', 'UA-1345454-1']);
_gaq.push(['_trackPageview']);
(function() {
var ga = document.createElement('script'); ga.type = 'text/javascript'; ga.async = true;
ga.src = ('https:' == document.location.protocol ? 'https://ssl' : 'http://www') + '.google-analytics.com/ga.js';
var s = document.getElementsByTagName('script')[0]; s.parentNode.insertBefore(ga, s);
})();
</script>
-->
</head>
```

```

<body>
<div id="pgContainerWrap">
  <div id="pgContainer">

    <span class="txtOffScreen"><a href="#pgContent" title="Skip site navigation" accesskey="1">Skip site
navigation</a> (1)</span>
    <span class="txtOffScreen"><a href="#pgContentWrap" title="Skip section navigation" accesskey="2">Skip
section navigation</a> (2)</span>

  <div id="pgHeaderContainer">

    <div id="pgSearch">

      <!-- Old pgjdbc form -->
      <form action="https://www.google.com/search" method="get">
        <input value="jdbc.postgresql.org" name="sitesearch" type="hidden" />
        <input id="q" name="q" type="text" size="20" maxlength="255" onfocus="if( this.value==this.defaultValue )
this.value=";" value="Google Search" accesskey="s" />
        <!-- <input onFocus="getBlank (this, 'Search the site with google');" size="25" name="q" id="query" type="text"
value="Search the site with google">&nbsp;   -->
          <input name="Search" value="Search" type="submit" />
        </form>

      <!-- New PostgreSQL form
      <form method="get" action="search/">
        <div>
          <h2 class="pgBlockHide"><label for="q">Search</label></h2>
          <input id="q" name="q" type="text" size="20" maxlength="255" onfocus="if( this.value==this.defaultValue )
this.value=";" value="Search" accesskey="s" />
          <input name="a" type="hidden" value="1"/>
          <input id="submit" name="submit" type="submit" value="Search" />
        </div>
      </form>
      -->

    </div> <!-- pgSearch -->
    <br />

    <div id="pgHeader">
      <div id="pgHeaderLogoLeft">
        
        <map name="maplinks">
          <area shape="rect" coords="0,0,231,80" alt="PostgreSQL" href="https://postgresql.org" />
          <area shape="rect" coords="232,0,390,80" alt="PostgreSQL JDBC Driver" href="https://jdbc.postgresql.org" />
        </map>
      </div>
      <div id="pgHeaderLogoRight">
        <a href="https://postgresql.org">

```

```
    
  </a>
</div>
</div> <!-- pgHeader -->
```

```
<div id="pgTopNav">
  <div id="pgTopNavLeft">
    
  </div>
  <div id="pgTopNavRight">
    
  </div>
  <ul id="pgTopNavList">
    <li><a href="../index.html" title="Home">Home</a></li>
    <li><a href="../about/about.html" title="About">About</a></li>
    <li><a href="../download.html" title="Download">Download</a></li>
    <li><a href="../documentation/documentation.html" title="Documentation">Documentation</a></li>
    <li><a href="../community/community.html" title="Community">Community</a></li>
    <li><a href="../development/development.html" title="Development">Development</a></li>
  </ul>
</div> <!-- pgTopNav -->
</div> <!-- pgHeaderContainer -->
```

```
<div id="pgContent">
  <div id="pgSideWrap">
    <div id="pgSideNav">
      <ul>
        <li><a href="about.html">About</a></li>
        <li><a href="license.html">License</a></li>
        <li><a href="extras.html">Extras</a></li>
      </ul>
    </div> <!-- pgSideNav -->
  </div> <!-- pgSideWrap -->
```

```
<div id="pgContentWrap">
  <h1>BSD 2-clause "Simplified" License</h1>
  <p>
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    The simplest explanation of the licensing terms is that
    you can do whatever you want with the product and source code as long
    as you don't claim you wrote it or sue us. You should give it a read
    though, it's only half a page.
  </p>
  <hr />
```

```
<pre style="font-family: monospace,'Courier'; background-color: #f9f9f9; padding: 1em; border: 1px solid #ddd">
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```

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```
</div> <!-- pgContentWrap -->
```

```
<br class="pgClearBoth" />
```

```
</div> <!-- pgContent -->
```

```
<hr />
```

```
<div id="pgFooter">
```

```
<a class="navFooter" href="https://www.postgresql.org/about/privacypolicy">Privacy Policy</a> |
```

```
<a class="navFooter" href="https://www.postgresql.org/about/">About PostgreSQL</a><br/>
```

```
Copyright &copy; 1996-2020 The PostgreSQL Global Development Group
```

```
</div> <!-- pgFooter -->
```

```
</div> <!-- pgContainer -->
```

```
</div> <!-- pgContainerWrap -->
```

```
</body>
```

```
</html>
```

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Last updated: 9 October 2018

```
<!DOCTYPE html><html class="wp"><head><meta charset="utf-8"/><meta http-equiv="x-ua-compatible"
content="ie=edge"/><meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-
fit=no"/><style data-href="/styles.bac76730c08e59a2e76d.css">.style-module--anchorLinks--2mh4W{text-
align:center}@media screen and (min-width:992px){.style-module--anchorLinks--2mh4W{display:-ms-
flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center;margin:3px
0}}.style-module--link--1Ko78{color:#0074a2;text-transform:uppercase;font-weight:700;letter-spacing:1.2px;font-
size:12px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;position:relative;margin:0
20px;padding:10px 0}@media screen and (max-width:991px){.style-module--link--1Ko78:first-of-type{margin-
top:0;padding-top:0}}@media screen and (max-width:991px){.style-module--link--1Ko78:last-of-type{margin-
bottom:0;padding-bottom:0}}@media screen and (max-width:991px){.style-module--link--
1Ko78{display:block;margin:20px 0}}@media screen and (min-width:992px){.style-module--link--
1Ko78:not(:last-of-
type):after{content:"";width:1px;height:30px;background:rgba(130,148,148,.25);position:absolute;right:-
20px}}.style-module--animationElement--XoaLp{opacity:1}@media screen and (min-width:992px){.style-module-
-animationElement--XoaLp{opacity:0}.style-module--animationElement--XoaLp.style-module--fromTop--2tsTM{-
webkit-animation:style-module--fromTop--2tsTM .3s cubic-bezier(.21,.78,.76,.78) forwards;animation:style-
module--fromTop--2tsTM .3s cubic-bezier(.21,.78,.76,.78) forwards}.style-module--animationElement--
XoaLp.style-module--fromRight--3EeXz{-webkit-animation:style-module--fromRight--3EeXz .5s cubic-
bezier(.21,.78,.76,.78) forwards;animation:style-module--fromRight--3EeXz .5s cubic-bezier(.21,.78,.76,.78)
forwards}.style-module--animationElement--XoaLp.style-module--fromBottom--6dP9P{-webkit-animation:style-
module--fromBottom--6dP9P .5s cubic-bezier(.21,.78,.76,.78) forwards;animation:style-module--fromBottom--
6dP9P .5s cubic-bezier(.21,.78,.76,.78) forwards}.style-module--animationElement--XoaLp.style-module--
fromLeft--1q-9z{-webkit-animation:style-module--fromLeft--1q-9z .5s cubic-bezier(.21,.78,.76,.78)
forwards;animation:style-module--fromLeft--1q-9z .5s cubic-bezier(.21,.78,.76,.78) forwards}.style-module--
animationElement--XoaLp.style-module--fadeIn--1P3t4{-webkit-animation:style-module--fadeIn--1P3t4 .5s cubic-
bezier(.21,.78,.76,.78) forwards;animation:style-module--fadeIn--1P3t4 .5s cubic-bezier(.21,.78,.76,.78)
forwards}}@-webkit-keyframes style-module--fromTop--2tsTM{0%{opacity:0;transform:translateY(-
15%)}to{opacity:1;transform:translateY(0)}}@keyframes style-module--fromTop--
2tsTM{0%{opacity:0;transform:translateY(-15%)}to{opacity:1;transform:translateY(0)}}@-webkit-keyframes
style-module--fromRight--
3EeXz{0%{transform:translateX(5%);opacity:0}50%{transform:translateX(0)}95%{opacity:1}to{transform:transla
teX(0);opacity:1}}@keyframes style-module--fromRight--
3EeXz{0%{transform:translateX(5%);opacity:0}50%{transform:translateX(0)}95%{opacity:1}to{transform:transla
teX(0);opacity:1}}@-webkit-keyframes style-module--fromBottom--
6dP9P{0%{opacity:0;transform:translateY(15%)}to{opacity:1;transform:translateY(0)}}@keyframes style-module-
-fromBottom--6dP9P{0%{opacity:0;transform:translateY(15%)}to{opacity:1;transform:translateY(0)}}@-webkit-
keyframes style-module--fromLeft--1q-9z{0%{transform:translateX(-
7%);opacity:0}50%{transform:translateX(0)}to{transform:translateX(0);opacity:1}}@keyframes style-module--
fromLeft--1q-9z{0%{transform:translateX(-
7%);opacity:0}50%{transform:translateX(0)}to{transform:translateX(0);opacity:1}}@-webkit-keyframes style-
```

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module--fadeIn--1P3t4{to{opacity:1}}@keyframes style-module--fadeIn--1P3t4{to{opacity:1}}.style-module--
overlay--
3uWjl{background:rgba(0,0,0,.75);width:100%;height:100%;left:0;top:0;opacity:1;position:fixed;transition:all .25s
ease-in-out;z-index:100}.style-module--button--K11_E{transition:all .5s ease-in-out;transition:all .5s cubic-
bezier(.785,.135,.15,.86);border-radius:6px;border-style:solid;border-width:1px;display:inline-block;font-
size:12px;font-weight:700;letter-spacing:.9px;line-height:1.5;padding:12px 30px;text-align:center;text-
decoration:none;text-transform:uppercase;position:relative}.style-module--button--K11_E:hover{cursor:pointer;text-
decoration:none}.style-module--button--K11_E.style-module--island--3qX2T{background-color:#38cccd;border-
color:#38cccd;color:#fff}.style-module--button--K11_E.style-module--island--
3qX2T:hover{background:#173361;border-color:#173361}.style-module--button--K11_E.style-module--island--
3qX2T:disabled{background-color:#ccc;border-color:#ccc;color:#666;cursor:not-allowed}.style-module--button--
K11_E.style-module--denim--S1xvF{background-color:#173361;border-color:#173361;color:#fff}.style-module--
button--K11_E.style-module--denim--S1xvF:hover{background:#0074a2;border-color:#0074a2}.style-module--
button--K11_E.style-module--denimOutline--1Y1tC{background-color:transparent;border-
color:#173361;color:#173361}.style-module--button--K11_E.style-module--denimOutline--
1Y1tC:hover{background:#173361;color:#fff}.style-module--button--K11_E.style-module--white--
3e10p{background-color:#fff;border-color:#fff;color:#173361}.style-module--button--K11_E.style-module--white--
3e10p:hover{background:transparent;color:#fff}.style-module--button--K11_E.style-module--whiteOutline--3cb-
h{background-color:transparent;border-color:#fff;color:#fff}.style-module--button--K11_E.style-module--
whiteOutline--3cb-h:hover{background:#fff;color:#173361}.style-module--button--K11_E.style-module--purple--
1TxqH{background-color:#431d73;border-color:#431d73;color:#fff}.style-module--button--K11_E.style-module--
purple--1TxqH:hover{background:transparent;border-color:#431d73;color:#431d73}.style-module--button--
K11_E.style-module--purpleOutline--1C3T-{background-color:transparent;border-
color:#431d73;color:#431d73}.style-module--button--K11_E.style-module--purpleOutline--1C3T-
:hover{background:#431d73;color:#fff}.style-module--button--K11_E.style-module--green--2BSuQ{background-
color:#159e86;border-color:#159e86;color:#fff}.style-module--button--K11_E.style-module--green--
2BSuQ:hover{background:transparent;border-color:#159e86;color:#159e86}.style-module--button--K11_E.style-
module--greenOutline--25Pg7{background-color:transparent;border-color:#159e86;color:#159e86}.style-module--
button--K11_E.style-module--greenOutline--25Pg7:hover{background:#159e86;color:#fff}.style-module--button--
K11_E.style-module--blue--sASBN{background-color:#0dacc;border-color:#0dacc;color:#fff}.style-module--
button--K11_E.style-module--blue--sASBN:hover{background:transparent;border-
color:#0dacc;color:#0dacc}.style-module--button--K11_E.style-module--blueOutline--yXs7S{background-
color:transparent;border-color:#0dacc;color:#0dacc}.style-module--button--K11_E.style-module--blueOutline--
yXs7S:hover{background:#0dacc;color:#fff}.style-module--button--K11_E.style-module--orange--
3FGxM{background-color:#e37d62;border-color:#e37d62;color:#fff}.style-module--button--K11_E.style-module--
orange--3FGxM:hover{background:transparent;border-color:#e37d62;color:#e37d62}.style-module--button--
K11_E.style-module--orangeOutline--Omcu9{background-color:transparent;border-
color:#e37d62;color:#e37d62}.style-module--button--K11_E.style-module--orangeOutline--
Omcu9:hover{background:#e37d62;color:#fff}.style-module--button--K11_E.style-module--grey--
2lpBY{background-color:#58788c;border-color:#58788c;color:#fff}.style-module--button--K11_E.style-module--
grey--2lpBY:hover{background:transparent;border-color:#58788c;color:#58788c}.style-module--button--
K11_E.style-module--greyOutline--3JM3v{background-color:transparent;border-
color:#58788c;color:#58788c}.style-module--button--K11_E.style-module--greyOutline--
3JM3v:hover{background:#58788c;color:#fff}.style-module--button--K11_E.style-module--boxShadow--
32GhS{padding:50px 30px;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;border:1px
solid rgba(130,148,148,.25);border-radius:8px;margin:0 5px;transition:all .3s ease}.style-module--button--
K11_E.style-module--boxShadow--32GhS.style-module--fromBottom--1KdMI:after{opacity:0;bottom:-5%}.style-
module--button--K11_E.style-module--boxShadow--32GhS.style-module--fromBottom--

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1KdMI:hover:after{ opacity: 1;bottom:5px }.style-module--button--K11_E.style-module--boxShadow--32GhS.style-
module--fromLeft--mzMQk:after{ opacity:0;top:calc(50% - 9px);right:6px }.style-module--button--K11_E.style-
module--boxShadow--32GhS.style-module--fromLeft--mzMQk:hover:after{ opacity: 1;right: 1px }.style-module--
button--K11_E.style-module--boxShadow--
32GhS:after{ content:"";position:absolute;width:20px;height:20px;background-
image:url("https://d33wubrfki0l68.cloudfront.net/1d1bc6e441a34bc38df8118a4d8541cffe6a6412/13d9c/icons/arrow
_line.inline.svg");background-repeat:no-repeat;transition:all .3s ease }.style-module--button--K11_E.style-module--
boxShadow--32GhS img{-o-object-fit:contain;object-fit:contain }.style-module--button--K11_E.style-module--
boxShadow--32GhS:hover{ box-shadow:0 4px 15px rgba(0,0,0,.25)}.style-module--button--
K11_E.disabled{ background-color:rgba(130,148,148,.25)!important;cursor:not-allowed!important;border-
color:rgba(130,148,148,.25)!important }.style-module--footnote--2QqUZ{ font-weight:300;font-
size:12px;color:#000;display:block;margin-top:15px }.style-module--arrow--
2RnsV{ position:relative;cursor:pointer }.style-module--arrow--2RnsV:after,.style-module--arrow--
2RnsV:before{ content:"";position:absolute;background-color:#173361;transition:all .4s cubic-
bezier(1,.07,.28,1.04);width:15px;height:2px }.style-module--left--fNXOv:before,.style-module--right--
1dAD9:after{-ms-transform:rotate(-45deg);transform:rotate(-45deg)}.style-module--left--fNXOv:after,.style-
module--right--1dAD9:before{-ms-transform:rotate(45deg);transform:rotate(45deg)}.style-module--left--
fNXOv:after,.style-module--left--fNXOv:before,.style-module--right--1dAD9:after,.style-module--right--
1dAD9:before{ left:0 }.style-module--left--fNXOv.style-module--sm--ib37X:after,.style-module--left--fNXOv.style-
module--sm--ib37X:before,.style-module--right--1dAD9.style-module--sm--ib37X:after,.style-module--right--
1dAD9.style-module--sm--ib37X:before{ width:8px }.style-module--left--fNXOv.style-module--sm--
ib37X:before,.style-module--right--1dAD9.style-module--sm--ib37X:before{ top:3px }.style-module--left--
fNXOv.style-module--sm--ib37X:after,.style-module--right--1dAD9.style-module--sm--ib37X:after{ top:9px }.style-
module--left--fNXOv.style-module--md--1r7eR:before,.style-module--right--1dAD9.style-module--md--
1r7eR:before{ top:5px }.style-module--left--fNXOv.style-module--md--1r7eR:after,.style-module--right--
1dAD9.style-module--md--1r7eR:after{ top:15px }.style-module--down--cdTKv:before{-ms-
transform:rotate(45deg);transform:rotate(45deg)}.style-module--down--cdTKv:after{-ms-transform:rotate(-
45deg);transform:rotate(-45deg)}.style-module--up--1TDML:before{-ms-
transform:rotate(135deg);transform:rotate(135deg)}.style-module--up--1TDML:after{-ms-transform:rotate(-
135deg);transform:rotate(-135deg)}.style-module--down--cdTKv:after,.style-module--up--
1TDML:after{ left:11px }.style-module--down--cdTKv.style-module--sm--ib37X:after,.style-module--down--
cdTKv.style-module--sm--ib37X:before,.style-module--up--1TDML.style-module--sm--ib37X:after,.style-module--
up--1TDML.style-module--sm--ib37X:before{ width:11px }.style-module--down--cdTKv.style-module--sm--
ib37X:after,.style-module--up--1TDML.style-module--sm--ib37X:after{ left:7px }.style-module--theme_white--
2Exob:after,.style-module--theme_white--2Exob:before{ background-color:#fff }.style-module--theme_denim--
2OIpA:after,.style-module--theme_denim--2OIpA:before{ background-color:#173361 }.style-module--
theme_academy--1Az4R:after,.style-module--theme_academy--1Az4R:before{ background-color:#0074a2 }.style-
module--title--mJiqI{ color:#173361;font-size:18px;font-weight:700;line-height:23px;margin:0;padding:0 }.style-
module--title--mJiqI a{ color:#173361;text-decoration:underline }.style-module--label--sGt7o{ color:#173361;font-
size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;line-height:1;margin-bottom:15px;text-
transform:uppercase }.style-module--main--1i9BQ{ color:#0074a2 }.style-module--subtitle--
1iPNp{ color:#829494 }.style-module--main--1i9BQ+.style-module--subtitle--1iPNp:before{ content:" | " }.style-
module--footnote--szfSW{ position:absolute;top:calc(100% + 10px);left:0;right:0;font-weight:300;font-
size:12px;color:#000 }.style-module--card--2PEGL{ background-color:#fff;border-radius:8px;margin-
bottom:10px;padding:25px;display:-ms-flexbox;display:flex;position:relative;color:#173361;font-size:16px;font-
weight:300;line-height:25px;letter-spacing:0 }.style-module--card--2PEGL:first-child:last-child{ margin-
bottom:0 }.style-module--card--2PEGL.style-module--style_list--3UZC3 .style-module--blurb--3eRIs
ul{ margin:0;padding:0;list-style:none }.style-module--card--2PEGL.style-module--style_stack--3ie4F{ text-

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align:center}@media screen and (max-width:767px){.style-module--card--2PEGL.style-module--style_stack--
3ie4F{margin-top:10px}.style-module--card--2PEGL.style-module--style_stack--3ie4F.style-module--hasFootnote--
2yz-c{margin-bottom:30px}}@media screen and (max-width:767px){.style-module--card--2PEGL.style-module--
style_stack--3ie4F+.style-module--style_stack--3ie4F{margin-top:30px}}.style-module--card--2PEGL.style-
module--style_stack--3ie4F.style-module--content--ycnjO{-ms-flex-direction:column;flex-direction:column}.style-
module--card--2PEGL.style-module--style_stack--3ie4F.style-module--iconContainer--
3JNL4{position:absolute;top:0;left:50%;-ms-transform:translate(-50%,-45px);transform:translate(-50%,-
45px);margin:0}.style-module--card--2PEGL.style-module--style_stack--3ie4F.style-module--iconContainer--
3JNL4+.style-module--main--okEB_{margin-top:20px}.style-module--card--2PEGL.style-module--style_stack--
3ie4F.style-module--blurb--3eRls{margin-top:25px}.style-module--card--2PEGL.style-module--style_stack--3ie4F
.style-module--ctaContainer--3OCCE{margin-top:50px;margin-bottom:25px}.style-module--card--2PEGL.style-
module--border--2oZLL{border:4px solid}.style-module--card--2PEGL.style-module--border--2oZLL.style-
module--border_gray--hLEki{border-color:hsla(0,0%,96.1%,.85)!important}.style-module--card--2PEGL.style-
module--island--21OU8 span{color:#173361}.style-module--card--2PEGL.style-module--island--21OU8
h3{color:#38cccd}.style-module--clickable--8zs5X{cursor:pointer}.style-module--clickable--8zs5X.style-module--
arrow--1waU4{position:absolute;right:40px;top:50%;-ms-transform:translateY(-50%);transform:translateY(-
50%)}.style-module--clickable--8zs5X.style-module--main--okEB_{margin-right:100px}@media screen and (max-
width:767px){.style-module--clickable--8zs5X.style-module--main--okEB_{margin-right:0}}.style-module--
clickable--8zs5X:~h3 a{text-decoration:underline}.style-module--content--ycnjO{display:-ms-
flexbox;display:flex;-ms-flex:1 1;flex:1 1;position:relative}.style-module--content--ycnjO p{margin-
top:10px}.style-module--content--ycnjO p:last-child{margin-bottom:0}.style-module--content--ycnjO .style-
module--iconContainer--3JNL4{margin-right:15px}.style-module--main--okEB_{-ms-flex:1 1;flex:1 1;display:-ms-
flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-flex-pack:justify;justify-content:space-
between}.style-module--ctaContainer--3OCCE{margin-top:25px}@media screen and (max-width:767px){.style-
module--cardPerson--oCaWX.style-module--content--ycnjO{-ms-flex-direction:column;flex-
direction:column}}@media screen and (max-width:767px){.style-module--cardPerson--oCaWX.style-module--
content--ycnjO h3,.style-module--cardPerson--oCaWX.style-module--iconContainer--3JNL4{text-
align:center}}.style-module--cardPerson--oCaWX.style-module--iconContainer--3JNL4
img{width:100px;height:auto;border-radius:50%}@media screen and (max-width:767px){.style-module--arrow--
1waU4{display:none}}.style-module--blurb--3eRls{margin-top:10px;margin-bottom:auto}.style-module--
image_top--1EEoe{-ms-flex-direction:column;flex-direction:column}.style-module--image_top--1EEoe.style-
module--content--ycnjO{margin:25px 0 0}@media screen and (max-width:991px){.style-module--image_left--
CsqNI.style-module--content--ycnjO{-ms-flex-direction:column;flex-direction:column}}.style-module--image_left--
CsqNI.style-module--content--ycnjO.style-module--main--okEB_{margin:25px}@media screen and (max-
width:991px){.style-module--image_left--CsqNI.style-module--content--ycnjO.style-module--main--
okEB_{margin:25px 0 0}}.style-module--image_left--CsqNI.style-module--imageContainer--r_DS-
{width:468px}@media screen and (max-width:991px){.style-module--image_left--CsqNI.style-module--
imageContainer--r_DS-{width:100%}}.style-module--container--3NHJW .slick-current{z-index:1}.style-module--
container--3NHJW .slick-prev{left:0}.style-module--container--3NHJW .slick-next{right:0}.style-module--
container--3NHJW .style-module--defaultArrows--V48oD .slick-arrow{position:absolute;top:50%;z-
index:12;height:80px;margin-top:-40px;font-size:0;width:0;opacity:0;transition:all .3s ease;text-
align:center;color:#fff;background:rgba(0,0,0,.7);outline:0;border:none}.style-module--container--3NHJW .style-
module--defaultArrows--V48oD .slick-arrow:before{line-height:80px;display:inline-block;font-
family:FontAwesome;font-size:40px}.style-module--container--3NHJW .style-module--defaultArrows--V48oD
.slick-arrow:~hover{-ms-transform:scale(1.1);transform:scale(1.1)}.style-module--container--3NHJW .style-module--
defaultArrows--V48oD .slick-prev{left:0;border-radius:0 40px 40px 0}.style-module--container--3NHJW .style-
module--defaultArrows--V48oD .slick-prev:before{content:"\F104";padding-right:15px}.style-module--container--
3NHJW .style-module--defaultArrows--V48oD .slick-next{right:0;border-radius:40px 0 0 40px}.style-module--

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container--3NHJW.style-module--defaultArrows--V48oD .slick-next:before{ content:"\F105";padding-
left:10px }.style-module--container--3NHJW.style-module--defaultArrows--V48oD:hover .slick-
arrow{ opacity:1;width:55px }.style-module--container--3NHJW.style-module--simpleArrows--1nTC0{ display:-ms-
flexbox;display:flex;-ms-flex-align:center;align-items:center }.style-module--container--3NHJW.style-module--
simpleArrows--1nTC0 .slick-arrow{ background:none;color:transparent;z-index:10}@media screen and (max-
width:991px){.style-module--container--3NHJW.style-module--simpleArrows--1nTC0 .slick-
arrow{ display:none }}.style-module--container--3NHJW.style-module--simpleArrows--1nTC0 .slick-list{-ms-flex:1
1;flex:1 1;margin:0 30px }.style-module--container--3NHJW.style-module--simpleArrows--1nTC0 .style-module--
dots--2oV0K{ position:absolute;top:100%;left:50%;-ms-transform:translate(-50%,20px);transform:translate(-
50%,20px);margin:0 }.style-module--dots--2oV0K{ display:block;margin:20px 0 0;padding:0;list-style:none;text-
align:center }.style-module--dots--2oV0K li{ cursor:pointer;display:inline-block;margin-right:10px }.style-module--
dots--2oV0K li:last-child{ margin-right:0 }.style-module--dots--2oV0K li
span{ width:12px;height:12px;background:#fff;border-radius:50px;display:block;border:1px solid #173361 }.style-
module--dots--2oV0K li.slick-active span{ background:#173361 }.style-module--theme_academy--1hrGrC .style-
module--dots--2oV0K li span{ border-color:#0074a2 }.style-module--theme_academy--1hrGrC .style-module--dots--
2oV0K li.slick-active span{ background:#0074a2 }.style-module--close--f6-
7U{ position:absolute;right:10px;top:10px;cursor:pointer;opacity:.5;height:25px;width:25px;z-index:3;transition:all
.25s ease-in-out }.style-module--close--f6-7U:hover{ opacity:1;-ms-transform:scale(.9);transform:scale(.9) }.style-
module--close--f6-7U:after,.style-module--close--f6-7U:before{ position:absolute;left:15px;content:"
";height:20px;width:2px;background-color:#173361 }.style-module--close--f6-7U:before{-ms-
transform:rotate(45deg);transform:rotate(45deg) }.style-module--close--f6-7U:after{-ms-transform:rotate(-
45deg);transform:rotate(-45deg) }.style-module--grid--3kV-8{ display:-ms-flexbox;display:flex;-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:start;justify-content:flex-start;width:100% }@media screen and (max-
width:767px){.style-module--grid--3kV-8{-ms-flex-direction:column;flex-direction:column} }.style-module--grid--
3kV-8>div{ margin:0;width:100% }@media screen and (max-width:767px){.style-module--grid--3kV-
8>div>div{ margin-top:10px} }.style-module--grid--3kV-8.style-module--col1--2h_Ja>div>div{ margin-
top:10px }@media screen and (min-width:768px){.style-module--grid--3kV-8.style-module--col2--
2p2M7>div{ margin-top:10px;width:calc((100% - 10px)/2) }.style-module--grid--3kV-8.style-module--col2--
2p2M7>div:nth-child(2n){ margin-left:10px }.style-module--grid--3kV-8.style-module--col2--2p2M7>div:first-
child,.style-module--grid--3kV-8.style-module--col2--2p2M7>div:nth-child(2){ margin-top:0 }@media screen and
(min-width:768px){.style-module--grid--3kV-8.style-module--col3--3TXIt>div{ margin-top:10px;margin-
left:10px;width:calc((100% - 20px)/3) }.style-module--grid--3kV-8.style-module--col3--3TXIt>div:nth-
child(3n+1){ margin-left:0 }.style-module--grid--3kV-8.style-module--col3--3TXIt>div:first-child,.style-module--
grid--3kV-8.style-module--col3--3TXIt>div:nth-child(2),.style-module--grid--3kV-8.style-module--col3--
3TXIt>div:nth-child(3){ margin-top:0 }@media screen and (min-width:768px) and (max-width:991px){.style-
module--grid--3kV-8.style-module--col4--3H2qW>div{ margin-top:10px;margin-left:10px;width:calc((100% -
10px)/2) }.style-module--grid--3kV-8.style-module--col4--3H2qW>div:nth-child(odd){ margin-left:0 }.style-module-
-grid--3kV-8.style-module--col4--3H2qW>div:first-child,.style-module--grid--3kV-8.style-module--col4--
3H2qW>div:nth-child(2){ margin-top:0 }@media screen and (min-width:992px){.style-module--grid--3kV-8.style-
module--col4--3H2qW>div{ margin-top:10px;margin-left:10px;width:calc((100% - 30px)/4) }.style-module--grid--
3kV-8.style-module--col4--3H2qW>div:nth-child(4n+1){ margin-left:0 }.style-module--grid--3kV-8.style-module--
col4--3H2qW>div:first-child,.style-module--grid--3kV-8.style-module--col4--3H2qW>div:nth-child(2),.style-
module--grid--3kV-8.style-module--col4--3H2qW>div:nth-child(3),.style-module--grid--3kV-8.style-module--col4-
3H2qW>div:nth-child(4){ margin-top:0 }@media screen and (min-width:768px){.style-module--grid--3kV-8.style-
module--col5--1Ve_W>div{ margin-top:10px;margin-left:10px;width:calc((100% - 40px)/5) }.style-module--grid--
3kV-8.style-module--col5--1Ve_W>div:nth-child(5n+1){ margin-left:0 }.style-module--grid--3kV-8.style-module--
col5--1Ve_W>div:first-child,.style-module--grid--3kV-8.style-module--col5--1Ve_W>div:nth-child(2),.style-
module--grid--3kV-8.style-module--col5--1Ve_W>div:nth-child(3),.style-module--grid--3kV-8.style-module--col5--

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1Ve_W>div:nth-child(4),.style-module--grid--3kV-8.style-module--col5--1Ve_W>div:nth-child(5){margin-
top:0}}.style-module--required--fqVjc{display:inline-block;color:#bf0000;font-size:13px;position:relative;top:-
3px}.style-module--input--3P0z6{background-color:#fff;border:2px solid hsla(0,0%,73.3%,.5);border-
radius:4px;width:100%;margin-bottom:5px;color:#000;font-size:14px;font-weight:300;line-
height:1.2;padding:10px}.style-module--input--3P0z6::-webkit-input-placeholder{color:#829494}.style-module--
input--3P0z6::-moz-placeholder{color:#829494}.style-module--input--3P0z6:-ms-input-
placeholder{color:#829494}.style-module--input--3P0z6::placeholder{color:#829494}.style-module--input--
3P0z6.style-module--error--2b0DF{border-color:#d8365d}.style-module--input--3P0z6[type=checkbox].style-
module--error--2b0DF+span{box-shadow:inset 0 0 0 2px #d8365d}.style-module--container--1xvMb{display:-ms-
flexbox;display:flex;-ms-flex-align:center;align-items:center;position:relative;margin:0}.style-module--container--
1xvMb+.style-module--container--1xvMb{margin-top:10px}.style-module--container--1xvMb.style-module--
checkbox--2Ha9r,.style-module--container--1xvMb input{width:25px;height:25px}.style-module--label--
2uunW{color:#000;font-size:14px;font-weight:300;line-height:1.8px;margin:0;cursor:pointer}.style-module--
inputContainer--2JVku{margin-right:10px}.style-module--inputContainer--2JVku
input{position:absolute;opacity:0;margin:0;z-index:1}.style-module--checkbox--2Ha9r{display:block;border:1px
solid #173361;transition:all .2s ease-in-out;background:#fff;border-
radius:4px;position:relative;cursor:pointer}.style-module--checkbox--
2Ha9r:after{content:"";position:absolute;display:none;background-color:#173361;width:100%;height:100%}.style-
module--input--CKpKC{width:auto;cursor:pointer}.style-module--input--CKpKC.style-module--error--
1LQt5,.style-module--input--CKpKC:checked+.style-module--checkbox--2Ha9r:after{display:block}.style-module-
input--CKpKC.style-module--error--1LQt5+.style-module--checkbox--2Ha9r{border-color:#d8365d}.style-
module--sm--3v0C2.style-module--checkbox--2Ha9r,.style-module--sm--3v0C2
input{width:15px;height:15px}.style-module--sm--3v0C2.style-module--label--2uunW{font-size:11px;line-
height:1.4px}.style-module--academy--iGYzj.style-module--checkbox--2Ha9r{border-color:#0074a2}.style-
module--academy--iGYzj.style-module--checkbox--2Ha9r:after{background-color:#0074a2}.style-module--
container--2hvXD,.style-module--menu--1h96n,.style-module--mobile--14cbj select{border-radius:4px;border:2px
solid rgba(130,148,148,.25);background-color:#fff;padding:6px 15px;width:100%;display:-ms-
flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-align:center;align-
items:center;cursor:pointer;position:relative;color:#829494;font-size:16px;font-weight:300;line-height:2.5px;letter-
spacing:0}@media screen and (max-width:767px){.style-module--container--2hvXD,.style-module--menu--
1h96n,.style-module--mobile--14cbj select{max-width:none}}@media screen and (max-width:767px){.style-
module--select--3SFOn.style-module--container--2hvXD{display:none}}.style-module--select--3SFOn.style-
module--menu--1h96n{padding:0;z-index:10;position:absolute;top:38px;left:-2px;width:calc(100% + 4px);max-
height:0;opacity:0;overflow:hidden;transition:all .5s ease-in-out}.style-module--select--3SFOn.style-module--
menu--1h96n ul{color:#173361;margin:0;padding:0;list-style:none;text-align:left;width:100%;max-
height:420px}.style-module--select--3SFOn.style-module--menu--1h96n ul li{padding:8px 15px;line-
height:1.75;white-space:nowrap;text-overflow:ellipsis;overflow-x:hidden}.style-module--select--3SFOn.style-
module--menu--1h96n ul li.style-module--selected--3yaOi,.style-module--select--3SFOn.style-module--menu--
1h96n ul li:hover{font-weight:700;background:hsla(0,0%,96.1%,.85)}.style-module--select--3SFOn.style-module--
menu--1h96n.style-module--overflow--1RxFl ul{overflow-y:scroll}.style-module--select--3SFOn.style-module--
fullWidth--2xKDP.style-module--container--2hvXD,.style-module--select--3SFOn.style-module--fullWidth--
2xKDP.style-module--menu--1h96n{max-width:none}.style-module--select--3SFOn.style-module--error--3hwWy
.style-module--container--2hvXD{border-color:#d8365d}.style-module--select--3SFOn.style-module--isOpen--
1d_xH.style-module--container--2hvXD{color:#173361;border-bottom-left-radius:0;border-bottom-right-
radius:0}.style-module--select--3SFOn.style-module--isOpen--1d_xH.style-module--menu--1h96n{max-
height:420px;opacity:1;border-top-left-radius:0;border-top-right-radius:0}.style-module--select--3SFOn.style-
module--hasValue--1Ju1P.style-module--container--2hvXD{color:#173361}.style-module--icon--2tH3R{margin-
right:15px}.style-module--mobile--14cbj{display:none;position:relative;width:100%}@media screen and (max-

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width:767px){.style-module--mobile--14cbj{display:inline-block}}.style-module--mobile--14cbj
select{height:40px;-webkit-appearance:none;-moz-appearance:none;appearance:none;cursor:pointer}.style-module-
-mobile--14cbj.style-module--icon--2tH3R{position:absolute;top:50%;right:20px}.style-module--tagline--
3IYwW{color:#173361;font-size:12px;font-weight:500;letter-spacing:2.33px;line-height:2.29;text-
transform:uppercase;margin-bottom:10px}.style-module--tagline--3IYwW a{text-decoration:underline}.style-
module--hero--1nLoF{background-color:#b4e1e4;border-radius:8px;color:#173361;font-size:18px;font-
weight:300;line-height:1.39;margin:85px 25px 15px}@media screen and (max-width:767px){.style-module--hero--
1nLoF{border-radius:0;margin-left:0;margin-right:0}}@media print{.style-module--hero--1nLoF{margin-
top:0}}.style-module--hero--1nLoF h1{color:#173361;font-size:46px;font-weight:700;line-
height:1.26;margin:0}@media screen and (max-width:767px){.style-module--hero--1nLoF h1{font-size:28px;word-
break:break-word}}.style-module--hero--1nLoF h1 a{color:inherit;text-decoration:underline}.style-module--hero--
1nLoF .style-module--container--1TRql{background-size:40% 100%;background-repeat:no-repeat;background-
position:100% 0;max-width:1170px;margin:0 auto;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-
items:center;padding:100px 15px;-ms-flex-pack:center;justify-content:center;text-align:center}@media print{.style-
module--hero--1nLoF .style-module--container--1TRql{padding:20px 0}}@media screen and (max-
width:767px){.style-module--hero--1nLoF .style-module--container--1TRql{background-
image:none!important;height:auto;padding-top:50px;padding-bottom:50px}}.style-module--hero--1nLoF .style-
module--container--1TRql.style-module--afterContentBottom--3LpT1{-ms-flex-direction:column;flex-
direction:column}.style-module--hero--1nLoF .style-module--container--1TRql.style-module--afterContentBottom--
3LpT1 .style-module--afterContent--3dL4o{margin-top:100px}.style-module--hero--1nLoF .style-module--
container--1TRql .style-module--content--34byx{line-height:1.39;font-size:18px;font-weight:300;max-
width:90%;width:800px}@media screen and (max-width:991px){.style-module--hero--1nLoF .style-module--
container--1TRql .style-module--content--34byx{text-align:center;margin:auto}}.style-module--hero--1nLoF .style-
module--container--1TRql .style-module--content--34byx>p:first-of-type{margin-top:50px}@media screen and
(max-width:767px){.style-module--hero--1nLoF .style-module--container--1TRql .style-module--content--
34byx>p:first-of-type{margin-top:25px}}.style-module--hero--1nLoF .style-module--container--1TRql .style-
module--content--34byx p+p{margin-top:15px}.style-module--hero--1nLoF .style-module--container--1TRql .style-
module--imageContainer--ZuS-j{max-width:400px;margin-left:100px;-ms-flex-negative:0;flex-shrink:0}@media
screen and (max-width:991px){.style-module--hero--1nLoF .style-module--container--1TRql .style-module--
imageContainer--ZuS-j{display:none}}.style-module--hero--1nLoF .style-module--footnote--3qpiY{font-
weight:300;font-size:12px;color:#000;display:block;margin-top:15px}.style-module--hero--1nLoF .style-module--
ctaContainer--1IaN3{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-flex-
align:center;align-items:center;margin-top:50px}@media screen and (max-width:767px){.style-module--hero--
1nLoF .style-module--ctaContainer--1IaN3{margin-top:25px}}@media screen and (min-width:576px){.style-
module--hero--1nLoF .style-module--ctaContainer--1IaN3{-ms-flex-direction:row;flex-direction:row;-ms-flex-
pack:center;justify-content:center}}.style-module--hero--1nLoF .style-module--ctaContainer--1IaN3 .style-module--
button--2qoRp{min-width:141px;padding-left:40px;padding-right:40px}@media screen and (max-
width:575px){.style-module--hero--1nLoF .style-module--ctaContainer--1IaN3 .style-module--button--2qoRp{min-
width:unset;max-width:270px;width:80%}}.style-module--hero--1nLoF .style-module--ctaContainer--1IaN3 .style-
module--button--2qoRp+.style-module--button--2qoRp{margin-top:10px}@media screen and (min-
width:576px){.style-module--hero--1nLoF .style-module--ctaContainer--1IaN3 .style-module--button--
2qoRp+.style-module--button--2qoRp{margin-left:10px;margin-top:0}}.style-module--hero--1nLoF .style-module--
textLeft--H18a_{-ms-flex-pack:start;justify-content:flex-start;text-align:left;width:95%}@media screen and (min-
width:768px) and (max-width:991px){.style-module--hero--1nLoF .style-module--textLeft--H18a_ .style-module--
content--34byx{width:80%}}@media screen and (max-width:767px){.style-module--hero--1nLoF .style-module--
textLeft--H18a_ .style-module--content--34byx{width:100%;-ms-flex-pack:center;justify-content:center;text-
align:center}}.style-module--hero--1nLoF .style-module--textLeft--H18a_ .style-module--ctaContainer--1IaN3{-ms-
flex-pack:center;justify-content:center}@media screen and (min-width:992px){.style-module--hero--1nLoF .style-

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module--textLeft--Hl8a_ .style-module--ctaContainer--1IaN3{-ms-flex-pack:start;justify-content:flex-start}}.style-
module--hero--1nLoF .style-module--containerImageBottom--2LKI6{padding-
top:100px;height:auto;position:relative}@media screen and (min-width:768px){.style-module--hero--1nLoF .style-
module--containerImageBottom--2LKI6{padding-bottom:258px}}@media screen and (max-width:767px){.style-
module--hero--1nLoF .style-module--containerImageBottom--2LKI6{padding-top:50px}}.style-module--hero--
1nLoF .style-module--containerImageBottom--2LKI6 .style-module--image_bottom--zOEsm{margin-
top:60px;max-height:400px;position:absolute;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%)}@media screen and (min-width:768px){.style-module--hero--1nLoF .style-module--containerImageBottom--
2LKI6 .style-module--image_bottom--zOEsm{bottom:-210px}}@media screen and (max-width:767px){.style-
module--hero--1nLoF .style-module--containerImageBottom--2LKI6 .style-module--image_bottom--
zOEsm{display:none}}.style-module--hero--1nLoF.style-module--denim--15Zqi{background-
color:#173361;color:#fff}.style-module--hero--1nLoF.style-module--denim--15Zqi h1{color:#fff}.style-module--
hero--1nLoF.style-module--denim--15Zqi .style-module--tagline--jeiwh{color:#38cccd}.style-module--hero--
1nLoF.style-module--academy--21rqe{background-color:#0074a2;color:#fff}.style-module--hero--1nLoF.style-
module--academy--21rqe .style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-module--academy--21rqe
h1{color:#fff}.style-module--hero--1nLoF.style-module--island--1yBks{background-
color:#38cccd;color:#fff}.style-module--hero--1nLoF.style-module--island--1yBks .style-module--tagline--
jeiwh,.style-module--hero--1nLoF.style-module--island--1yBks h1{color:#fff}.style-module--hero--1nLoF.style-
module--ice--1HVBN{background-color:#e6f5fb;color:#173361}.style-module--hero--1nLoF.style-module--ice--
1HVBN .style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-module--ice--1HVBN
h1{color:#173361}.style-module--hero--1nLoF.style-module--darkPurple--3cUD3{background-
color:#431d73;color:#fff}.style-module--hero--1nLoF.style-module--darkPurple--3cUD3 .style-module--tagline--
jeiwh,.style-module--hero--1nLoF.style-module--darkPurple--3cUD3 h1{color:#fff}.style-module--hero--
1nLoF.style-module--green--1pKlp{background-color:#159e86;color:#fff}.style-module--hero--1nLoF.style-
module--green--1pKlp .style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-module--green--1pKlp
h1{color:#fff}.style-module--hero--1nLoF.style-module--blue--32EDh{background-color:#0dacc3;color:#fff}.style-
module--hero--1nLoF.style-module--blue--32EDh .style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-
module--blue--32EDh h1{color:#fff}.style-module--hero--1nLoF.style-module--orange--3Nn0V{background-
color:#e37d62;color:#fff}.style-module--hero--1nLoF.style-module--orange--3Nn0V .style-module--tagline--
jeiwh,.style-module--hero--1nLoF.style-module--orange--3Nn0V h1{color:#fff}.style-module--hero--1nLoF.style-
module--grey--b1HtI{background-color:#58788c;color:#fff}.style-module--hero--1nLoF.style-module--grey--b1HtI
.style-module--tagline--jeiwh,.style-module--hero--1nLoF.style-module--grey--b1HtI h1{color:#fff}.style-module--
hero--1nLoF.style-module--white--2ExPf{background-color:#fff;color:#173361}.style-module--hero--1nLoF.style-
module--white--2ExPf h1{color:#173361}.style-module--hero--1nLoF.style-module--white--2ExPf .style-module--
tagline--jeiwh{color:#0074a2}.wp .style-module--hero--1nLoF{margin-top:5px!important;margin-bottom:0}.wp
.style-module--hero--1nLoF p{color:#173361;line-height:1.39;font-size:18px;font-weight:300}.style-module--
thankyou--2DaBZ{color:#000;font-size:28px;font-weight:500}@media screen and (max-width:767px){.style-
module--thankyou--2DaBZ{font-size:21px}}.style-module--container--
v6Tvx{position:fixed;top:0;left:0;width:100%;height:100%;z-index:100;pointer-events:none}.style-module--
content--3Dxe5{position:fixed;top:100%;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%);background:#fff;margin:0 auto;border-radius:5px;height:auto;width:100%;max-width:700px;max-
height:80%;padding:30px;transition:all .25s ease-in-out;z-index:200}.style-module--close--
1K7Mo{position:absolute;right:33px;top:33px;cursor:pointer;opacity:.5;height:25px;width:25px;z-
index:200;transition:all .25s ease-in-out}.style-module--close--1K7Mo:after,.style-module--close--
1K7Mo:after,.style-module--close--1K7Mo:before{position:absolute;left:15px;content:"
";height:30px;width:3px;background-color:#333}.style-module--close--1K7Mo.style-module--sm--
3FBda:after,.style-module--close--1K7Mo.style-module--sm--3FBda:before{height:20px}.style-module--close--
1K7Mo:before{-ms-transform:rotate(45deg);transform:rotate(45deg)}.style-module--close--1K7Mo:after{-ms-

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transform:rotate(-45deg);transform:rotate(-45deg)}.style-module--active--2tAbX{pointer-events:auto}.style-
module--active--2tAbX .style-module--content--3Dxe5{top:50%;left:50%;-ms-transform:translate(-50%,-
50%);transform:translate(-50%,-50%)}.style-module--videoContainer--3o_eo
iframe{width:100%;height:100%;position:absolute;top:0;left:0}.style-module--videoContainer--3o_eo .style-
module--content--3Dxe5{background:#333;padding:0;width:100%;max-width:940px;height:auto;max-
height:540px;border-radius:0;opacity:0}.style-module--videoContainer--3o_eo .style-module--video--
qbhce{position:relative;width:100%;height:0;padding-bottom:56.25%}.style-module--videoContainer--3o_eo .style-
module--close--1K7Mo{top:-30px;right:-30px;opacity:.8}.style-module--videoContainer--3o_eo .style-module--
close--1K7Mo:hover{opacity:1}.style-module--videoContainer--3o_eo .style-module--close--1K7Mo:after,.style-
module--videoContainer--3o_eo .style-module--close--1K7Mo:before{background-color:#fff}.style-module--
videoContainer--3o_eo.style-module--active--2tAbX .style-module--content--3Dxe5{opacity:1}.style-module--
powder--BBZ_b{background:#d7eff6}.style-module--powder--BBZ_b .style-module--close--
1K7Mo{opacity:1}.style-module--powder--BBZ_b .style-module--close--1K7Mo:hover{opacity:.7}.style-module--
powder--BBZ_b .style-module--close--1K7Mo:after,.style-module--powder--BBZ_b .style-module--close--
1K7Mo:before{background-color:#0074a2}.style-module--pagination--2YHER ul{list-
style:none;margin:0;padding:0;text-align:center}@media screen and (max-width:767px){.style-module--pagination-
2YHER ul{display:none}}.style-module--pagination--2YHER ul li{display:inline-block;border-
radius:50%;color:#829494;margin:0 5px 5px}.style-module--pagination--2YHER ul li.style-module--dots--
3mYwl{vertical-align:bottom}.style-module--pagination--2YHER ul
li>{*{display:block;width:42px;height:42px;font-size:14px;border-radius:50%;text-align:center;border:1px solid
#829494;line-height:2.9;color:#fff}.style-module--pagination--2YHER ul li a{color:#829494;transition:none}.style-
module--pagination--2YHER ul li.style-module--selected--1eCAQ>*,.style-module--pagination--2YHER ul li
a:hover{background:#0074a2;border-color:#0074a2;color:#fff;text-decoration:none}.style-module--pagination--
2YHER ul li.style-module--nextPrev--1p0Y7{vertical-align:middle}.style-module--pagination--2YHER ul li.style-
module--nextPrev--1p0Y7>{*{font-size:35px;line-height:1;border:0;color:#0074a2;width:auto;height:auto}.style-
module--pagination--2YHER ul li.style-module--nextPrev--1p0Y7>:hover{background:none;color:#0074a2}.style-
module--pagination--2YHER .style-module--select--3RbV5{display:none;width:150px;margin:0 auto}@media
screen and (max-width:767px){.style-module--pagination--2YHER .style-module--select--
3RbV5{display:block}}.style-module--searchResultsHeader--1mw-i{display:-ms-flexbox;display:flex;-ms-flex-
align:center;align-items:center;margin-bottom:50px}.style-module--searchResultsHeader--1mw-i
h4{color:#000;font-size:28px;font-weight:500}@media screen and (max-width:767px){.style-module--
searchResultsHeader--1mw-i h4{font-size:21px}}.style-module--searchResultsHeader--1mw-i .style-module--clear-
24W_M{background:#c4c4c4;border-radius:50%;color:#fff;cursor:pointer;width:20px;height:20px;margin-
left:5px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;-ms-flex-pack:center;justify-
content:center;font-size:18px}.style-module--searchSimpleFormOverlay--
wdr1p{opacity:0;position:fixed;top:50%;left:50%;z-index:105;max-width:720px;width:100%;-ms-
transform:translate(-50%,-50%);transform:translate(-50%,-50%);transition:all .3s ease-in-out;pointer-
events:none}.style-module--searchSimpleFormOverlay--wdr1p input{width:100%;padding:20px;border:0;border-
radius:8px;outline:none;font-size:18px;color:rgba(0,0,0,.85)}.style-module--searchSimpleFormOverlay--
wdr1p.style-module--active--1zCL5{opacity:1;pointer-events:all}.style-module--titleEyebrow--
1cR4_{color:#173361;font-size:40px;font-weight:500;margin:0 auto 100px;max-width:760px;width:80%;padding-
top:50px;padding-bottom:0;position:relative;text-align:center}@media screen and (max-width:767px){.style-
module--titleEyebrow--1cR4_{font-size:24px;padding-top:30px;margin-bottom:30px}}.style-module--
titleEyebrow--
1cR4_::before{content:"";width:40px;height:4px;background:#38cccd;border:0;position:absolute;top:0;left:50%;-
ms-transform:translateX(-50%);transform:translateX(-50%);border-radius:10px}.style-module--purple--
2xL6D::before{background:#551d9d}.style-module--green--140Xz::before{background:#159e86}.style-module--
blue--3wFL2::before{background:#0dacc}.style-module--orange--19EsT::before{background:#e37d62}.style-

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module--grey--3eDVD:before{background:#58788c}.style-module--sectionTitle--2jZI\_{text-align:center;max-width:960px;width:90%;margin:0 auto}.style-module--sectionTitle--2jZI\_.style-module--hasSummary--1no4l{margin-bottom:50px}@media screen and (max-width:767px){.style-module--sectionTitle--2jZI\_.style-module--hasSummary--1no4l{margin-bottom:30px}}.style-module--sectionTitle--2jZI\_:not(.style-module--hasSummary--1no4l){margin-bottom:100px}@media screen and (max-width:767px){.style-module--sectionTitle--2jZI\_:not(.style-module--hasSummary--1no4l){margin-bottom:50px}}.style-module--sectionTitle--2jZI\_.style-module--title--3Euzj{margin-bottom:0}@media screen and (max-width:767px){.style-module--sectionTitle--2jZI\_.style-module--title--3Euzj{line-height:1}}.style-module--browless--CHF2O{text-align:center;margin-bottom:50px}.style-module--browless--CHF2O h3{color:#000;font-size:28px;font-weight:500;padding:0}.style-module--summary--2q5sK{width:830px;max-width:100%;margin:50px auto 100px;font-size:16px;font-weight:300;line-height:1.56;text-align:center}@media screen and (max-width:767px){.style-module--summary--2q5sK{margin-top:30px;margin-bottom:50px}}.style-module--summary--2q5sK.style-module--denim--1DoX9{font-weight:500;font-size:20px;color:#173361}.style-module--section--2XsCV{background-color:transparent;border-radius:8px;margin:0 25px;background:hsla(0,0%,96.1%,.85);padding:50px 0}@media screen and (max-width:767px){.style-module--section--2XsCV{border-radius:0;margin-left:0;margin-right:0}}.style-module--section--2XsCV.style-module--robinsEgg--LFgus{background:#b4e1e4}.style-module--section--2XsCV.style-module--ice--30OgX{background:#e6f5fb}.style-module--section--2XsCV.style-module--noBg--180h6{background:none}.style-module--section--2XsCV.style-module--noBg--180h6:first-child,.style-module--section--2XsCV.style-module--noBg--180h6:first-of-type{padding-top:0}.style-module--section--2XsCV.style-module--alignCenter--1L8\_q{text-align:center}.style-module--section--2XsCV.style-module--hasOneLiner--1p7m-.style-module--title--wHTN1{margin-bottom:50px}@media screen and (min-width:768px){.style-module--section--2XsCV.style-module--spacing\_medium--D-7ZH{padding:50px 0}}@media screen and (min-width:768px){.style-module--section--2XsCV.style-module--spacing\_large--cQa4H{padding:100px 0}}.style-module--oneLiner--1FdcA{margin-bottom:50px;text-align:center}.style-module--contentContainer--1-LvB{margin:0 auto;max-width:1170px;padding-left:15px;padding-right:15px;width:auto}@media screen and (min-width:768px) and (max-width:991px){.style-module--contentContainer--1-LvB.style-module--noBg--180h6{padding-left:0;padding-right:0}}@media screen and (min-width:992px) and (max-width:1199px){.style-module--contentContainer--1-LvB.style-module--noBg--180h6{padding-left:0;padding-right:0}}.style-module--paragraph--2KB8F{width:35%;margin:0 auto;line-height:1.63;color:#000;font-size:18px;font-weight:300}@media screen and (max-width:767px){.style-module--paragraph--2KB8F{width:90%}}.style-module--ctaContainer--pFbUg{margin:100px auto 0;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}@media screen and (max-width:991px){.style-module--ctaContainer--pFbUg{margin:50px auto 0}}@media screen and (max-width:575px){.style-module--ctaContainer--pFbUg{-ms-flex-direction:column;flex-direction:column;-ms-flex-align:center;align-items:center}}.style-module--ctaContainer--pFbUg>.not(:first-child){margin-left:20px}@media screen and (max-width:575px){.style-module--ctaContainer--pFbUg>.not(:first-child){margin-top:20px;margin-left:0}}.style-module--icon--22aj0{width:40px;max-width:none}.style-module--card--13DnA{color:#000}.style-module--card--13DnA p{margin:0 0 25px}.style-module--card--13DnA p img{float:left;margin-right:15px}.style-module--hero--1e4LA .style-module--imageContainer--1UGDo{-ms-flex-item-align:start;align-self:flex-start}.style-module--hero--1e4LA .style-module--imageContainer--1UGDo img{max-width:370px}.style-module--hero--1e4LA .style-module--imageContainer--1UGDo svg{width:370px}.style-module--section--37qRW .style-module--imageContainer--171BX{width:270px}.style-module--section--37qRW .style-module--card--2bKAt{border-width:7px;margin-bottom:0}.style-module--section--37qRW .style-module--dot--3tfYP{display:block}.style-module--button--17RR7+.style-module--button--17RR7{margin-left:10px}@media screen and (max-width:575px){.style-module--button--17RR7+.style-module--button--17RR7{margin-left:0;margin-top:10px}}.style-module--sectionContent--1W6av{padding:25px}.style-module--sectionContent--1W6av h1,.style-module--sectionContent--1W6av h2,.style-module--sectionContent--1W6av h3{color:#173361;margin:25px 0 15px;padding:0}.style-module--sectionContent--1W6av h3{color:#173361;font-size:18px;font-weight:700;line-height:23px}@media screen and (max-

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width:767px}{.style-module--sectionContent--1W6av{margin:0 15px;text-align:center}}.style-module--
sectionContent--1W6av.style-module--bg_white--13ZJH{background-color:#fff}.style-module--sectionContent--
1W6av .style-module--contentContainer--3Qcyf{-ms-flex:1 1;flex:1 1}.style-module--sectionContent--1W6av
.style-module--imageContainer--291eb{max-width:470px}@media screen and (max-width:767px){.style-module--
sectionContent--1W6av .style-module--imageContainer--291eb{margin:0 auto}}@media screen and (min-
width:768px){.style-module--left--1sbqu .style-module--grid--2J6vK .style-module--contentContainer--
3Qcyf,.style-module--right--3LEvb .style-module--grid--2J6vK .style-module--imageContainer--291eb{margin-
left:25px!important}}@media screen and (max-width:767px){.style-module--left--1sbqu .style-module--grid--
2J6vK .style-module--contentContainer--3Qcyf,.style-module--right--3LEvb .style-module--grid--2J6vK .style-
module--imageContainer--291eb{margin-top:25px!important}}.style-module--left--1sbqu .style-module--grid--
2J6vK .style-module--imageContainer--291eb,.style-module--right--3LEvb .style-module--grid--2J6vK .style-
module--imageContainer--291eb{margin:0}@media screen and (max-width:767px){.style-module--left--1sbqu
.style-module--grid--2J6vK .style-module--imageContainer--291eb,.style-module--right--3LEvb .style-module--
grid--2J6vK .style-module--imageContainer--291eb{margin:0 auto}}@media screen and (min-width:768px){.style-
module--noImage--27tFT h2{margin-bottom:50px}}.style-module--noImage--27tFT ul{list-style-
position:inside}.style-module--noImage--27tFT .style-module--contentContainer--3Qcyf{margin:0;text-
align:center}.style-module--noImage--27tFT .style-module--sectionContent--1W6av{padding:0}.style-module--
ctaContainer--3vcVr{margin-top:50px}@media screen and (max-width:767px){.style-module--twoColumnTexts--
3GVuA ul{list-style-position:inside;padding:0;margin:0}}.style-module--twoColumnTexts--3GVuA .style-module--
imageContainer--291eb{margin:0 auto 25px;max-width:none;text-align:center}.style-module--twoColumnTexts--
3GVuA .style-module--imageContainer--291eb img{max-height:300px}.style-module--twoColumnTexts--3GVuA
.style-module--ctaContainer--3vcVr{text-align:center}@media screen and (min-width:768px){.style-module--
twoColumnTexts--3GVuA .style-module--grid--2J6vK>div:last-child{padding-left:15px}}@media screen and
(max-width:767px){.style-module--twoColumnTexts--3GVuA .style-module--grid--2J6vK>div:last-child{padding-
top:15px}}.style-module--section--2OZcS{padding-top:50px!important;padding-bottom:50px}.style-module--
section--2OZcS.style-module--sm--2e0EF{padding-top:20px!important;padding-bottom:20px}.style-module--
sectionImage--2VxLy{-ms-flex-align:center;align-items:center}.style-module--sectionImage--2VxLy .style-module-
imageContainer--1ryhq{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-
flex-align:center;align-items:center;text-align:center}@media screen and (max-width:991px){.style-module--
sectionImage--2VxLy .style-module--imageContainer--1ryhq{margin:20px 0}}@media screen and (max-
width:991px){.style-module--sectionImage--2VxLy .style-module--imageContainer--1ryhq:first-of-type{margin-
top:0}}@media screen and (max-width:991px){.style-module--sectionImage--2VxLy .style-module--
imageContainer--1ryhq:last-of-type{margin-bottom:0}}.style-module--sectionImage--2VxLy .style-module--
imageContainer--1ryhq img{max-width:100%;-o-object-fit:contain;object-fit:contain}.style-module--sectionImage--
2VxLy .style-module--imageContainer--1ryhq .style-module--title--3K_gD{color:#000;font-
size:14px;width:85%;margin-top:15px}.style-module--sectionImage--2VxLy .style-module--imageContainer--1ryhq
.style-module--title--3K_gD a{color:inherit;text-decoration:underline}.style-module--toc--3Z34A>div:first-child
h3{margin-top:0}.style-module--toc--3Z34A ul{list-style:none;margin:0;padding:0}.style-module--toc--3Z34A ul
li{margin-bottom:10px}.style-module--toc--3Z34A ul li a{color:#173361;font-size:21px;font-weight:500;line-
height:27px}.style-module--faqContent--3OYeA>div:first-child h3{margin-top:0}.style-module--faqContent--
3OYeA .style-module--card--2yIN3{border:2px solid hsla(0,0%,96.1%,.85);border-radius:8px;margin-
bottom:10px;padding:25px}.style-module--faqContent--3OYeA .style-module--card--2yIN3 h4{color:#173361;font-
size:18px;font-weight:700;line-height:23px}.style-module--faqContent--3OYeA .style-module--card--2yIN3
div{color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.style-module--faq--2N00h{text-
align:left}.style-module--faq--2N00h hr{margin:90px 0;border-top:7px solid hsla(0,0%,96.1%,.85)}.style-module--
faq--2N00h h3{color:#000;font-size:28px;font-weight:500;margin:50px 0 30px}@media screen and (max-
width:767px){.style-module--faq--2N00h h3{font-size:21px}}.style-module--featuredPartnersSection--
1dyfM{margin-bottom:0}@media screen and (min-width:576px) and (max-width:767px){.style-module--

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featuredPartnersSection--1dyfM .style-module--grid--1yELm{-ms-flex-direction:row;flex-direction:row} .style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 {display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-flex-align:center;align-items:center;-ms-flex-pack:start;justify-content:flex-start;padding:0 40px 60px}@media screen and (min-width:576px) and (max-width:767px){ .style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 {margin:0;width:50%} .style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 .style-module--imageContainer--3EjXP {max-width:200px;height:100px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center} .style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 .style-module--imageContainer--3EjXPimg {width:100%} .style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 a {margin-top:20px}@media screen and (min-width:576px) and (max-width:767px){ .style-module--featuredPartnersSection--1dyfM .style-module--grid--1yELm .style-module--partner--3Uw11 a {margin:0} } .style-module--header--31rfm {position:fixed;top:0;left:0;background:#fff;width:100%;z-index:20;height:85px;padding:18px 0;box-shadow:0 4px 10px -3px #829494;transition:box-shadow .3s ease-in-out}@media print { .style-module--header--31rfm {position:relative} } .style-module--header--31rfm

 .style-module--header--31rfm .style-module--topPage--85hNf {box-shadow:none}@media screen and (min-width:768px) and (max-width:991px){ .style-module--header--31rfm>.style-module--container--3N3ii {width:100%;padding-left:25px;padding-right:25px} } .style-module--header--31rfm .style-module--nav--1mswf {float:right;display:block}@media screen and (max-width:767px){ .style-module--header--31rfm .style-module--nav--1mswf {display:none} }@media screen and (max-width:920px){ .style-module--header--31rfm .style-module--nav--1mswf {display:none} } .style-module--header--31rfm .style-module--nav--1mswf>ul>li {display:inline-block;margin:0 15px;position:relative}@media screen and (min-width:1200px){ .style-module--header--31rfm .style-module--nav--1mswf>ul>li {margin:0 20px} } .style-module--header--31rfm .style-module--nav--1mswf>ul>li>a {display:block;font-size:14px;font-weight:400;letter-spacing:.7px;text-transform:uppercase;text-decoration:none;-ms-transform:none!important;transform:none!important} .style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR) a {color:#173361} .style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR)>ul {display:block;background:#fff;color:#15202b;position:absolute;top:58px;left:-60px;padding:10px 10px 10px 0;border-radius:7px;transition:all .3s ease-in-out;opacity:0;visibility:hidden;border:1px solid #e0e0e0;box-shadow:none;z-index:10} .style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR)>ul a {color:#173361;font-size:16px;font-weight:300;width:100%;display:block;white-space:nowrap;overflow:hidden;text-overflow:ellipsis;padding:10px 0;margin:0 20px;line-height:20px} .style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR):hover>a {border-bottom:5px solid #b78142;font-weight:400;color:#111820} .style-module--header--31rfm .style-module--nav--1mswf>ul>li:not(.style-module--download--XKthR):hover>ul {opacity:1;visibility:visible} .style-module--header--31rfm .style-module--nav--1mswf .style-module--indent--I5Hp9 {margin-left:20px} .style-module--header--31rfm .style-module--logo--1fS2J {float:left;position:absolute;top:50%;-ms-transform:translateY(-50%);transform:translateY(-50%);z-index:99;margin-right:20px;background:#fff} .style-module--header--31rfm .style-module--logo--1fS2J svg {width:180px}@media screen and (min-width:1200px){ .style-module--header--31rfm .style-module--logo--1fS2J svg {width:250px;max-width:none} } .style-module--header--31rfm .style-module--navMobile--1PXXZ {display:none} .style-module--header--31rfm .style-module--navMobile--1PXXZ nav {opacity:0;visibility:hidden;background:#111820;position:fixed;padding:1em 0 80px;left:0;width:100%;border-top:1px solid #4c4c4d;height:90%;transition:all .5s ease;overflow:auto;top:80px} .style-module--header--31rfm .style-module--navMobile--1PXXZ nav>ul {display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap} .style-module--header--31rfm .style-module--navMobile--1PXXZ nav>ul>li {margin-bottom:20px} .style-module--header--31rfm .style-module--navMobile--1PXXZ nav>ul>li>a {color:#fff;text-transform:uppercase;padding:5px 20px;display:block} .style-module--header--31rfm .style-module--navMobile--1PXXZ nav>ul>li ul li a {color:#a7a7a8;text-transform:none;padding:5px 20px;display:block}@media screen and

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(max-width:920px){.style-module--header--31rfm .style-module--navMobile--1PXXZ{display:block}.style-
module--header--31rfm .style-module--navMobile--1PXXZ.style-module--open--2mcoG
nav{opacity:1;visibility:visible}.style-module--header--31rfm .style-module--navMobile--1PXXZ.style-module--
open--2mcoG>button .icon-bar{display:none}.style-module--header--31rfm .style-module--navMobile--
1PXXZ.style-module--open--2mcoG>button:after{content:"\D7";color:#111820;cursor:pointer;font-size:24px;line-
height:0;margin-left:5px;position:relative;top:0}.style-module--header--31rfm .style-module--navMobile--
1PXXZ>button{margin:0;display:block;padding:10px}.style-module--header--31rfm .style-module--navMobile--
1PXXZ .icon-bar{background-color:#111820}}.style-module--searchContainer--M0vVi{background:0
0;position:relative;float:right;margin-top:5px}@media screen and (max-width:920px){.style-module--
searchContainer--M0vVi{margin-top:3px}}@media screen and (min-width:992px){.style-module--
searchContainer--M0vVi{margin-right:20px}}.style-module--searchContainer--M0vVi>button{background-
color:transparent;border:0;outline:0;float:left;position:relative;z-index:2;text-align:left;text-indent:-
9999px;display:block;height:18px;width:18px;background-image:url(https://cdn.confluent.io/wp-
content/themes/confluent/assets/images/search-icon.png);background-repeat:no-repeat;margin:9px;transition:width
.3s,left .1s,bottom .1s;padding:0;background-size:15px}.style-module--searchContainer--
M0vVi>div{float:left;overflow:hidden;position:relative;z-index:1;width:1px;transition:width .3s,left .1s,bottom
.1s}.style-module--searchContainer--M0vVi>div input{display:inline-block;font-size:14px;font-weight:400;line-
height:16px;float:left;height:32px;padding:0 20px 0 40px;color:#fff;border:0;border-radius:2px;background:0
0;width:200px;outline:0}.style-module--searchContainer--M0vVi.style-module--active--3q6zJ>button{z-
index:0;width:0;visibility:hidden}.style-module--searchContainer--M0vVi.style-module--active--
3q6zJ>div{width:220px}.style-module--searchContainer--M0vVi.style-module--active--3q6zJ>div
input{border:1px solid #333;color:#333}.style-module--languageContainer--
GbiNb{display:none;position:relative;float:right}.style-module--languageContainer--GbiNb ul{display:-ms-
flexbox;display:flex;list-style:none;max-width:40px;padding-left:0;border-
radius:8px;height:42px;overflow:hidden}.style-module--languageContainer--GbiNb ul:before{background-
color:#000;content:" ";display:block}.style-module--languageContainer--GbiNb ul li{-ms-flex-align:center;align-
items:center;display:-ms-flexbox;display:flex;margin:0;padding:6px 0}.style-module--languageContainer--GbiNb ul
li:before{background-size:cover;border:1px solid #979797;border-radius:20px;content:"";margin-left:0;margin-
right:10px;height:30px;width:30px}.style-module--languageContainer--GbiNb ul li a{display:none;color:#000;font-
size:12px}.style-module--languageContainer--GbiNb ul li.lang-en{-ms-flex-order:2;order:2;margin:0}.style-
module--languageContainer--GbiNb ul li.lang-en:before{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/e10fc60db43311c1d7521b9005ba5d5257054e53/language-
english.png")}.style-module--languageContainer--GbiNb ul li.lang-fr{-ms-flex-order:3;order:3;margin:0}.style-
module--languageContainer--GbiNb ul li.lang-fr:before{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/2357e84a1b7e54596e3d18f6ec5984174f7de42a/language-
french.png")}.style-module--languageContainer--GbiNb ul li.lang-de{-ms-flex-order:4;order:4;margin:0}.style-
module--languageContainer--GbiNb ul li.lang-de:before{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/1604bda91e6e4972abb4b7030c72d17b49747417/language-
german.png")}.style-module--languageContainer--GbiNb ul li.lang-ja{-ms-flex-order:5;order:5;margin:0}.style-
module--languageContainer--GbiNb ul li.lang-ja:before{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/b722710de108f10b5ecacce7634b1db48200fd8e/language-
japanese.png")}.style-module--languageContainer--GbiNb.style-module--open--2mcoG ul{height:100%;-ms-flex-
direction:column;flex-direction:column;max-width:130px;padding:0 15px}.style-module--languageContainer--
GbiNb.style-module--open--2mcoG ul li a{display:block}.style-module--languageContainer--GbiNb.style-module--
open--2mcoG .style-module--dropdown--39_e2{border:1px solid #979797;border-
radius:8px;background:#fff}.style-module--languageContainer--GbiNb.style-module--open--2mcoG .style-module--
toggle--3ljCl{-ms-transform:rotate(270deg);transform:rotate(270deg)}.style-module--languageContainer--GbiNb
.style-module--toggle--3ljCl{background-size:cover;cursor:pointer;display:inline-

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block;height:16px;position:absolute;right:-15px;top:14px;width:10px;background-  
 image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/link-arrow-black.png);-ms-  
 transform:rotate(90deg);transform:rotate(90deg)}@media screen and (min-width:992px){.style-module--  
 languageContainer--GbiNb{display:block}}.smartling-de .style-module--languageContainer--GbiNb .lang-  
 de,.smartling-fr .style-module--languageContainer--GbiNb .lang-fr,.smartling-ja .style-module--languageContainer--  
 GbiNb .lang-ja{-ms-flex-order:1;order:1}.style-module--logo--35JXe g{fill:#173361}.style-module--purple--Ofct3  
 .bg-fill{fill:#eee8f5}.style-module--purple--Ofct3 .line-fill{fill:#551d9d}.style-module--purple--Ofct3 .line-  
 stroke{stroke:#551d9d}.style-module--gdpr--2VS6b{opacity:0;transition:opacity .5s ease-in-out}.style-module--  
 gdpr--2VS6b.style-module--show--DiYdJ{opacity:1}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--  
 2QBT6{position:fixed;bottom:0;left:0;background:#173361;width:100%;color:#fff;z-index:11}@media screen and  
 (max-width:640px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--button--  
 3srjX{margin:0}}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--  
 gdprWrapper--1rFOT{padding:20px 40px;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-  
 content:space-between;-ms-flex-align:center;align-items:center;box-sizing:border-box}.style-module--gdpr--  
 2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT p{margin:0;font-  
 size:14px;font-weight:400}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--  
 gdprWrapper--1rFOT .style-module--gdprContent--3KsKx{-ms-flex:1 1;padding-right:200px}.style-  
 module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT .style-module--  
 gdprContent--3KsKx a,.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--  
 gdprWrapper--1rFOT .style-module--gdprContent--3KsKx p{color:#fff}.style-module--gdpr--2VS6b.style-module--  
 gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT .style-module--gdprContent--3KsKx a{text-  
 decoration:underline}@media screen and (max-width:1024px){.style-module--gdpr--2VS6b.style-module--  
 gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT .style-module--gdprContent--3KsKx{padding-  
 right:0;padding-bottom:20px}}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--  
 gdprWrapper--1rFOT .style-module--gdprRight--1UBvi{display:-ms-flexbox;display:flex;-ms-flex-  
 align:center;align-items:center}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--  
 gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX:last-child{margin-  
 left:10px}@media screen and (max-width:640px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--  
 2QBT6 .style-module--gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX:last-  
 child{margin-left:0;margin-top:10px}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-  
 module--gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX:last-  
 child:before{left:-7px}}.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--  
 gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX{min-width:100px}@media  
 screen and (max-width:991px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--  
 gdprWrapper--1rFOT .style-module--gdprRight--1UBvi .style-module--button--3srjX{min-width:205px}}.style-  
 module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--1rFOT .style-module--  
 gdprRight--1UBvi button:last-of-type{margin-right:0;margin-left:20px}@media screen and (max-  
 width:640px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--  
 1rFOT .style-module--gdprRight--1UBvi button:last-of-type{margin:0}}@media screen and (max-  
 width:640px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--gdprWrapper--  
 1rFOT .style-module--gdprRight--1UBvi{-ms-flex-direction:column;flex-direction:column}}@media screen and  
 (max-width:1024px){.style-module--gdpr--2VS6b.style-module--gdprPrivacyBar--2QBT6 .style-module--  
 gdprWrapper--1rFOT{-ms-flex-direction:column;flex-direction:column;-ms-flex-align:center;align-  
 items:center}}.style-module--topBanner--  
 qjZvc{position:fixed;top:0;background:#070a1f;color:#fff;height:40px;width:100%;z-index:20;font-size:11px;font-  
 weight:500;letter-spacing:1.17px;overflow:hidden;text-overflow:ellipsis}.style-module--topBanner--qjZvc  
 .container div{line-height:4}.style-module--topBanner--qjZvc .container a{color:#fff;cursor:pointer;text-  
 decoration:none}.style-module--topBanner--qjZvc .style-module--text--



n3hed{ position:absolute;left:0;width:100%;text-align:center;z-index:1 }.style-module--topBanner--qjZvc .style-module--phone--3dD5b{ text-align:right;position:relative;z-index:2;float:right }.style-module--topBanner--qjZvc a.style-module--ogLink--1xHFT{ color:#4597cb;margin-left:10px;transition:all .3s ease }.style-module--topBanner--qjZvc a.style-module--ogLink--1xHFT:hover{ opacity:.6 }.style-module--topBanner--qjZvc .style-module--longText--yBz3N{ display:none } @media screen and (min-width:768px){ .style-module--topBanner--qjZvc .style-module--longText--yBz3N{ display:inline } } @media screen and (max-width:600px){ .style-module--topBanner--qjZvc .style-module--phone--3dD5b{ display:none } }.style-module--siteFooter--1SYvh{ border-top:1px solid #e9e9ed }.style-module--siteFooter--1SYvh footer{ background-color:#fff;padding:40px 0 }.style-module--footerRow--2E2Yb{ display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center } @media screen and (min-width:992px){ .style-module--footerRow--2E2Yb{-ms-flex-pack:justify;justify-content:space-between } } @media screen and (min-width:1200px){ .style-module--footerRow--2E2Yb{ max-width:100% } }.style-module--footerRow--2E2Yb div:not(:last-of-type){ display:none } @media screen and (min-width:992px){ .style-module--footerRow--2E2Yb div:not(:last-of-type){ display:-ms-flexbox;display:flex } }.style-module--menu--19Yv4{ list-style:none;padding:0;color:#fff;font-size:16px;margin:0 0 20px }.style-module--menu--19Yv4 li{ line-height:20px;margin:2px 0 12px }.style-module--menu--19Yv4 li:first-of-type{ margin-bottom:25px }.style-module--menu--19Yv4 li:first-of-type a{ color:#404040;font-weight:400;font-size:16px }.style-module--menu--19Yv4 li:first-of-type a:hover{ transition:none;color:#404040 }.style-module--menu--19Yv4 li a{ font-weight:300;color:#5d5d5d;text-decoration:none;padding:2px 0;font-size:14px;line-height:18px;display:block }.style-module--menu--19Yv4 li a:hover{ color:#4597cb;transition:all .4s ease-in-out }.style-module--socialNav--12Fjk ul{ list-style:none;margin:0;padding:0;font-size:16px }.style-module--socialNav--12Fjk ul li{ margin:0 5px }.style-module--socialIcon--PjnYm{ width:20px;height:20px;fill:#a7a7a8 }.style-module--socialIcon--PjnYm.style-module--twitterIcon--3zPrM:hover{ fill:#55acee }.style-module--socialIcon--PjnYm.style-module--linkedinIcon--1E52K:hover{ fill:#0e76a8 }.style-module--socialIcon--PjnYm.style-module--githubIcon--2CHYh:hover{ fill:#333 }.style-module--socialIcon--PjnYm.style-module--slideshareIcon--3uHWi:hover{ fill:#f7941e }.style-module--socialIcon--PjnYm.style-module--youtubeIcon--21oE-:hover{ fill:red }.style-module--socialIcon--PjnYm.style-module--instagramIcon--3WweF:hover{ fill:#c1558b }.style-module--socialIcon--PjnYm.style-module--facebookIcon--29Pqt:hover{ fill:#3b5998 }.style-module--socialMediaListContainer--m3scG{ display:-ms-flexbox;display:flex } @media screen and (max-width:991px){ .style-module--socialMediaListContainer--m3scG{ display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center } }.style-module--footerBottom--Nm5lk{ padding-top:40px }.style-module--copyright--1gcwO,.wp .style-module--copyright--1gcwO{ max-width:100%;text-align:center } @media screen and (min-width:992px){ .style-module--copyright--1gcwO,.wp .style-module--copyright--1gcwO{ text-align:left } }.style-module--copyright--1gcwO p,.wp .style-module--copyright--1gcwO p{ display:inline;font-size:11px;line-height:1.2;color:#a7a7a8;margin:0;padding:2px 0 }.style-module--copyright--1gcwO p:first-of-type,.wp .style-module--copyright--1gcwO p:first-of-type{ line-height:1.5;color:#a7a7a8;padding:0 }.style-module--copyright--1gcwO p a,.wp .style-module--copyright--1gcwO p a{ color:#535353;border:0;padding:0 }.style-module--copyright--1gcwO .style-module--onetrustLink--F7UX8,.wp .style-module--copyright--1gcwO .style-module--onetrustLink--F7UX8{ font-size:11px!important;color:#535353!important;border:0!important;padding:0!important }.style-module--copyright--1gcwO .style-module--onetrustLink--F7UX8:hover,.wp .style-module--copyright--1gcwO .style-module--onetrustLink--F7UX8:hover{ text-decoration:underline;background-color:#fff!important }.wp .error404\_section{ background-color:#2c3437 }.wp .page-title{ color:#fff;font-weight:400;margin-top:15px;margin-bottom:15px }.wp .error404-body{ padding-top:30px;padding-bottom:80px }.wp .page-cloud-customer-dpa .dpa p,.wp .page-cloud-customer-dpa .dpa ul{ color:#4a4a4a;font-size:16px;font-weight:300;list-style:none;line-height:26px;margin-bottom:18px }.wp .page-cloud-customer-dpa .dpa li{ margin-bottom:9px }.wp .page-cloud-customer-dpa .dpa ul ul{ margin-top:12px }.wp .page-cloud-customer-dpa .dpa .spacer{ height:1px;margin-bottom:24px }.wp .page-cloud-customer-dpa .dpa h3,.wp .page-cloud-customer-dpa .dpa h4{ color:#4a4a4a;margin-bottom:18px;text-align:center }.wp .page-cloud-customer-dpa .dpa h3{ margin-bottom:30px!important }.confluent-privacy-statement-module--container--3nAUI{ font-weight:300;line-height:1.78;color:#4a4a4a;font-

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size:18px}.confluent-privacy-statement-module--container--3nAU1 h2{font-size:30px;text-align:center}.confluent-privacy-statement-module--container--3nAU1 h3{text-align:left;font-size:20px;text-transform:uppercase}.confluent-privacy-statement-module--container--3nAU1 .confluent-privacy-statement-module--disc--2bGkH{list-style-type:disc}.wp .page-supplemental-services-terms ol,.wp .page-supplemental-services-terms ul{font-size:18px;font-weight:300;line-height:1.78;color:#4a4a4a}.wp .page-supplemental-services-terms ul{list-style-type:circle}.wp .page-supplemental-services-terms ol{list-style-type:upper-alpha}.wp .page-supplemental-services-terms ol li>ol{list-style-type:decimal}.wp .page-template-careers-rebrand section.careers_job_listings_section{text-align:left}.wp .page-template-careers-rebrand section.careers_job_listings_section h3{margin-top:20px}.wp .page-template-careers-rebrand section.careers_job_listings_section .jobs{margin-bottom:20px}.wp .page-template-careers-rebrand section.careers_job_listings_section .job{clear:both;display:block;overflow:hidden;margin-bottom:5px}.wp .page-template-careers-rebrand section.careers_job_listings_section .job .left{float:left}.wp .page-template-careers-rebrand section.careers_job_listings_section .job .right{float:right}.wp .page-template-careers-rebrand section.careers_job_listings_section .job .right a{min-width:100px}.wp .page-template-careers-rebrand .carousel-item{display:-ms-flexbox!important;display:flex!important;-ms-flex-align:center;align-items:center;-ms-flex-pack:center;justify-content:center;text-align:center}.wp .page-template-careers-rebrand .h3-border{text-align:center;font-size:14px!important;font-weight:500;line-height:1.6px;text-transform:uppercase}.wp .page-template-careers-rebrand .h3-border:after{content:"";height:2px;width:40px;background:#257bd7;display:block;margin:5px auto;position:relative}@media screen and (max-width:1000px){.wp .page-template-careers-rebrand .h3-border:after{margin:5px auto 0}}.wp .page-template-careers-rebrand .btn{min-width:175px!important;border:1px solid #173361;background:#fff;display:block;color:#173361;padding-top:12px;padding-bottom:14px;border-radius:8px}.wp .page-template-careers-rebrand .btn:hover{background:#173361;color:#fff}.wp .page-template-careers-rebrand .gradient-bluegreen{background-image:linear-gradient(270deg,#31bec2,#257bd7)}.wp .page-template-careers-rebrand .container{max-width:1272px}.wp .page-template-careers-rebrand .hero_overview{background-size:cover;background-position:bottom;height:100vh}@media screen and (max-width:991px){.wp .page-template-careers-rebrand .hero_overview{background-position:inherit}}.wp .page-template-careers-rebrand .hero_overview .hero-content{text-align:center;left:50%;max-width:650px;position:absolute;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-50%);top:50%;width:100%}.wp .page-template-careers-rebrand .hero_overview .hero-content h1,.wp .page-template-careers-rebrand .hero_overview .hero-content p{color:#fff}.wp .page-template-careers-rebrand .career__slider{margin:3px 0;overflow:hidden}.wp .page-template-careers-rebrand .career__slider .slick-slider,.wp .page-template-careers-rebrand .career__slider .slick-slider img{height:434px!important}.wp .page-template-careers-rebrand .career__slider .slick-slider .slick-track{display:-ms-flexbox;display:flex}.wp .page-template-careers-rebrand .career__slider .slick-slider .slick-slide{width:800px!important;-ms-flex:0 0 800px;flex:0 0 800px;margin:0 3px}.wp .page-template-careers-rebrand .career__inspiration{padding:100px 0;text-align:center}.wp .page-template-careers-rebrand .career__inspiration .container{max-width:650px}.wp .page-template-careers-rebrand .career__inspiration h2{font-size:48px;line-height:1.125}.wp .page-template-careers-rebrand .career__inspiration .btn{margin:0 auto;max-width:175px}.wp .page-template-careers-rebrand .career__banner h3{color:#fff;font-size:24px;font-weight:700;line-height:1.167;padding:30px 0}.wp .page-template-careers-rebrand .career__banner h3 a{color:#fff}.wp .page-template-careers-rebrand .career__banner a:hover{text-decoration:underline}.wp .page-template-careers-rebrand .career__banner img{width:60px!important;height:45px}.wp .page-template-careers-rebrand .career__pillars{padding:135px 0 150px}.wp .page-template-careers-rebrand .career__pillars .row{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (min-width:992px){.wp .page-template-careers-rebrand .career__pillars .row{-ms-flex-pack:justify;justify-content:space-between}}.wp .page-template-careers-rebrand .career__pillars .career__pillar{margin-bottom:25px;text-align:center;width:48%}@media screen and (min-width:992px){.wp .page-template-careers-rebrand .career__pillars .career__pillar{margin-bottom:0;width:18%}}.wp .page-template-careers-rebrand .career__pillars img{margin-

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bottom:25px;max-height:100px}.wp .page-template-careers-rebrand .career__pillars p{color:#fff;font-
weight:400;margin-bottom:0}.wp .page-template-careers-rebrand .career__pillars
svg{width:100px;height:100px;margin-bottom:20px}.wp .page-template-careers-rebrand .career__pillars svg
g{fill:#fff}.wp .page-template-careers-rebrand .careers_job_listings_section .filter-container{margin:20px
0;display:inline-block;min-width:300px}@media (min-width:768px){.wp .page-template-careers-rebrand
.careers_job_listings_section .filter-container:first-of-type{margin-right:15px}.wp .page-template-careers-rebrand
.careers_job_listings_section .filter-container:last-of-type{margin-left:15px}}.wp .page-template-careers-rebrand
.careers_job_listings_section .filter-container .select{border:1px solid
#ddd;background:#f3f4f8;display:block;color:#444;line-height:1.3;padding:8px 10px 8px 20px;font-size:18px;font-
weight:300;border-radius:4px;max-width:300px;width:100%;cursor:pointer;-moz-appearance:none;-webkit-
appearance:none;appearance:none;margin:0 auto}.wp .page-template-careers-rebrand .careers_job_listings_section
.filter-container .select:hover{border-color:#c4c4c4}.wp .page-template-careers-rebrand
.careers_job_listings_section .jobs-list{background:#fff;box-shadow:0 5px 27px 0 rgba(0,0,0,.05);border-
radius:4px;padding:30px}@media screen and (min-width:992px){.wp .page-template-careers-rebrand
.careers_job_listings_section .jobs-list{padding:60px}}@media (max-width:992px){.wp .page-template-careers-
rebrand .careers_job_listings_section .jobs-list .job{display:-ms-flexbox;display:flex;-ms-flex-
direction:column;flex-direction:column;padding:25px 0;box-shadow:0 4px 5px -6px #222;text-align:center}}.wp
.page-template-careers-rebrand .careers_job_listings_section .job{display:block;margin-bottom:20px;-ms-flex-
wrap:wrap;flex-wrap:wrap;overflow:inherit;text-align:center}.wp .page-template-careers-rebrand
.careers_job_listings_section .job .btn{max-width:175px;margin:0 auto}@media screen and (min-width:992px){.wp
.page-template-careers-rebrand .careers_job_listings_section .job{-ms-flex-align:center;align-items:center;display:-
ms-flexbox;display:flex;margin-bottom:5px;-ms-flex-pack:justify;justify-content:space-between;text-
align:inherit}.wp .page-template-careers-rebrand .careers_job_listings_section .job .btn{margin:0}}.wp .page-
template-careers-rebrand .careers_job_listings_section .job .left,.wp .page-template-careers-rebrand
.careers_job_listings_section .job .right{float:none}.wp .page-template-careers-rebrand .careers_job_listings_section
h2{text-align:center}@media screen and (min-width:992px){.wp .page-template-careers-rebrand
.careers_job_listings_section h2{font-size:48px;line-height:55px}}.wp .page-template-careers-rebrand
.careers_job_listings_section h3,.wp .page-template-careers-rebrand .careers_job_listings_section h4{font-
size:18px;line-height:24px}.wp .page-template-careers-rebrand .careers_job_listings_section
.commitment{background:#173361;border-radius:8px;color:#fff;font-size:12px;font-weight:600;line-
height:14px;margin-right:15px;padding:5px 10px;text-transform:uppercase;vertical-align:middle}@media screen
and (max-width:991px){.wp .page-template-careers-rebrand .careers_job_listings_section
.commitment{display:block}}.wp .page-template-careers-rebrand .careers_job_listings_section span{font-
size:18px;font-weight:300;line-height:21px}.wp .page-template-careers-rebrand .careers_job_listings_section
span.label{padding-top:8px;text-align:left}.wp .page-template-careers-rebrand .careers_job_listings_section .filter-
wrapper,.wp .page-template-careers-rebrand .careers_job_listings_section .no-jobs{text-align:center}.wp .page-
template-careers-rebrand .careers_job_listings_section .no-jobs{font-size:18px}.wp .page-template-careers-rebrand
.careers_job_listings_section .filter-wrapper{margin:50px 0}@media screen and (max-width:991px){.page-
template-certificate-page .certification-module--hero--1CWTC>div{-ms-flex-direction:column;flex-
direction:column}}@media screen and (max-width:991px){.page-template-certificate-page .certification-module--
hero--1CWTC .certification-module--imageContainer--33fsg{display:block;margin-left:0;margin-top:60px}}.page-
template-certificate-page .certification-module--hero--1CWTC .certification-module--imageContainer--33fsg
img{border:9px solid #81cfe2;cursor:pointer}.page-template-certificate-page .certification-module--
certificateOverviewSection--3aOWY{padding:60px 0 50px}.page-template-certificate-page .certification-module--
certificateOverviewSection--3aOWY p{max-width:800px;margin-left:auto;margin-right:auto;color:#4597cb;font-
size:25px;line-height:32px}.page-template-certificate-page .certification-module--certificateItemsSection--
1HUMO{padding:0!important;text-align:center!important}.page-template-certificate-page .certification-module--
certificateItemsSection--1HUMO h3,.page-template-certificate-page .certification-module--certificateItemsSection--

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1HUMO p{color:#fff}.page-template-certificate-page .certification-module--certificateItemsSection--1HUMO  
h3{font-size:25px}@media screen and (min-width:992px){.page-template-certificate-page .certification-module--  
certificateItemsSection--1HUMO h3{min-height:92px}}.page-template-certificate-page .certification-module--  
bgColorBlue--2eJfR{background-color:#4597cb}.page-template-certificate-page .certification-module--  
bgColorOrange--270dL{background-color:#173361}.page-template-certificate-page .certification-module--  
certItemUnorderedList--2khCH{text-align:left;color:#fff;list-style-type:disc;margin-bottom:38px}@media screen  
and (min-width:992px){.page-template-certificate-page .certification-module--certItemUnorderedList--  
2khCH{display:-ms-flexbox!important;display:flex!important}}.page-template-certificate-page .certification-  
module--items--2EvXj{list-style:none;display:block;padding:0;margin:0;overflow:hidden}@media screen and (min-  
width:768px){.page-template-certificate-page .certification-module--items--2EvXj{display:-ms-  
flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}}.page-template-certificate-page .certification-module--  
certificateItem--jApeq{padding:80px 20px!important}@media screen and (min-width:768px){.page-template-  
certificate-page .certification-module--certificateItem--jApeq{width:50%}}@media screen and (min-  
width:992px){.page-template-certificate-page .certification-module--certificateItem--jApeq{width:calc(33.33% -  
10px)!important;margin:0 5px!important}}.page-template-certificate-page .certification-module--certificateItem--  
jApeq .certification-module--item--11Jr8{position:relative}.page-template-certificate-page .certification-module--  
certificateItem--jApeq .certification-module--item--11Jr8 ul{color:#fff;margin:20px 0;text-align:left}.page-  
template-certificate-page .certification-module--media--37RII{margin:0}.page-template-certificate-page  
.certification-module--midContent--2hN3i{max-width:900px;margin-left:auto;margin-right:auto}.page-template-  
certificate-page .certification-module--certificateFaqSection--1TWw0 h2{color:#4597cb;font-size:48px;margin-  
bottom:40px;line-height:56px}.page-template-certificate-page .certification-module--certificateFaqSection--1TWw0  
h3{color:#4597cb;font-size:28px;text-align:left;margin-bottom:10px}.page-template-certificate-page .certification-  
module--certificateFaqSection--1TWw0 p{max-width:800px}.page-template-certificate-page .certification-module--  
faqsItems--y-uMZ{list-style:none;padding:0;margin:0;text-align:left}.page-template-certificate-page .certification-  
module--faqsItems--y-uMZ li{margin-bottom:40px}@media screen and (min-width:992px){.page-template-  
certificate-page .certification-module--mediaContent---T5KW{display:-ms-flexbox;display:flex;-ms-flex-  
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center;min-  
height:308px;height:100%}}@media screen and (max-width:991px){.page-template-certificate-page .certification-  
module--mediaContent---T5KW{padding:0!important;text-align:center}}.page-template-certificate-page  
.certification-module--mediaContent---T5KW li{list-style-type:disc}.page-template-certificate-page .certification-  
module--mediaContent---T5KW h3{text-align:center}.page-template-certificate-page .certification-module--row--  
3abUE{-ms-flex-pack:justify;justify-content:space-between;margin-top:80px}@media screen and (min-  
width:768px){.page-template-certificate-page .certification-module--row--3abUE{display:-ms-  
flexbox;display:flex}}.page-template-certificate-page .certification-module--h3Border--SFaPi{font-  
size:16px!important;line-height:21px!important;text-transform:uppercase;text-  
align:center;position:relative;padding-top:0!important}.page-template-certificate-page .certification-module--  
h3Border--SFaPi:after{content:"";height:2px;width:40px;background:#257bd7;margin-  
top:5px;display:block;position:absolute;left:50%;-ms-transform:translateX(-50%);transform:translateX(-  
50%)}  
.page-template-certificate-page .certification-module--benefits--36TgD{margin-top:80px}.page-template-  
certificate-page .certification-module--benefit--2Qg0c{text-align:center}@media screen and (min-  
width:768px){.page-template-certificate-page .certification-module--benefit--2Qg0c{-ms-flex:0 1 16%;flex:0 1  
16%}}.page-template-certificate-page .certification-module--benefit--2Qg0c img{max-width:50px;max-  
height:45px}.page-template-certificate-page .certification-module--benefit--2Qg0c .certification-module--  
benefitText--2rIS\_{font-size:16px;margin-top:20px}.page-template-certificate-page .certification-module--  
ctaContainer--1hwZR{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;margin-  
top:20px}.page-template-certificate-page .certification-module--ctaContainer--1hwZR .certification-module--  
button--3wfFd+.certification-module--button--3wfFd{margin-top:20px}.wp .page-community-code-of-conduct  
.coc-header{color:#101040!important;padding:30px 18px}.wp .page-community-code-of-conduct p{font-

size:16px;line-height:30px;max-width:750px}.wp .page-community-code-of-conduct h1,.wp .page-community-code-of-conduct h2,.wp .page-community-code-of-conduct h4,.wp .page-community-code-of-conduct p{color:#101040}.wp .page-community-code-of-conduct h4{font-size:14px;position:relative;text-transform:uppercase}.wp .page-community-code-of-conduct h4:after{content:"";height:2px;width:40px;background:#257bd7;bottom:10px;left:0;position:absolute}.wp .page-community-code-of-conduct h1,.wp .page-community-code-of-conduct h2{font-size:36px;font-weight:400;line-height:48px;padding-top:30px}.wp .page-community-code-of-conduct a{color:#4197cb}.wp .page-community-code-of-conduct .coc-header-img img{width:100%;padding:0 80px;margin:0 auto;display:block;max-width:400px}.wp .page-community-code-of-conduct .coc-list{background:#f2f3f6;padding:30px 0}.wp .page-community-code-of-conduct .coc-body h4,.wp .page-community-code-of-conduct .coc-body p{max-width:750px}.wp .page-community-code-of-conduct .coc-content{padding:30px 18px}.wp .page-community-code-of-conduct .coc-content h4{margin-bottom:30px}@media screen and (min-width:1000px){.wp .page-community-code-of-conduct h1,.wp .page-community-code-of-conduct h2{font-size:48px;line-height:55px;padding-top:40px}.wp .page-community-code-of-conduct .coc-header{-ms-flex-align:center;align-items:center;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;padding:60px 18px}.wp .page-community-code-of-conduct .coc-header-content,.wp .page-community-code-of-conduct .coc-header-img{width:50%}.wp .page-community-code-of-conduct .coc-header-img img{padding:80px;margin:0;max-width:100%}.wp .page-community-code-of-conduct .coc-header p{max-width:425px}}@media screen and (min-width:1000px){.wp .page-community-code-of-conduct .coc-list{padding:60px 0}}@media screen and (min-width:100px){.wp .page-community-code-of-conduct .coc-content{padding:60px 18px}}.wp .page-confluent-community-license-faq table{margin:20px 0;width:100%}.wp .page-confluent-community-license-faq table td,.wp .page-confluent-community-license-faq table th{padding:10px;vertical-align:top;border:1px solid #000}.wp .page-confluent-community-license-faq table th{color:#c5832e;text-transform:uppercase}.wp .page-confluent-community-license-faq table td{width:50%}.wp .page-confluent-community-license-faq table tr.head td{background-color:#b4e1e4!important;color:#0074a2;text-transform:uppercase}.wp .page-confluent-community-license-faq table tbody tr:nth-child(2n) td{background-color:#e6f5fb}.wp .confluent-verified-integration-faqs-module--page--BYndC span{font-weight:400}.wp .confluent-verified-integration-faqs-module--page--BYndC .confluent-verified-integration-faqs-module--faq--2vNyy{border-top:1px solid #eee;padding-top:40px}.wp .confluent-verified-integration-faqs-module--page--BYndC .confluent-verified-integration-faqs-module--faq--2vNyy ul li li{margin-bottom:0}.cookies-module--container--30krb h3{text-align:center}.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH{font-size:18px;border:1px solid #ccc;border-collapse:collapse;margin:0;padding:0;width:100%;table-layout:fixed}.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:nth-child(2n){background-color:#ecec;ecec;border:1px solid #ddd;padding:.35em}.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:nth-child(odd){background-color:#dcd8d8;border:1px solid #ddd;padding:2em}.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:nth-child(2n) td,.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:nth-child(odd) td{border-right:1px solid #ddd;padding:10px;vertical-align:unset}.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:first-child{background-color:#777373;border:1px solid #ddd;padding:.35em}.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH tr:first-child td{border-right:1px solid #ddd;padding:10px;color:#fff}.cookies-module--container--30krb .cookies-module--cookiesTable--E-5QH td:nth-of-type(3n) ul{margin-top:15px}.wp .page-template-industry-solutions-page .main\_banner{background:#b4e1e4}.wp .page-template-industry-solutions-page .main\_banner p{font-weight:400;font-size:26px;max-width:800px;margin-left:auto;margin-right:auto;margin-top:20px;line-height:36px}.wp .page-template-industry-solutions-page .main\_banner .white\_outline\_button{background-color:#ff671f;border:2px solid #ff671f;padding:10px 50px}.wp .page-template-industry-solutions-page .featured\_use\_cases\_section h2{font-size:32px;font-weight:500}.wp .page-template-industry-solutions-page .featured\_use\_cases\_section .uc\_item{margin-top:20px}.wp .page-template-industry-solutions-page .featured\_use\_cases\_section .uc\_inner{background-color:#fff;text-align:left;padding:20px

35px;font-size:16px}.wp .page-template-industry-solutions-page .featured\_use\_cases\_section .uc\_item .uc\_inner h3{font-size:22px;font-weight:700;color:#4596ca}.wp .page-template-industry-solutions-page .cta\_section{padding:80px 0 90px;text-align:center;background-color:#f0f0f0}.wp .page-template-industry-solutions-page .cta\_section h2{font-size:48px;line-height:1.08;color:#2a323c}.wp .page-template-industry-solutions-page .cta\_section p{font-size:26px;line-height:1.23;color:#111820!important;margin-bottom:0;padding-bottom:0}.wp .page-template-industry-solutions-page .industry\_solution\_section h2{font-size:32px;font-weight:500}.wp .page-template-industry-solutions-page .solution\_categories{margin-top:20px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category{height:300px;background:#173361}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category:nth-child(2n){background:#0074a2}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category.cbp-singlePageInline-active{opacity:1!important;overflow:visible}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category.cbp-singlePageInline-active .cbp-item-wrapper{z-index:2}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category.cbp-singlePageInline-active:after{content:"";display:block;position:absolute;left:50%;bottom:-30px;margin-left:-50px;border:50px solid transparent;border-bottom-color:#eff2f5;z-index:1}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category img{display:block;margin:0 auto 38px;width:auto}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category .cbp-l-caption-title{font-size:26px;font-weight:700}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category .cbp-l-caption-desc{margin-top:35px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category .white\_button{color:#4596ca;transition:inherit;background-color:#fff;border-radius:2px;font-size:16px;line-height:24px;padding:6px 25px;display:inline-block;font-weight:700}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info{background-color:#eff2f5;padding:30px 35px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .desc h4{color:#4596ca;font-size:22px;line-height:normal;font-weight:700}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .solution\_item{margin-top:20px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .solution\_item .solution\_item\_inner{background-color:#fff;padding:25px 25px 50px;position:relative;height:100%}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .solution\_item h4{font-size:18px;font-weight:700;line-height:normal;padding:0;margin-bottom:20px}.wp .page-template-industry-solutions-page .solution\_categories .solution\_category\_info .solution\_item .morelink{position:absolute;bottom:20px;left:25px}.wp .page-template-industry-solutions-page .solution\_categories .cbp-popup-singlePageInline{margin-bottom:60px}.wp .page-template-industry-solutions-page .solution\_categories .cbp-popup-singlePageInline .cbp-popup-content{margin-bottom:30px}.wp .page-template-industry-solutions-page .solution\_categories .cbp-popup-singlePageInline .cbp-popup-navigation{display:none}.wp .page-template-industry-solutions-page .desc h5{font-size:18px;font-weight:700}.wp .page-template-industry-solutions-page .desc ul{padding:0;list-style:none}.wp .page-template-industry-solutions-page .desc ul li{padding-left:20px;background-image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/li-style.png);background-repeat:no-repeat;background-position:left 10px}@media screen and (min-width:768px){.wp .page-template-industry-solutions-page .additional-resources-row{display:-ms-flexbox;display:flex}}.modern-slavery-policy-module--page--s\_47{text-align:left!important}.modern-slavery-policy-module--page--s\_47 h2{color:#333;font-size:30px;font-weight:400;line-height:36px;margin:0;padding:10px 0;text-align:center}.modern-slavery-policy-module--page--s\_47 h3{font-size:20px}.modern-slavery-policy-module--page--s\_47 ol{font-weight:300;line-height:1.78;color:#4a4a4a;font-size:18px}.wp .page-nominate .nomination .h3-border:after{content:"";height:2px;width:40px;background:#257bd7;margin-top:5px;display:block;position:relative}@media screen and (max-width:1000px){.wp .page-nominate .nomination .h3-border{text-align:center}.wp .page-nominate .nomination .h3-border:after{margin:5px auto 0}}.wp .page-nominate .nomination img{margin:0}.wp .page-nominate .nomination .row{display:-ms-flexbox;display:flex}@media screen and (max-width:1000px){.wp .page-nominate .nomination .row{margin-left:0;margin-right:0}}.wp .page-nominate .nomination h1,.wp .page-nominate .nomination h2{font-size:45px;line-

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height:61px;max-width:900px}.wp .page-nominate .nomination h3{font-size:16px!important;line-
height:21px!important;text-transform:uppercase}.wp .page-nominate .nomination__hero{padding-
top:100px;background:#257bd7}@media screen and (max-width:1000px){.wp .page-nominate .nomination__hero
.row{display:block}}.wp .page-nominate .nomination__hero h1,.wp .page-nominate .nomination__hero h2,.wp
.page-nominate .nomination__hero h3,.wp .page-nominate .nomination__hero p{color:#fff}@media screen and
(max-width:1000px){.wp .page-nominate .nomination__hero h1,.wp .page-nominate .nomination__hero h2,.wp
.page-nominate .nomination__hero h3,.wp .page-nominate .nomination__hero p{text-align:center}}.wp .page-
nominate .nomination__hero p{font-size:18px;line-height:27px;max-width:600px}@media screen and (max-
width:1000px){.wp .page-nominate .nomination__hero p{margin:0 auto}}.wp .page-nominate .nomination__hero
h3{color:#d8d8d8}.wp .page-nominate .nomination__hero .row{position:relative}@media screen and (min-
width:1000px){.wp .page-nominate .nomination__hero .row{display:-ms-flexbox;display:flex}}@media screen and
(min-width:1000px){.wp .page-nominate .nomination__hero .half:first-child{width:60%;padding-
bottom:200px}}.wp .page-nominate .nomination__hero .half:last-child{margin:0 auto;width:50%}@media screen
and (min-width:1000px){.wp .page-nominate .nomination__hero .half:last-
child{position:absolute;right:0;bottom:0}}.wp .page-nominate
.nomination__pillars{background:#eef44;padding:60px 0}.wp .page-nominate .nomination__pillars .row{-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.wp .page-nominate
.nomination__pillars h3{margin-bottom:45px}.wp .page-nominate .nomination__pillars .nomination__pillar{text-
align:center;width:100%}.wp .page-nominate .nomination__pillars .nomination__pillar p{font-size:16px}.wp .page-
nominate .nomination__pillars .nomination__pillar img{max-width:90px}@media screen and (min-width:550px)
and (max-width:999px){.wp .page-nominate .nomination__pillars .nomination__pillar{width:50%}}@media screen
and (min-width:1000px){.wp .page-nominate .nomination__pillars .nomination__pillar{width:15%}}.wp .page-
nominate .nomination__pillars p{font-size:18px;line-height:27px;margin-top:20px}.wp .page-nominate
.nomination__content{background-repeat:repeat-x;background-position:bottom;background-
image:url(https://cdn.confluent.io/images/nominations/buildings-bg.png);margin-top:100px}@media screen and
(min-width:1200px){.wp .page-nominate .nomination__content{background-position:50%}}.wp .page-nominate
.nomination__content img{max-width:100%;width:auto}.wp .page-nominate .nomination__content p{font-
size:16px}.wp .page-nominate .nomination__content .row{position:relative;-ms-flex-wrap:wrap;flex-
wrap:wrap;text-align:center}@media screen and (min-width:1000px){.wp .page-nominate .nomination__content
.row{text-align:left}}@media screen and (min-width:1000px){.wp .page-nominate .nomination__content .row:last-
child{margin-top:100px}}.wp .page-nominate .nomination__content .row:last-child .half:first-child{padding-
left:0}@media screen and (min-width:1000px){.wp .page-nominate .nomination__content .row:last-child .half:first-
child{margin-top:-75px}}.wp .page-nominate .nomination__content .image--right{display:none;margin-
top:40px;float:right}@media screen and (min-width:1000px){.wp .page-nominate .nomination__content .image--
right{display:block}}.wp .page-nominate .nomination__content .container{background-size:cover;background-
position:bottom;background-repeat:no-repeat;padding-bottom:50px;padding-top:100px}.wp .page-nominate
.nomination__content .container .half{width:100%}@media screen and (min-width:1000px){.wp .page-nominate
.nomination__content .container .half{width:46%}}.wp .page-nominate .nomination__content .container .half:first-
child{padding-left:30px}.wp .page-nominate .nomination__content .container .half:last-child{padding-
right:30px;margin-left:8%}}.wp .page-nominate
.nomination__form{background:#2a2e71;overflow:hidden;position:relative}@media screen and (min-
width:1000px){.wp .page-nominate .nomination__form{padding-bottom:150px}}.wp .page-nominate
.nomination__form:before{background-image:url(https://cdn.confluent.io/images/nominations/blue-
buildings.png);display:block;height:70%;width:685px;position:absolute;background-size:cover;z-
index:1;left:65%;background-repeat:no-repeat;bottom:250px}@media screen and (min-width:1000px){.wp .page-
nominate .nomination__form:before{content:""}}.wp .page-nominate .nomination__form .container{padding:100px
0 50px}.wp .page-nominate .nomination__form .container>div:first-child{width:100%}@media screen and (min-
width:1000px){.wp .page-nominate .nomination__form .container>div:first-child{width:60%}}.wp .page-nominate

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.nomination__form h2{padding-left:10px}.wp .page-nominate .nomination__form h2,.wp .page-nominate
.nomination__form h3,.wp .page-nominate .nomination__form h4,.wp .page-nominate .nomination__form
p{color:#fff}.wp .page-nominate .nomination__form p{font-size:18px;line-height:27px}.wp .page-nominate
.nomination__form label.error{color:red;position:absolute;top:0;margin:0;right:0;width:auto}.wp .page-nominate
.nomination__form-row{position:relative}.wp .page-nominate .nomination__form-row input,.wp .page-nominate
.nomination__form-row label,.wp .page-nominate .nomination__form-row
textarea{color:#afb0b3;display:block;width:100%}.wp .page-nominate .nomination__form-row label{letter-
spacing:1px;margin:20px 0 10px;text-transform:uppercase}.wp .page-nominate .nomination__form-row
textarea{min-height:250px;padding:15px}.wp .page-nominate .nomination__form-row input,.wp .page-nominate
.nomination__form-row textarea{background:transparent;border:1px solid #afb0b3}.wp .page-nominate
.nomination__form-row input[type=email],.wp .page-nominate .nomination__form-row input[type=text],.wp .page-
nominate .nomination__form-row textarea[type=email],.wp .page-nominate .nomination__form-row
textarea[type=text]{padding:17px}.wp .page-nominate .nomination__form-row--radio input,.wp .page-nominate
.nomination__form-row--radio label{display:inline;width:auto}.wp .page-nominate .nomination__form-row--radio
p{margin-top:15px;opacity:0;transition:opacity .6s}.wp .page-nominate .nomination__form-row--radio
input{margin-right:6px}.wp .page-nominate .nomination__form-row--radio label{margin-right:20px}.wp .page-
nominate .nomination__form-row--radio .isOver18{display:block}.wp .page-nominate .nomination__form-row--
control button{background:#257bd7;border-radius:50px;border:none;color:#fff;font-size:24px;line-
height:28px;margin-right:10px;margin-top:30px;min-width:260px;outline:none;padding:15px 20px;text-
align:center;-ms-transform:scale(1);transform:scale(1);transition:all .4s ease}.wp .page-nominate
.nomination__form-row--control button:hover{-ms-
transform:scale(1.025);transform:scale(1.025);background:#1e62ab}.wp .page-nominate .nomination__form-row--
control button.nomination__button--prev{background:none;border:1px solid #257bd7;color:#257bd7}@media
screen and (max-width:600px){.wp .page-nominate .nomination__form-row--control{text-align:center}.wp .page-
nominate .nomination__form-row--control button{display:block;font-size:18px;margin:15px auto;max-
width:60%}}.wp .page-nominate .nomination__form .swiper-pagination{bottom:0;left:50%;padding:14px
0;position:relative;-ms-transform:translateX(-50%);transform:translateX(-50%)}@media screen and (min-
width:1000px){.wp .page-nominate .nomination__form .swiper-pagination{bottom:10px;position:absolute}}.wp
.page-nominate .nomination__form .swiper-pagination-bullet{background:#d8d8d8;height:12px;margin:0
3px;opacity:1;width:12px}.wp .page-nominate .nomination__form .swiper-pagination-bullet-
active{background:#257bd7}.wp .page-nominate .nomination__form .swiper-slide{padding:10px}.wp .page-
nominate .nomination__form .swiper-slide fieldset{display:none}.wp .page-nominate .nomination__form .swiper-
slide:first-child fieldset{display:block}.wp .page-nominate .nomination__form .container{position:relative}.wp
.page-nominate .nomination__form img{bottom:-30px;right:-50%;max-width:450px;position:relative;-ms-
transform:translateX(-50%);transform:translateX(-50%);z-index:2}@media screen and (min-width:1000px){.wp
.page-nominate .nomination__form img{bottom:0;position:absolute;right:0;-ms-
transform:translateX(0);transform:translateX(0)}}.wp .page-nominate .nomination__form .thank-
you{display:none;padding:0 10px}@media screen and (min-width:1000px){.wp .page-nominate .nomination__form
.thank-you{margin-bottom:300px}}.wp .page-nominate .nomination .nomination-content{background-
color:#d61c50;padding:15px;color:#fff;text-align:center}.wp .page-nominate .nomination .nomination-
paragraph{margin:0 auto;color:#fff;font-size:16px;letter-spacing:.2px;width:70%;font-weight:400}@media screen
and (max-width:768px){.wp .page-nominate .nomination .nomination-paragraph{font-size:14px;width:90%}}.wp
.page-nominate .nomination .nomination__people{margin:20px 0}.wp .page-nominate .nomination
.nomination__people h2{max-width:none;text-align:center;margin:0;padding:0}.wp .page-nominate .nomination
.nomination__people img{border-radius:50%;width:112px;height:112px;border:1px solid #fff;-o-object-
fit:cover;object-fit:cover}.wp .page-nominate .nomination .nomination__people img.avatar{border-color:#ccc}.wp
.page-nominate .nomination .nomination__people .country-flag{width:25px;height:auto;-o-object-fit:contain;object-
fit:contain}.wp .page-nominate .nomination .nomination__people .container{display:-ms-flexbox;display:flex;-ms-

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flex-wrap:wrap;flex-wrap:wrap}.wp .page-nominate .nomination .nomination__people .container>div{text-align:center;width:20%;margin:25px 0}.wp .page-nominate .nomination .nomination__people .container>div:nth-child(5n){margin-right:0}.wp .page-nominate .nomination .nomination__people .name{margin-top:5px}@media screen and (max-width:920px){.wp .page-nominate .nomination .nomination__people .container{-ms-flex-pack:center;justify-content:center}.wp .page-nominate .nomination .nomination__people .container>div{text-align:center;width:30%}}@media screen and (max-width:540px){.wp .page-nominate .nomination .nomination__people .container>div{text-align:center;width:40%}}@media screen and (max-width:360px){.wp .page-nominate .nomination .nomination__people .container>div{text-align:center;width:100%}}.wp .previous-versions-module--container---YDGX td{height:auto}.sub-processors-module--page--2onUo table{border:1px solid #ccc;border-collapse:collapse;margin:0;padding:0;width:100%;table-layout:fixed;height:250px}.sub-processors-module--page--2onUo table thead tr{background-color:#dcd8d8;border:1px solid #ddd;padding:.35em}.sub-processors-module--page--2onUo table tbody tr{border:1px solid #ddd;padding:.35em}.sub-processors-module--page--2onUo table td{border-right:1px solid #ddd;padding:10px;height:24px;width:33.2969%}.wp .page-template-subscription .subscription-confluent-platform{margin-bottom:40px}.wp .page-template-subscription .sublist{font-family:MarkOT,sans-serif!important;font-size:16px!important;font-weight:300!important;line-height:24px!important;color:#4a4a4a!important}.wp .page-template-subscription .content-container{margin-left:40px}.style-module--container--2SjuF ul li{font-weight:300;line-height:1.78;color:#4a4a4a;font-size:18px}.style-module--container--2SjuF ul ul{margin:0}.wp .page-why-confluent .full-bleed-banner{background-image:url(https://cdn.confluent.io/wp-content/uploads/hero-image.png);background-size:cover;background-position:50%;padding:60px 0;text-align:center}@media only screen and (min-width:480px){.wp .page-why-confluent .full-bleed-banner{padding:90px 0}}@media only screen and (min-width:540px){.wp .page-why-confluent .full-bleed-banner{padding:120px 0}}@media only screen and (min-width:768px){.wp .page-why-confluent .full-bleed-banner{padding:250px 0}}.wp .page-why-confluent .full-bleed-banner__subtitle{color:#fff;font-size:18px;line-height:24px;font-weight:400;text-transform:uppercase}.wp .page-why-confluent .full-bleed-banner h1{color:#fff;font-size:60px;line-height:80px;font-weight:700}.wp .page-why-confluent .full-bleed-banner__buttons{position:relative;margin:12px auto 0}@media only screen and (min-width:768px){.wp .page-why-confluent .full-bleed-banner__buttons{-ms-flex-align:start;align-items:flex-start;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}}.wp .page-why-confluent .full-bleed-banner__buttons a{border-radius:8px;font-size:14px;display:block;line-height:14px;margin:0 auto 18px;opacity:1;padding:18px 42px;text-transform:uppercase;transition:opacity .3s ease;width:-webkit-max-content;width:-moz-max-content;width:max-content}@media only screen and (min-width:768px){.wp .page-why-confluent .full-bleed-banner__buttons a{display:inline-block;margin:0}}.wp .page-why-confluent .full-bleed-banner__buttons a:hover{opacity:.75}@media only screen and (min-width:768px){.wp .page-why-confluent .full-bleed-banner__buttons a+a{margin-left:18px}}.wp .page-why-confluent .full-bleed-banner__buttons a:first-child{background-color:#fff;color:#637fed}.wp .page-why-confluent .full-bleed-banner__buttons a:last-child{border:1px solid #fff;background-color:transparent;color:#fff;margin-bottom:0}.wp .page-why-confluent .schema-registry{overflow-x:hidden}.page-template-customers .bg-grey{display:block;z-index:1;opacity:1}.page-template-customers .swiper-wrapper{height:auto!important}.page-template-customers .featured-stories{background-image:linear-gradient(180deg,hsla(0,0%,100%,0),rgba(70,152,203,.08))}.page-template-customers .featured-stories.bg-grey,.page-template-customers .featured-stories.bg-white{background-image:none!important}.page-template-customers .featured-stories.bg-grey{background-color:#fafafa!important}.page-template-customers .featured-stories__stories{margin-top:48px}@media screen and (min-width:768px){.page-template-customers .featured-stories__stories{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-wrap:wrap;flex-wrap:wrap}}.page-template-customers .featured-stories__story{background-color:#fff;border:1px solid #ddd;border-radius:10px;display:block;margin-bottom:30px;padding:30px;position:relative;text-align:left}@media screen and (min-width:768px){.page-template-customers .featured-stories__story{margin:1%;width:48%}}@media screen and (min-width:992px){.page-template-customers .featured-stories__story{width:31%}}.page-template-customers .featured-stories__story [data-mh=story-

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image]{-ms-flex-align:center;align-items:center;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center;margin-bottom:12px}.page-template-customers .featured-stories__story [data-mh=story-image]
img{margin:0}.page-template-customers .featured-stories__story h3{color:#4a4a4a;font-size:24px;font-
weight:700;line-height:30px;margin-bottom:12px}.page-template-customers .featured-
stories__story h3 a{color:#4597cb;margin-top:0}.page-template-customers .featured-stories__story h3 a:hover{text-
decoration:none}.page-template-customers .featured-stories__story p{color:#8b8d90;font-size:16px;font-
weight:400;line-height:28px;margin-bottom:0}.page-template-customers .featured-stories__story
a{display:block;margin-top:24px}.page-template-customers .featured-stories__story a img{margin-left:0}.page-
template-customers .featured-stories__story .icon-container{display:inline-block;vertical-align:middle;margin-
right:10px}.page-template-customers .featured-stories__bubbles {margin-top:30px}@media screen and (min-
width:768px){.page-template-customers .featured-stories__bubbles{-ms-flex-align:center;align-
items:center;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-
content:center}}.page-template-customers .featured-stories__bubble{-ms-flex-align:center;align-
items:center;background:#fff;border-radius:50%;display:-ms-flexbox;display:flex;height:160px;margin:0 auto
30px;padding:18px;position:relative;width:160px}@media screen and (min-width:768px){.page-template-
customers .featured-stories__bubble{margin:0 12px 30px}}.page-template-customers .featured-stories__bubble
div{-ms-flex-align:center;align-items:center;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center;position:relative;text-align:center;width:100%}.page-template-customers .featured-stories__bubble
img{margin:0}.page-template-customers .featured-stories__bubble span{display:block!important}.page-template-
customers .image-text-carousel{background-image:linear-
gradient(180deg,hsla(0,0%,100%,0),rgba(70,152,203,.08))}.page-template-customers .image-text-carousel.bg-
grey,.page-template-customers .image-text-carousel.bg-white{background-image:none!important}.page-template-
customers .image-text-carousel.bg-grey{background-color:#fafafa!important}.page-template-customers .image-text-
carousel .container{position:relative}.page-template-customers .image-text-carousel .swiper-container .swiper-
slide__content{margin:0 auto;padding:0 60px;position:relative;text-align:left}.page-template-customers .image-
text-carousel .swiper-container .swiper-slide__content>div:first-child{margin-bottom:24px}@media screen and
(min-width:768px){.page-template-customers .image-text-carousel .swiper-container .swiper-
slide__content{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}.page-
template-customers .image-text-carousel .swiper-container .swiper-slide__content>div:first-child{margin-
bottom:0;padding:0 30px;width:40%}.page-template-customers .image-text-carousel .swiper-container .swiper-
slide__content>div:last-child{width:60%}}.page-template-customers .image-text-carousel .swiper-container
.swiper-slide__content img{margin:0;padding:0}.page-template-customers .image-text-carousel .swiper-container
.swiper-slide__content h3{color:#4a4a4a;font-size:24px;font-weight:700;line-height:38px;margin-top:0;padding-
top:0}.page-template-customers .image-text-carousel .swiper-container .swiper-slide__content
p{color:#4a4a4a;font-size:16px;line-height:32px}.page-template-customers .image-text-carousel .swiper-button-
next,.page-template-customers .image-text-carousel .swiper-button-prev{background-image:none;border-
bottom:4px solid #8b8d90;border-left:4px solid #8b8d90;height:30px;width:30px;-ms-
transform:rotate(45deg);transform:rotate(45deg)}.page-template-customers .image-text-carousel .swiper-button-
next{-ms-transform:rotate(-135deg);transform:rotate(-135deg)}.page-template-customers .image-text-carousel
.swiper-pagination{margin-top:30px;position:relative}.page-template-customers .image-text-carousel .swiper-
pagination .swiper-pagination-bullet{background-color:transparent;border:1px solid #8b8d90;height:9px;margin:0
9px;opacity:1;width:9px}.page-template-customers .image-text-carousel .swiper-pagination .swiper-pagination-
bullet-active{background-color:#8b8d90}.page-template-customers .section.hero_overview.hero-
section{padding:90px 0 30px!important}@media screen and (max-width:800px){.page-template-customers
.section.hero_overview.hero-section{padding:60px 0 30px!important}}.page-template-customers .cc-featured-table-
header{padding:30px 0;position:relative}.page-template-customers .cc-featured-table-
header:before{content:"";display:block;width:100%;height:1px;border-top:1px solid
#dce0e4;position:absolute;left:0;bottom:0}.page-template-customers .license-table{background:#fff;padding:0 0

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90px;position:relative}.page-template-customers .license-table p{font-size:16px}.page-template-customers .license-table h4{color:#8e9093;font-size:18px;font-weight:600;line-height:28px;padding:0}.page-template-customers .license-table hr{margin-top:20px}.page-template-customers .license-table ul{margin-bottom:30px}.page-template-customers .license-table ul ul{margin-top:18px;padding-left:24px}.page-template-customers .license-table li{color:#8e9093;margin-bottom:20px;font-weight:300}.page-template-customers .license-table .row{box-shadow:none;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.page-template-customers .half{padding:30px}.page-template-customers .half #download-cloud-half-button{background-color:rgba(74,148,214,.85);background-image:radial-gradient(ellipse farthest-corner at -40% 260%,#4a94d6 0,rgba(49,109,194,0) 80%,#4e95d3 0),linear-gradient(258deg,rgba(87,238,255,.1),rgba(77,108,211,0));border-radius:50px;box-shadow:none;color:#fff;display:inline-block;min-width:360px;padding:16px 20px 16px 65px;position:relative;text-align:left;text-decoration:none}.page-template-customers .half #download-cloud-half-button:before{content:"";background-repeat:no-repeat;background-size:contain;width:40px;height:40px;position:absolute;left:20px;top:28px;transition:all .1s ease-in}.page-template-customers .tabs-stage{padding-bottom:60px;box-shadow:0 0 30px 0 rgba(57,84,109,.14)}.page-template-customers .license-table.test-2 .row{border:none;box-shadow:none;padding:0}.page-template-customers .license-table .layout-break{margin:-35px 0 35px;font-size:36px;line-height:46px}.page-template-customers .line-dot-right:before{width:calc(100% - 60px)}.page-template-customers .line-dot-right:after{right:50px}.page-template-customers .test-2 .container h2+div>h3{color:#8e9093;font-size:16px;font-weight:300;letter-spacing:2px;line-height:2;text-transform:uppercase}@media screen and (min-width:800px){.page-template-customers .half{width:49.9%}.page-template-customers .license-table .row{-ms-flex-wrap:nowrap;flex-wrap:nowrap}}.page-template-customers .skinny{padding-top:90px}.page-template-customers .skinny h2{color:#8e9093;font-size:32px;line-height:52px;font-weight:300}.page-template-customers .skinny p{color:#4698cb;font-size:16px}.page-template-customers .skinny img{opacity:.1;margin:0 0 10px}.page-template-customers .featured-table+.featured-table{margin-top:90px}.page-template-customers .featured-table table{width:100%}.page-template-customers .featured-table h3{color:#4a4a4a;font-size:24px;line-height:38px;letter-spacing:.7px;text-transform:none}.page-template-customers .featured-table h3+ul{color:#8e9093;font-weight:300;list-style:none;padding:0}.page-template-customers .featured-table h3+ul li{padding:0 6px!important}.page-template-customers .featured-table .gs-tooltip,.page-template-customers .featured-table h4{padding:17px}.page-template-customers .gs-tooltip>p,.page-template-customers td>p{color:#4a4a4a}@media screen and (max-width:800px){.page-template-customers .gs-tooltip>p,.page-template-customers td>p{font-size:12px!important}}.page-template-customers .table-dot{background:#4698cb;border-radius:30px;height:15px;margin:0 auto;text-align:center;width:15px}.page-template-customers .featured-table h4{font-size:12px;line-height:32px;letter-spacing:2px;text-transform:uppercase;color:#8e9093}.page-template-customers .thead-no-background h3{font-weight:600;margin:0;padding-top:60px}@media screen and (max-width:800px){.page-template-customers .thead-no-background h3{font-size:18px!important}}@media screen and (max-width:800px){.page-template-customers .thead-no-background h4{font-size:10px!important;padding:10px 0}}.page-template-customers .featured-table .tr-heading{background:#fafafa}.page-template-customers .no-border{border:none!important}.page-template-customers .featured-table table+table tbody tr{border-bottom:1px solid rgba(0,0,0,.1)}.page-template-customers .featured-table table tbody td:first-child{width:50%}.page-template-customers section.three-col-media-blocks{text-align:left;padding:0}.page-template-customers section.three-col-media-blocks section.three-col-media-blocks img{opacity:.3}.page-template-customers section.three-col-media-blocks p{margin:10px 0 20px}.page-template-customers section.three-col-media-blocks a{font-size:18px}.page-template-customers section.three-col-media-blocks li div:first-child{display:block}.page-template-customers section.three-col-media-blocks li div img{margin:0;max-width:120px}.page-template-customers .cta-links-section{padding-top:0}.page-template-customers .cta-links-section h4{font-weight:500}.page-template-customers .cta-links-section\_\_title{color:#8e9093;font-size:12px;letter-spacing:3px;text-transform:uppercase}@media screen and (max-width:800px){.page-template-customers .cta-links-section .col-12{margin-bottom:30px}}.page-template-

customers .three-col-media-blocks .intro-title{max-width:100% }.page-template-customers .three-col-media-blocks .intro-title h2{margin:25px 0;padding-bottom:45px;position:relative;text-align:left;width:100% }.page-template-customers .three-col-media-blocks .intro-title h2:before{content:"";display:block;width:calc(100% - 10px);height:1px;border:2.5px solid #dce0e4;position:absolute;left:0;bottom:0;border-radius:5px }.page-template-customers .three-col-media-blocks .intro-title h2:after{content:"";display:block;width:1px;height:1px;border:2.5px solid #dce0e4;position:absolute;right:0;bottom:0;border-radius:5px }.page-template-customers .download\_white h5{color:#4597cb!important }.page-template-customers #download\_cp\_cc\_\_cloud tr td .gs-tooltip{text-align:center }.page-template-customers #download\_cp\_cc\_\_cloud tr td:first-child .gs-tooltip{text-align:left }.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table tbody tr{border-bottom:1px dashed #d3d0d0 }.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table tbody td:first-child{width:30% }.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td .rounded\_button,.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td button{background:#4597cb;border-radius:50px;border:2px solid transparent;color:#fff;display:block;font-size:14px;font-weight:500;letter-spacing:2px;margin:0 auto;max-width:160px;min-width:0;min-width:160px;padding:12px 0 11px;position:relative;text-align:center;text-transform:uppercase;transition:background .35s ease-out,color .35s ease-out;white-space:nowrap } @media screen and (max-width:768px){.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td .rounded\_button,.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td button{font-size:11px;min-width:110px;max-width:110px;margin-left:auto!important } }.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td .chart-cta-links{color:#5996c6;display:block;margin-top:30px;text-decoration:underline;font-weight:300 } @media screen and (max-width:768px){.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td .chart-cta-links{font-size:11px;min-width:110px;max-width:110px;margin-left:auto!important } } @media screen and (max-width:480px){.page-template-customers #download\_cp\_cc\_\_cloud .featured-table table td{min-width:0;max-width:none;display:table-cell } }.page-template-customers .rounded\_button{position:relative;display:inline-block;text-decoration:none;border-radius:50px;box-shadow:2px 3px 6px 0 rgba(0,0,0,.25);box-shadow:none;min-width:360px;max-width:370px;text-align:left;font-size:18px }.page-template-customers .rounded\_button.simple\_blue,.page-template-customers .rounded\_button.simple\_white{border:2px solid #4a94d6 }.page-template-customers .download\_blue-c3{background-image:radial-gradient(ellipse farthest-corner at -40% 260%,#4a94d6 0,rgba(49,109,194,0) 80%,#4e95d3 0),linear-gradient(258deg,rgba(87,238,255,.1),rgba(77,108,211,0));background-color:rgba(74,148,214,.85);color:#fff;padding:16px 20px 16px 65px }.page-template-customers .no-icon:before{background-image:none!important }.page-template-customers .rounded\_button h5{display:block;padding:0;opacity:.99;font-family:Roboto;font-size:24px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.6;letter-spacing:.7px;text-align:left;color:#fff }.page-template-customers .global\_\_breadcrumbs{font-size:12px;margin-bottom:60px }.page-template-customers .global\_\_breadcrumbs ul{margin:auto;list-style:none;overflow:hidden;position:static }.page-template-customers .global\_\_breadcrumbs li{float:left }.page-template-customers .global\_\_breadcrumbs li a{font-weight:300 }.page-template-customers .global\_\_breadcrumbs li:after{color:#4698cb;content:">";padding:6px }.page-template-customers .global\_\_breadcrumbs li:last-child:after{content:"" }.page-template-customers .download\_blue-c3:before{content:"";background-repeat:no-repeat;background-size:contain;width:40px;height:40px;position:absolute;left:20px;top:28px;transition:all .1s ease-in }.page-template-customers .single--text:before{width:30px;height:30px;top:20px }.page-template-customers .download\_blue-simple{position:relative;width:240px;height:45px;padding:0;line-height:54px;margin-right:17px;background-color:#4597cb;color:#fff;border:3px solid #4597cb;border-radius:7.5px;opacity:.99;font-size:18px;font-weight:700;letter-spacing:1px;transition:all .3s ease;display:inline-block;text-align:center;white-space:nowrap;vertical-align:middle;cursor:pointer;background-image:none;text-decoration:none!important;margin-top:15px;margin-bottom:25px }.page-template-customers .cta-text-block h2{margin-bottom:60px }.page-template-customers .download\_blue-simple h5{color:#fff;text-decoration:none!important;padding:5px 15px;font-

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size:16px}.page-template-customers .paper_white-c3{margin-left:15px;position:relative;display:inline-block;min-
width:360px;text-align:left;font-size:18px;text-decoration:none!important;border-radius:50px;background-
color:#fff;color:#4a94d6;padding:17px 21px 16px 70px;outline:0;transition:all .4s ease-in-out;border:3px solid
#4698cb}.page-template-customers .paper_white-c3 h5{display:block;padding:0;opacity:.99;font-
family:Roboto;font-size:24px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.6;letter-
spacing:.7px;text-align:left;color:#4a94d6}.page-template-customers .paper_white-
c3:before{content:"";background-image:url(https://cdn.confluent.io/wp-
content/themes/confluent/assets/images/paper_white_link_icon.png);background-repeat:no-repeat;background-
size:contain;width:51px;height:51px;position:absolute;left:13px}.page-template-customers .download_blue-c3
span,.page-template-customers .paper_white-c3 span{display:block;font-size:15px;line-height:20px}.page-template-
customers .c3-video_container a.play_btn{background-
size:contain;position:absolute;content:"play";display:block;width:21%;height:30%;text-align:left;text-indent:-
9999px;background-repeat:no-repeat;background-size:cover;top:40%;right:50%;margin-top:-41px;margin-left:-
34px}.page-template-customers .imagefullright .col-sm-3{position:absolute;left:66.66%;right:calc(-50% +
300px);padding:0;width:50%;text-align:left;left:64%}.page-template-customers .imagefullright img{margin-top:-
55px}.page-template-customers .hero-section .col-sm-8{position:relative;z-index:1}.page-template-customers .hero-
section h1{margin-bottom:30px;padding-bottom:0;line-height:70px}@media only screen and (max-
width:767px){.page-template-customers .hero-section h1 br{display:none}}.page-template-customers .hero-section
.cta-wrap{padding-top:35px}.page-template-customers .hero-section--border{border-bottom:1px solid
#e6e6e6}.page-template-customers .hero-section p{color:#4a4a4a;line-height:32px!important;max-
width:760px;letter-spacing:.2px;font-size:21px;width:700px}.page-template-customers
.section.hero_overview{overflow-x:hidden;overflow:hidden;padding:120px 0 30px;text-align:left}@media only
screen and (min-width:768px){.page-template-customers .section.hero_overview{padding:120px 0}}.page-
template-customers .testimonial-section{padding-top:119px;padding-bottom:120px}.page-template-customers
.testimonial-section-block{padding-right:21px;padding-left:21px;margin-right:auto;margin-left:auto}.page-
template-customers .cta-text-section{padding-top:50px;padding-bottom:60px;background-color:#fafafa}.page-
template-customers .cta-text-gradient{padding-top:50px;padding-bottom:60px;background-color:#fff;background-
image:linear-gradient(180deg,hsla(0,0%,100%,0),rgba(70,152,203,.08))}.page-template-customers .cta-text-
white{padding-top:50px;padding-bottom:60px}.page-template-customers .cta-text-block{padding-
right:21px;padding-left:21px;margin-right:auto;margin-left:auto}.page-template-customers .cta-text-block
img{width:150px}.page-template-customers .intro-title{margin:auto}.page-template-customers .intro-title h2{font-
weight:300;color:#8e9093;text-align:center;font-size:3.6rem;line-height:52px}.page-template-customers .intro-title
p{margin-top:0;text-align:center}.page-template-customers .quote-customer-name{font-size:16px!important;text-
align:center;line-height:2!important;color:#ff671b;text-transform:uppercase;padding:0;letter-spacing:2px;font-
weight:400}.page-template-customers .quote-customer-desination{font-size:16px!important;text-align:center;line-
height:2!important;color:#4a4a4a;padding:0;letter-spacing:.2px;font-weight:300}.page-template-customers .bottom-
cta{background-color:#fafafa;overflow:hidden;padding:50px 0}.page-template-customers .bottom-cta
.container{padding:90px 15px;position:relative}.page-template-customers .bottom-cta h2{margin-
bottom:30px}@media only screen and (max-width:767px){.page-template-customers .bottom-cta h2
br{display:none}}.page-template-customers .bottom-cta
.container:before{content:"";display:block;width:200%;height:50%;background-color:#fff;border-radius:500px 0 0
0;position:absolute;top:0;left:-10%}.page-template-customers .bottom-cta
.container:after{content:"";display:block;width:200%;height:50%;background-color:#fff;border-radius:0 0 0
500px;position:absolute;bottom:0;left:-10%}.page-template-customers .bottom-cta .container .text-
wrap{position:relative;z-index:1}.page-template-customers .learn-to-love p,.page-template-customers .section-text
p{font-weight:300;line-height:2;color:#4a4a4a;font-size:16px}.page-template-customers .learn-to-love p{font-
family:Roboto;font-style:normal;font-stretch:normal;letter-spacing:.2px;text-align:left;padding-top:7px;margin-
bottom:48px}.page-template-customers .cta-links-section{background:#fafafa;padding:80px 0}.page-template-

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customers .cta-anchors{padding-right:60px;display:block;font-weight:300;line-height:32px}.page-template-  
customers .transition-c3 p:nth-child(6){margin-bottom:0}.page-template-customers .section-text\_\_left p,.page-  
template-customers .section-text\_\_right p{font-family:Roboto;font-size:16px;font-weight:300;font-  
style:normal;font-stretch:normal;line-height:2;letter-spacing:.2px;text-align:left;color:#4a4a4a;padding-  
bottom:10px;padding-top:8px}.page-template-customers .section-text\_\_right h3,.page-template-customers .section-  
text\_\_right p,.page-template-customers .section-text\_\_right ul{padding-left:110px}.page-template-customers  
.section-text\_\_left h3,.page-template-customers .section-text\_\_left p{padding-right:110px}.page-template-customers  
.section-text\_\_left h3,.page-template-customers .section-text\_\_right h3{width:90%;opacity:.99;font-  
family:Roboto;font-size:24px;font-weight:700;font-style:normal;font-stretch:normal;line-height:1.6;letter-  
spacing:.7px;text-align:left;color:#4a4a4a;padding-top:60px}.page-template-customers .section-text\_\_right  
a{padding-left:110px}.page-template-customers .section-img\_\_left img{padding-top:150px}.page-template-  
customers .section-img\_\_left\_No img{padding-top:125px}.page-template-customers .section-img\_\_right  
img{padding-top:110px}.page-template-customers .c3\_specific\_content p{padding-top:8px}.page-template-  
customers .c3\_specific\_content{background-color:#fafafa;padding-top:90px;padding-bottom:35px}.page-template-  
customers .image-text-section{background-color:#fff;background-image:linear-  
gradient(180deg,hsla(0,0%,100%,0),rgba(70,152,203,.08));padding-top:120px;padding-bottom:89px}.page-  
template-customers .image-text-section ul{margin-top:-20px;font-weight:300}.page-template-customers .image-  
text-section ul li{color:#4a4a4a}@media screen and (min-width:768px){.page-template-customers .image-text-  
section .section-text\_\_right ul{margin-left:35px}}@media screen and (max-width:767px){.page-template-  
customers .image-text-section .section-text\_\_right ul{padding-left:40px}}.page-template-customers .image-  
animation-1,.page-template-customers .image-animation-2,.page-template-customers .image-animation-  
3{position:relative;margin-top:25px}.page-template-customers .image-animation-1{display:block}.page-template-  
customers .img-section-title{width:264px;font-family:Roboto;font-size:24px;font-weight:700;font-  
style:normal;font-stretch:normal;line-height:1.58;letter-spacing:.7px;text-align:left;color:#4698cb;padding:0}.page-  
template-customers .main\_banner{padding:90px 0 100px}.page-template-customers .faq\_intro p{max-  
width:90%;color:#4a4a4a;font-size:18px}.page-template-customers .faq\_content{max-width:90%!important}.page-  
template-customers .certificate\_faq\_section p{max-width:none}.page-template-customers .image-animation-  
1,.page-template-customers .image-animation-2{display:none}.page-template-customers .form\_style{padding-  
left:320px;padding-top:25px}.page-template-customers .form\_style\_media{padding-left:20px;padding-  
top:25px}@media screen and (max-width:990px){.page-template-customers .form\_style{padding-left:65px}.page-  
template-customers .form\_style\_media{padding-left:0}}@media screen and (min-width:1450px){.page-template-  
customers .imagefullright .col-sm-3 img{margin:-55px 0 0;max-width:750px}.page-template-customers .c3-  
video\_container a.play\_btn{width:120px;height:120px;right:0;left:30%;top:45%}}@media screen and (max-  
width:991px){.page-template-customers .c3-video\_container  
a.play\_btn{width:90px;height:90px;top:40%;left:40%}}@media screen and (max-width:767px){.page-template-  
customers .c3-video\_container a.play\_btn{width:80px;height:80px;top:50%;left:50%}}.page-template-customers  
.imagefullright .col-sm-3 img{display:block;margin:20px auto 0}.page-template-customers .imagefullright .col-sm-  
3{position:relative!important;left:0!important;right:0!important;padding:15px!important;width:100%!important}.pa-  
ge-template-customers .section-text\_\_left h3,.page-template-customers .section-text\_\_left p{padding-  
right:10px!important}.page-template-customers .transition-c3{padding-bottom:55px}}@media screen and (max-  
width:1199px){.page-template-customers .paper\_white-c3{margin-left:0!important;margin-top:20px}.page-  
template-customers .download\_blue-c3{margin-bottom:10px}.page-template-customers .section-text\_\_right a,.page-  
template-customers .section-text\_\_right h3,.page-template-customers .section-text\_\_right p,.page-template-  
customers .section-text\_\_right ul{padding-left:10px}}@media screen and (max-width:767px){.page-template-  
customers .section-img\_\_left\_No img,.page-template-customers .section-img\_\_left img{padding-  
top:25px!important}.page-template-customers .section-text\_\_right a,.page-template-customers .section-text\_\_right  
h3,.page-template-customers .section-text\_\_right p{padding-left:10px!important}.page-template-customers .section-  
img\_\_right img{padding-top:20px!important}}@media screen and (max-width:480px){.page-template-customers

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.download_blue-c3 h5,.page-template-customers .paper_white-c3 h5{ font-size:18px!important} .page-template-
customers .c3_specific_content .image-animation{ margin-top:100px } @media only screen and (max-
width:767px){ .page-template-customers .c3_specific_content .image-animation{ margin-top:10px } .page-template-
customers .animation_specfic_content{ padding-bottom:25px } } .page-template-customers .bottom-cta p{ margin-
top:-80px } .page-template-customers .animation_specfic_content{ padding-bottom:110px } .page-template-customers
.desktop-only { display:none } @media screen and (min-width:800px){ .page-template-customers .desktop-
only{ display:block } } .page-template-customers .cc-featured-table-header h2{ font-size:38px!important;text-
align:center;text-transform:capitalize!important} .page-template-customers #tab-2 .rounded_button{ margin:30px
auto!important} .page-template-customers #tab-2 h3{ font-size:28px!important;text-align:center;margin-
bottom:50px } .page-template-customers #tab-2 .pricing-check-list{ max-width:850px;margin:0 auto } .page-template-
customers #tab-2 .pricing-check-list li{ font-size:20px;width:100%;margin-bottom:20px } @media screen and (min-
width:1000px){ .page-template-customers #tab-2 .pricing-check-list li{ width:50%;padding-left:30px;text-
align:left;margin-bottom:50px } } .page-template-customers #view-pricing .container{ background:#fff;box-shadow:0
0 10px 3px rgba(0,0,0,.1) } @media screen and (max-width:768px){ .page-template-customers #view-pricing
.container{ width:100% } } @media screen and (min-width:1000px){ .page-template-customers #view-pricing
.container{ padding:0 50px } } .page-template-customers .pricing-table{ position:relative } @media screen and (max-
width:1000px){ .page-template-customers .pricing-table{ padding-bottom:0 } } @media screen and (min-
width:750px){ .page-template-customers .pricing-
table:after{ background:#f2f3f6;content:"";height:250px;left:0;position:absolute;top:0;width:100%;z-index:-
1 } } .page-template-customers .pricing-table .rounded_button{ background:#4597cb;border:2px solid
#4597cb;color:#fff;display:block;font-size:14px;max-width:160px;min-width:160px;padding:10px;text-
align:center;text-transform:uppercase;width:50%;transition:all .3s ease } .page-template-customers .pricing-table
.rounded_button--outline,.page-template-customers .pricing-table
.rounded_button:hover{ background:#fff;border:2px solid #4597cb;color:#4597cb } .page-template-customers
.pricing-table .rounded_button--outline:hover{ background:#4597cb;color:#fff } .page-template-customers .pricing-
table .pricing-ctas{ margin:0 auto;width:auto;padding:60px 0 40px;display:block } @media screen and (min-
width:800px){ .page-template-customers .pricing-table .pricing-ctas{ display:-ms-flexbox;display:flex;-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center } } .page-template-customers .pricing-table
.pricing-ctas .rounded_button{ margin:10px auto!important } @media screen and (min-width:800px){ .page-template-
customers .pricing-table .pricing-ctas .rounded_button{ margin:10px!important } } .page-template-customers .pricing-
table .pricing-ctas p{ margin:30px 0;text-decoration:underline;text-align:center;width:100% } .page-template-
customers .pricing-table .row{ display:-ms-flexbox;display:flex;margin:0 0 6px } .page-template-customers .pricing-
table .row-total h3{ position:relative } .page-template-customers .pricing-table .row-total h3:before{ border-top:1px
solid #979797;width:250px;position:absolute;content:"";height:1px;top:-16px;left:0 } .page-template-customers
.pricing-table ul.tabs{ display:block;list-style:none;margin:0 auto;padding:0;position:relative;z-index:1 } @media
screen and (min-width:800px){ .page-template-customers .pricing-table ul.tabs { -ms-flex-align:center;align-
items:center;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center } } .page-template-
customers .pricing-table ul.tabs:before{ border-top:1px solid
#e6e6e6;content:"";position:absolute;top:50%;width:100%;height:1px;left:0;z-index:-1 } .page-template-customers
.pricing-table ul.tabs li{ border:1px solid #e6e6e6;background:#fff;display:block;font-size:14px;padding:20px
30px;text-align:center;min-width:310px;cursor:pointer } .page-template-customers .pricing-table ul.tabs li
span{ display:block;font-size:16px } .page-template-customers .pricing-table .tab-link:first-child{ border-radius:5px
5px 0 0;border-bottom:none } .page-template-customers .pricing-table .tab-link:nth-child(2){ border-radius:0 0 5px
5px;border-top:none } @media screen and (min-width:800px){ .page-template-customers .pricing-table .tab-link:first-
child{ border-radius:5px 0 0 5px;border-bottom:1px solid #e6e6e6;border-color:#e6e6e6 currentcolor;border-
right:none } .page-template-customers .pricing-table .tab-link:first-child.current{ border-color:#5781e9 } .page-
template-customers .pricing-table .tab-link:nth-child(2){ border-radius:0 5px 5px 0;border-color:currentcolor
#e6e6e6 #e6e6e6;border-top:1px solid #e6e6e6;border-left:none } .page-template-customers .pricing-table .tab-

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link:nth-child(2).current{border-color:#5781e9}.page-template-customers .pricing-table ul.tabs
li.current{border:1px solid #5781e9;background:#5781e9;color:#fff}.page-template-customers .pricing-table .tab-
content{display:none;padding:15px}.page-template-customers .pricing-table .tab-
content.current{display:inherit}.page-template-customers .pricing-table .pricing-check-list{margin-
bottom:30px;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;padding:0;-ms-flex-
pack:center;justify-content:center}.page-template-customers .pricing-table .pricing-check-list
.icon.check{display:inline-block;margin-right:15px;height:15px;width:15px}.page-template-customers .pricing-
table .pricing-check-list ul{padding:0;text-align:center}.page-template-customers .pricing-table .pricing-check-list
li{display:block;list-style:none;text-align:center;width:100%}@media screen and (min-width:1000px){.page-
template-customers .pricing-table .pricing-check-list li{text-align:left;width:50%}}@media screen and (min-
width:1200px){.page-template-customers .pricing-table .pricing-check-list li{text-align:center;width:25%}}@media
screen and (max-width:850px){.page-template-customers .pricing-table .pricing-check-list li{margin-
bottom:8px}.page-template-customers .pricing-table .pricing-check-list li+li{margin-left:0}}.page-template-
customers .pricing-table .intro-title{margin:0 auto;padding:30px 0}.page-template-customers .pricing-table .intro-
title h2{color:#101040;margin-bottom:30px}.page-template-customers .pricing-table h3{color:#101040;font-
size:22px!important;font-weight:700}@media screen and (max-width:850px){.page-template-customers .pricing-
table h3{font-size:16px!important}}.page-template-customers .pricing-table h4{font-size:18px!important;font-
weight:700}@media screen and (max-width:850px){.page-template-customers .pricing-table h4{font-
size:14px!important}}.page-template-customers .pricing-table p{color:#101040;font-size:16px;line-
height:2}@media screen and (max-width:850px){.page-template-customers .pricing-table p{font-size:12px}}.page-
template-customers .pricing-table .col-sm-4{background:#fafafa;width:33%}.page-template-customers .pricing-
table .col-sm-4:first-child{background:#fff;border-bottom:1px solid #e6e6e6;-ms-flex-pack:start;justify-
content:flex-start}.page-template-customers .pricing-table .col-sm-4:first-child h3{font-size:18px!important}.page-
template-customers .pricing-table .col-sm-4 img{display:block;margin:0 auto;max-width:100px}.page-template-
customers .pricing-table .pricing-example-container{border:8px solid #fafafa;border-top:30px solid
#fafafa}@media screen and (min-width:1000px){.page-template-customers .pricing-table .pricing-example-
container{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}}.page-template-customers
.pricing-table .pricing-example-container .pricing-example{margin:0 auto;width:95%}.page-template-customers
.pricing-table .pricing-example-container .pricing-example:first-child{border-bottom:1px solid #979797}@media
screen and (min-width:1000px){.page-template-customers .pricing-table .pricing-example-container .pricing-
example{margin:0;width:50%}.page-template-customers .pricing-table .pricing-example-container .pricing-
example:first-child{border-bottom:none}}.page-template-customers .pricing-table .pricing-example-container
.pricing-example .cluster{-ms-flex-align:start;align-items:flex-start;-ms-flex-pack:start;justify-content:flex-
start;padding:14px 34px}@media screen and (min-width:1000px){.page-template-customers .pricing-table .pricing-
example-container .pricing-example .cluster{min-height:120px}}.page-template-customers .pricing-table .pricing-
example-container .pricing-example .cluster img{margin-top:12px}.page-template-customers .pricing-table .pricing-
example-container .pricing-example .cluster h3{font-size:18px!important}.page-template-customers .pricing-table
.pricing-example-container .pricing-example .cluster h4{font-size:14px!important;padding:0}.page-template-
customers .pricing-table .pricing-example-container .pricing-example .cluster p{font-size:14px}.page-template-
customers .pricing-table .pricing-example-container .pricing-example .cluster p span{font-size:18px}.page-
template-customers .pricing-table .top-row{border-top:1px solid #e6e6e6}.page-template-customers .pricing-table
.flex-row{-ms-flex-pack:justify;justify-content:space-between}.page-template-customers .pricing-table .flex-row
.light{font-weight:400}.page-template-customers .pricing-table .flex-row div{width:50%}.page-template-customers
.pricing-table .flex-row div h3,.page-template-customers .pricing-table .flex-row div h4,.page-template-customers
.pricing-table .flex-row div p{margin:0;padding:0}.page-template-customers .pricing-table .flex-row div+div{text-
align:right}.page-template-customers .pricing-table .flex-row.grey-bg{background-color:#fafafa}.page-template-
customers .pricing-table .darkgrey-bg{background-color:#eeff4}.page-template-customers .pricing-table .border-
bottom{border-bottom:2px solid #e6e6e6}.page-template-customers .pricing-table .push-top{margin-

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top:65px }.page-template-customers .pricing-table .cluster,.page-template-customers .pricing-table .options,.page-
template-customers .pricing-table .title{margin:0 0 0 6px;padding:27px 34px }.page-template-customers .pricing-
table .cluster:first-child,.page-template-customers .pricing-table .options:first-child,.page-template-customers
.pricing-table .title:first-child{margin-left:0 }.page-template-customers .pricing-table .cluster{-ms-flex-
align:center;align-items:center;border-left:0;border-right:0;display:-ms-flexbox;display:flex;-ms-flex-
pack:center;justify-content:center }.page-template-customers .pricing-table .cluster img{margin:0 20px 0 0;max-
width:35px }.page-template-customers .pricing-table .cluster h3{padding:0 }.page-template-customers .pricing-table
.cluster p{font-size:16px;margin:0 }.page-template-customers .mobile-only,.page-template-customers .mobile-only
.row{display:block }.page-template-customers .mobile-only .top-row .title h3{text-align:center }.page-template-
customers .mobile-only .top-row .title img{display:block;margin:0 auto }.page-template-customers .mobile-only
.cluster{text-align:left;-ms-flex-pack:start;justify-content:flex-start;padding:14px 34px !important }@media screen
and (min-width:800px){.page-template-customers .mobile-only{display:none }}.page-template-customers .mobile-
only .aws,.page-template-customers .mobile-only .cloud{background:#fafafa;margin:0 auto 30px;max-
width:600px;padding:33px 25px }@media screen and (max-width:850px){.page-template-customers .mobile-only
.aws .toggle,.page-template-customers .mobile-only .cloud .toggle{font-size:12px }}.page-template-customers
.mobile-only .aws h3,.page-template-customers .mobile-only .cloud h3{font-size:18px;padding:0 }.page-template-
customers .mobile-only .aws h4,.page-template-customers .mobile-only .cloud h4{padding:0;line-height:1 }.page-
template-customers .mobile-only .aws h4,.page-template-customers .mobile-only .aws p,.page-template-customers
.mobile-only .cloud h4,.page-template-customers .mobile-only .cloud p{font-size:12px }.page-template-customers
.mobile-only .aws>img,.page-template-customers .mobile-only .cloud>img{display:block;margin:0 auto
30px }.page-template-customers .mobile-only .aws>img+.row p,.page-template-customers .mobile-only
.cloud>img+.row p{margin-bottom:0 }.page-template-customers .mobile-only .col-sm-6{width:50% }.page-template-
customers .mobile-only .expand{border-top:2px solid #e6e6e6;display:none;margin-top:20px;padding-
top:20px }.page-template-customers .test-table{width:100% }@media screen and (max-width:1000px){.page-
template-customers .test-table{display:none }}.page-template-customers .test-table thead td:nth-child(2),.page-
template-customers .test-table thead td:nth-child(4){width:30% }.page-template-customers .test-table thead
td>div{border:2px solid rgba(142,144,147,.2);border-top-left-radius:25px;border-top-right-radius:25px;border-
bottom:0;padding:30px }.page-template-customers .test-table thead td:nth-child(3){width:25px }.page-template-
customers .test-table tbody td:nth-child(2)>div,.page-template-customers .test-table tbody td:nth-
child(4)>div{border:2px solid rgba(142,144,147,.2);border-bottom:0;border-top:0;padding:15px 30px }.page-
template-customers .test-table tbody td:first-child{padding:15px 30px }.page-template-customers .test-table tbody
td{vertical-align:top }.page-template-customers .test-table tbody td:nth-child(3){padding:0 }.page-template-
customers .test-table tbody td p{margin:0;font-size:15px;font-weight:300 }.page-template-customers .test-table
tbody tr:nth-child(odd){background:#fafafa }.page-template-customers .test-table tfoot td>div{border:2px solid
rgba(142,144,147,.2);border-bottom-left-radius:25px;border-bottom-right-radius:25px;border-
top:0;padding:30px }.page-template-customers .test-table--mobile{display:none;width:100% }@media screen and
(max-width:1000px){.page-template-customers .test-table--mobile{display:table }}.page-template-customers .test-
table--mobile thead h4{font-size:18px;font-weight:700;margin:0;padding:0 }.page-template-customers .test-table--
mobile thead h4+p{font-size:12px;font-weight:300;line-height:18px;margin-top:0;padding-top:0 }.page-template-
customers .test-table--mobile tbody tr:nth-child(odd){background:#fafafa }.page-template-customers .test-table--
mobile tbody td{padding:15px;vertical-align:top }.page-template-customers .test-table--mobile tbody
p{margin:0;font-size:16px;font-weight:300 }.page-template-customers .test-table--mobile tfoot td{padding:30px 0
60px }.wp .style-module--mainBanner--2fR-k{background-color:#b4e1e4 }.wp .page-template-about-rebrand
.main_banner{height:100vh;padding:0;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center;-ms-flex-align:center;align-items:center;background:url(https://cdn.confluent.io/wp-
content/uploads/about_bg_2019.jpg);background-size:cover;background-position:0 }.wp .page-template-about-
rebrand .main_banner .container h1{font-family:MarkOT;font-size:60px;font-weight:700;color:#fff }.wp .page-
template-about-rebrand .main_banner .container p{width:700px;max-width:90%;margin:0 auto;font-size:21px;font-

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family:MarkOT;line-height:1.69;color:#fff;font-weight:300}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue {background-color:#fff}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue .container h2 {font-family:MarkOT;font-size:14px;font-weight:500;text-
transform:uppercase}.wp .page-template-about-rebrand .section.bg_light_grayish_blue .container
h2:after {content:"";height:2px;width:40px;background:#257bd7;display:block;margin:-10px
auto;position:relative}.wp .page-template-about-rebrand .sub-text {width:708px;text-align:center;max-
width:90%;margin:60px auto}.wp .page-template-about-rebrand .sub-text-content {font-family:MarkOT;font-
size:48px;font-weight:500;line-height:1.15;color:#000}.wp .page-template-about-rebrand .background-section-
paragraphs {width:826px;font-family:MarkOT;font-size:16px;font-weight:300;line-height:1.88;letter-
spacing:normal;text-align:center;color:#101040;margin:auto;max-width:90%}.wp .page-template-about-rebrand
#management {background-color:#fafafa}.wp .page-template-about-rebrand .section.team_section h2 {font-
family:MarkOT;font-size:48px;font-weight:500;letter-spacing:.7px;text-align:center;color:#000;padding-
bottom:30px;padding-top:50px}.wp .page-template-about-rebrand .avatar_wrapper.team-toggle {border:4px solid
#fff;box-shadow:0 0 3px rgba(0,0,0,.2);display:inline-block;line-height:0;width:200px;height:200px}.wp .page-
template-about-rebrand .br_990 {display:none}.wp .page-template-about-rebrand .bg_linear_blue {background-
image:linear-gradient(90deg,#247cd7,#31bfc2)}.wp .page-template-about-rebrand
.circular_border_button_white {border-radius:8px;border:2px solid #fff;background-color:#fff;font-
family:MarkOT;font-size:14px;font-weight:500;color:#173361;letter-spacing:.5px;text-transform:uppercase}.wp
.page-template-about-rebrand .section.bg_orange.bg_linear_blue h2 {font-family:MarkOT;font-size:40px;font-
weight:700;line-height:1.13}.wp .page-template-about-rebrand .name.team-toggle {font-weight:700}.wp .page-
template-about-rebrand .team-member .social a {border-radius:5px;width:22px;height:22px;font-size:13px}.wp
.page-template-about-rebrand .social a .fa {font-size:15px}.wp .page-template-about-rebrand .position.team-
toggle {font-size:18px;font-weight:300;font-style:normal;font-stretch:normal;line-height:1.78}.wp .page-template-
about-rebrand .col-xs-12.col-sm-6.office {padding:0;min-height:500px;display:-ms-flexbox;display:flex;-ms-flex-
pack:center;justify-content:center;-ms-flex-align:center;align-items:center;background-
position:bottom;width:calc(50% - 2px)}.wp .page-template-about-rebrand .col-xs-12.col-sm-6.office:first-of-
type {margin-right:2px}.wp .page-template-about-rebrand .col-xs-12.col-sm-6.office:last-of-type {margin-
left:2px}.wp .page-template-about-rebrand .office_address_container {height:350px;width:376px;opacity:.8;border-
radius:8px;background-color:#000;max-width:90%;letter-spacing:.29px;font-weight:100}.wp .page-template-about-
rebrand .office_name {padding:75px 0 25px}.wp .page-template-about-rebrand .office_address,.wp .page-template-
about-rebrand .office_phone {font-size:20px}.wp .page-template-about-rebrand .section.team_section {background-
color:#fafafa;padding-bottom:130px}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue.investors_section h2 {font-family:MarkOT;font-size:48px;font-weight:700;text-
transform:capitalize;letter-spacing:.7px;padding:0;margin:0}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue.investors_section .container {max-width:90%}.wp .page-template-about-rebrand
.items.widthcol5.teams {margin-bottom:0}.wp .page-template-about-rebrand
.section.bg_light_grayish_blue.investors_section h2:after {display:none}.wp .page-template-about-rebrand .line-
container {position:absolute;bottom:0;width:100%}.wp .page-template-about-rebrand .line-container
.line {height:2px;display:block;border:1px solid #d3d3d3;margin:auto;width:1140px;max-width:90%}.wp .page-
template-about-rebrand .bg_vary_dark_blue.additional_resources_section.section {background-
image:none!important;background-color:#fff!important;padding-top:150px!important}.wp .page-template-about-
rebrand .bg_vary_dark_blue.additional_resources_section.section .container {width:1170px;max-
width:90%;padding:0}.wp .page-template-about-rebrand .bg_vary_dark_blue.additional_resources_section.section
h2 {font-size:48px;font-weight:700;letter-spacing:.7px;color:#000;margin-bottom:100px;padding-top:0}.wp .page-
template-about-rebrand .additional_resources_section .item {box-shadow:0 0 15px 0 rgba(0,0,0,.25);border-top:12px
solid #4698cb;transition:all .2s ease;padding:28px 25px 3px;border-bottom-left-radius:8px;border-bottom-right-
radius:8px}.wp .page-template-about-rebrand .additional_resources_section .item:hover {background-color:#fff;box-
shadow:2px 20px 20px 0 rgba(0,0,0,.25)}.wp .page-template-about-rebrand

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.bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control{width:calc(33.33% - 75px);margin:0 37.5px;padding:20px 0;text-align:left}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover img.cta\_icon{display:inline}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover img.cta\_icon\_hover{display:none}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover h3,.wp .page-template-about-rebrand .additional\_resources\_section .item:hover p{color:#4698cb}.wp .page-template-about-rebrand .additional\_resources\_section .item h3{font-family:MarkOT;font-size:24px;font-weight:700;line-height:1.58;letter-spacing:.7px;color:#4698cb}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover h3,.wp .page-template-about-rebrand .additional\_resources\_section .item:hover p{color:#000}.wp .page-template-about-rebrand .section.section .items.teams li{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}.wp .page-template-about-rebrand .additional\_resources\_section .item p{margin-bottom:50px}.wp .page-template-about-rebrand .cta\_icon{margin-left:-10px!important;margin-bottom:23px}.wp .page-template-about-rebrand .want\_to\_learn\_p\_mh{font-family:MarkOT;font-size:16px;font-weight:300;line-height:1.63;letter-spacing:.2px;color:#4a4a4a}.wp .page-template-about-rebrand .additional\_resources\_section .item:hover h3{color:#4698cb}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .col-xxs-12.col-xs-6.col-sm-6.col-md-4.items\_control{height:auto!important;padding:0}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .col-xxs-12.col-xs-6.col-sm-6.col-md-4.items\_control a{background-color:#f16f45;color:#fff;opacity:1;margin-bottom:30px}.wp .page-template-about-rebrand .top-level-directors{display:-ms-flexbox;display:flex;width:100%}@media (min-width:990px){.wp .page-template-about-rebrand .top-level-directors{-ms-flex-pack:center;justify-content:center}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .container .row,.wp .page-template-about-rebrand .items.widthcol5.teams{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control:first-of-type{margin-left:0}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control:last-of-type{margin-right:0}}@media (max-width:768px){.wp .page-template-about-rebrand h2{line-height:1.3}.wp .page-template-about-rebrand .section.bg\_light\_grayish\_blue .container h2:after{margin:0 auto}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .container{width:100%}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .row{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center;-ms-flex-direction:column;flex-direction:column;width:80%;margin:auto}.wp .page-template-about-rebrand .items\_control{width:100%;margin:0}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control{width:100%;height:auto}.wp .page-template-about-rebrand .additional\_resources\_section .item a{margin-bottom:30px}.wp .page-template-about-rebrand .col-xxs-12.col-sm-6.office{width:100%}.wp .page-template-about-rebrand .col-xxs-12.col-sm-6.office:first-of-type{margin-right:0}.wp .page-template-about-rebrand .col-xxs-12.col-sm-6.office:last-of-type{margin-left:0}.wp .page-template-about-rebrand .row.bod-list .col-xxs-12.col-xs-6.col-sm-6.col-md-4.team-member{width:50%}.wp .page-template-about-rebrand .bg\_vary\_dark\_blue.additional\_resources\_section.section .items\_control:not(:last-of-type){margin-bottom:30px}.wp .page-template-about-rebrand .section.bg\_light\_grayish\_blue.investors\_section li{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center}.wp .page-template-about-rebrand .section.bg\_light\_grayish\_blue.investors\_section li:nth-child(odd){padding:20px 7px 20px 15px}.wp .page-template-about-rebrand .section.bg\_light\_grayish\_blue.investors\_section li:nth-child(2n){padding:20px 15px 20px 7px}.wp .page-template-about-rebrand .main\_banner .container p{max-width:80%;margin:auto}.style-module--modalVisible--2JxA1{overflow:hidden}.confluent-cloud-promo-disclaimer-module--wrapper--2AnZS{padding-top:80px;width:800px;max-width:90%;margin:0 auto 50px;text-align:left}.confluent-cloud-promo-disclaimer-module--wrapper--2AnZS h1{font-size:31px;font-weight:700;width:70%;text-align:center;margin:50px auto;line-height:125%;text-transform:uppercase}@media screen and (min-width:768px){.confluent-cloud-promo-disclaimer-module--wrapper--2AnZS h1{font-size:38px}}.confluent-cloud-promo-disclaimer-module--wrapper--2AnZS

p{font-weight:300;line-height:175%;font-size:18px}.covid-relief-module--offeringSection--34r6\_{text-align:center}.covid-relief-module--offeringSection--34r6\_h2{width:900px;max-width:95%;color:#173361;margin:auto auto 40px}.covid-relief-module--offeringSection--34r6\_.covid-relief-module--confluentOfferingSummary--31Iue{font-size:16px;margin-bottom:50px;color:#173361}.covid-relief-module--offeringSection--34r6\_p{width:800px;max-width:95%;margin:25px auto}@media screen and (min-width:768px){.covid-relief-module--offeringSection--34r6\_.covid-relief-module--confluentOfferingSections--1wWnO{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}}.covid-relief-module--offeringSection--34r6\_.covid-relief-module--confluentOfferingSections--1wWnO.covid-relief-module--offeringCopy--2yt09{text-align:left}@media screen and (min-width:768px){.covid-relief-module--offeringSection--34r6\_.covid-relief-module--confluentOfferingSections--1wWnO.covid-relief-module--offeringCopy--2yt09{max-width:48%;-ms-flex:1 1;flex:1 1}}.covid-relief-module--offeringButton--2pwMm{margin-top:50px}.covid-relief-module--cardWrapper--DUVnd{border-radius:8px;border:2px solid rgba(130,148,148,.25);padding:25px;width:800px;max-width:95%;margin:0 auto 10px}.covid-relief-module--cardWrapper--DUVnd\_h4{color:#173361;font-weight:700}@media screen and (max-width:991px){.style-module--hero--1FU4d.container{-ms-flex-direction:column-reverse;flex-direction:column-reverse;height:auto;min-height:400px}}@media screen and (max-width:991px){.style-module--hero--1FU4d.container.style-module--content--3wHkp{text-align:center}}@media screen and (min-width:992px){.style-module--hero--1FU4d.container.style-module--content--3wHkp{width:100%}}.style-module--hero--1FU4d.container.style-module--imageContainer--2XT8f\_img{border:15px solid #fff;border-radius:5px;max-width:380px}.style-module--card--3Yp\_S{margin:40px 0;background:#fff}.style-module--card--3Yp\_S\_h3{font-size:18px;font-weight:700;color:rgba(0,0,0,.85);margin:0 0 20px}.style-module--card--3Yp\_S.container{display:-ms-flexbox;display:flex;box-shadow:0 3px 31px 0 rgba(57,84,109,.14);padding:25px;width:100%}@media screen and (max-width:991px){.style-module--card--3Yp\_S.container{-ms-flex-direction:column;flex-direction:column}}.style-module--card--3Yp\_S.container.style-module--right--3X6O9{-ms-flex-direction:row-reverse;flex-direction:row-reverse}@media screen and (max-width:991px){.style-module--card--3Yp\_S.container.style-module--right--3X6O9{-ms-flex-direction:column-reverse;flex-direction:column-reverse}}.style-module--card--3Yp\_S.style-module--description--1v6zY{font-size:14px;font-weight:300;line-height:1.79;color:rgba(0,0,0,.85)}.style-module--card--3Yp\_S.style-module--textContainer--38irh{margin:20px;-ms-flex:2 1;flex:2 1;width:100%}.style-module--card--3Yp\_S.style-module--textContainer--38irh\_pre{overflow:scroll}.style-module--card--3Yp\_S.style-module--imageContainer--2i\_kX{-ms-flex:1 1;flex:1 1}.style-module--card--3Yp\_S.style-module--left--RafmO.style-module--imageContainer--2i\_kX{margin-left:80px}.style-module--card--3Yp\_S.style-module--right--3X6O9.style-module--imageContainer--2i\_kX{margin-right:80px}.style-module--card--3Yp\_S.style-module--left--RafmO.style-module--imageContainer--2i\_kX,.style-module--card--3Yp\_S.style-module--right--3X6O9.style-module--imageContainer--2i\_kX{max-width:465px;min-width:200px;text-align:center}@media screen and (max-width:991px){.style-module--card--3Yp\_S.style-module--left--RafmO.style-module--imageContainer--2i\_kX,.style-module--card--3Yp\_S.style-module--right--3X6O9.style-module--imageContainer--2i\_kX{margin:0 auto}}.style-module--cardContainer--TkI1J{display:block}.style-module--cardContainer--TkI1J\_h2{margin-bottom:40px}.style-module--cardContainer--TkI1J.style-module--description--1-eWt{font-size:14px;font-weight:300;line-height:1.79;color:rgba(0,0,0,.85);text-align:center;margin-bottom:100px}.style-module--group--2btFr.style-module--cards--3S\_hd{box-shadow:0 3px 31px 0 rgba(57,84,109,.14);padding:25px;background:#fff}.style-module--group--2btFr.style-module--cards--3S\_hd>div{margin:0}.style-module--group--2btFr.style-module--cards--3S\_hd>div>div{box-shadow:none;padding:25px 0;border-bottom:1px solid rgba(0,0,0,.1)}.style-module--group--2btFr.style-module--cards--3S\_hd>div:first-of-type>div{padding-top:0}.style-module--group--2btFr.style-module--cards--3S\_hd>div:last-of-type>div{padding-bottom:0;border-bottom:0}.style-module--faq--2lnMY\_h2{color:#173361;font-size:28px;font-weight:500;margin-bottom:90px;text-align:center}@media screen and (max-width:767px){.style-module--faq--2lnMY\_h2{font-size:21px}}.style-module--faq--2lnMY.style-module--list--2VXxQ{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-

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wrap:wrap;flex-wrap:wrap}.style-module--faq--2lnMY .style-module--list--2VXxQ>div{width:48%}@media
screen and (max-width:767px){.style-module--faq--2lnMY .style-module--list--2VXxQ>div{width:100%}}.style-
module--faq--2lnMY .style-module--list--2VXxQ .style-module--item--3p8Bv{margin-bottom:30px}.style-module-
-faq--2lnMY .style-module--list--2VXxQ .style-module--item--3p8Bv h3{margin:0 0 20px;font-size:18px;font-
weight:700;color:rgba(0,0,0,.85)}.style-module--faq--2lnMY .style-module--list--2VXxQ .style-module--item--
3p8Bv p{text-align:justify;font-size:14px;font-weight:300;line-height:1.79;color:rgba(0,0,0,.85);margin:0}.style-
module--textCta--3ZsDH .style-module--title--2a9FF{margin-bottom:90px}.style-module--textCta--3ZsDH .style-
module--content--1zhSd{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-
flex-wrap:wrap;flex-wrap:wrap}.style-module--textCta--3ZsDH .style-module--content--
1zhSd>div{width:48%}@media screen and (max-width:767px){.style-module--textCta--3ZsDH .style-module--
content--1zhSd>div{width:100%;margin:30px 0}.style-module--textCta--3ZsDH .style-module--content--
1zhSd>div:first-child{margin-top:0}}.style-module--textCta--3ZsDH .style-module--content--1zhSd>div
h3{color:rgba(0,0,0,.85);font-size:28px;font-weight:300;margin:0 0 30px;line-height:1.2}.style-module--textCta--
3ZsDH .style-module--content--1zhSd>div .list-links{margin:0;padding:0;list-style:none;list-style-
position:inside;line-height:1.86}@media screen and (max-width:767px){.style-module--textCta--3ZsDH .style-
module--content--1zhSd>div .list-links{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-
flex-pack:justify;justify-content:space-between;width:100%}}@media screen and (max-width:767px){.style-
module--textCta--3ZsDH .style-module--content--1zhSd>div .list-links li{width:48%}}@media screen and (max-
width:575px){.style-module--textCta--3ZsDH .style-module--content--1zhSd>div .list-links li{width:100%}}.style-
module--textCta--3ZsDH .style-module--content--1zhSd>div .list-links
li:before{content:"\2022";color:#257bd7;font-weight:700;display:inline-block;width:1em;margin-right:5px;vertical-
align:middle}.style-module--textCta--3ZsDH .style-module--content--1zhSd>div .list-links li a{color:#257bd7;font-
size:14px}.style-module--textCta--3ZsDH .style-module--content--1zhSd>div .faq h3{color:rgba(0,0,0,.85);font-
size:18px;font-weight:700;margin:30px 0 20px}.style-module--textCta--3ZsDH .style-module--content--1zhSd>div
.faq p{color:rgba(0,0,0,.85);font-size:14px;font-weight:300;line-height:1.79}.style-module--html--hXhKt .cta-
container{text-align:center}.style-module--html--hXhKt .cta-container a{transition:all .5s ease-in-out;transition:all
.5s cubic-bezier(.785,.135,.15,.86);border-radius:6px;display:inline-block;font-size:12px;letter-spacing:.9px;line-
height:1.5;padding:12px 30px;text-align:center;text-decoration:none;text-transform:uppercase;background-
color:#38cccd;border:1px solid #38cccd;color:#fff;font-weight:700;max-width:300px;width:90%}.style-module--
html--hXhKt .cta-container a:hover{cursor:pointer;text-decoration:none}.style-module--layout--
1T_e6{background:#f3f4f7}.style-module--layout--1T_e6 .style-module--content--
3E83u>div{background:none}.style-module--layout--1T_e6 .style-module--content--3E83u>div>div{padding:90px
0}.style-module--layout--1T_e6 .style-module--content--3E83u>div:nth-child(2)>div{padding-top:0}.style-module-
-layout--1T_e6 .style-module--content--3E83u>div:nth-child(odd){background:#fff}.style-module--layout--1T_e6
.style-module--content--3E83u ol+p,.style-module--layout--1T_e6 .style-module--content--3E83u p+p,.style-
module--layout--1T_e6 .style-module--content--3E83u ul+p{margin-top:15px}.style-module--label--
1wBOP{position:relative}.style-module--checkbox--
4RNxb{position:absolute;top:0;left:0;height:25px;width:25px;border:1.1px solid #e3e4e5;transition:all .2s ease-in-
out;background:#fff;border-radius:4px}.style-module--checkbox--
4RNxb:after{content:"";position:absolute;display:none;background-
color:#173361;width:100%;height:100%;border-radius:4px}.style-module--input--mBEsz{width:auto}.style-
module--input--mBEsz:checked+.style-module--checkbox--4RNxb:after{display:block}.style-module--popup--
1HA66{opacity:0;position:fixed;top:100%;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%);transition:all .25s ease-in-out;background:#fff;width:100%;z-index:9999;border-
radius:8px;padding:25px;max-width:475px;max-height:80%;overflow-y:scroll}.style-module--popup--1HA66.style-
module--active--3SoXb{opacity:1;top:50%;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-
50%)}.style-module--popup--1HA66 label{display:none}.style-module--popup--1HA66 form{font-
family:inherit!important;font-size:16px!important;width:100%!important;display:-ms-

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flexbox !important; display: flex !important; -ms-flex-direction: column; flex-direction: column } .style-module--popup--
1HA66 form input[type=email], .style-module--popup--1HA66 form input[type=tel], .style-module--popup--1HA66
form input[type=text] { background-color: #fff; border: 2px solid rgba(130, 148, 148, .25); border-
radius: 4px; width: 100% !important; margin-bottom: 5px; color: #000; font-size: 14px; font-weight: 300; line-
height: 1.2; padding: 10px; box-shadow: none } .style-module--popup--1HA66 form input[type=email]::-webkit-input-
placeholder, .style-module--popup--1HA66 form input[type=tel]::-webkit-input-placeholder, .style-module--popup--
1HA66 form input[type=text]::-webkit-input-placeholder { color: #829494 } .style-module--popup--1HA66 form
input[type=email]::-moz-placeholder, .style-module--popup--1HA66 form input[type=tel]::-moz-placeholder, .style-
module--popup--1HA66 form input[type=text]::-moz-placeholder { color: #829494 } .style-module--popup--1HA66
form input[type=email]::-ms-input-placeholder, .style-module--popup--1HA66 form input[type=tel]::-ms-input-
placeholder, .style-module--popup--1HA66 form input[type=text]::-ms-input-placeholder { color: #829494 } .style-
module--popup--1HA66 form input[type=email]::placeholder, .style-module--popup--1HA66 form
input[type=tel]::placeholder, .style-module--popup--1HA66 form
input[type=text]::placeholder { color: #829494 } .style-module--popup--1HA66 form
input[type=checkbox] { border: 1px solid #173361; border-radius: 2px; -webkit-appearance: none; -moz-
appearance: none; appearance: none; height: 14px; width: 14px; outline: 0 } .style-module--popup--1HA66 form
input[type=checkbox]:checked { background: #173361 } .style-module--popup--1HA66 form
input[type=checkbox]+label { color: #000; font-size: 12px; font-weight: 300; margin-bottom: 15px; margin-
left: 25px } .style-module--popup--1HA66 form input[type=checkbox]+label:last-child { margin-bottom: 0 } .style-
module--popup--1HA66 form .mktoLabel { color: #000; font-size: 12px; font-
weight: 300 !important; margin: 0; padding: 0 } .style-module--popup--1HA66 form .mktoLabel a { text-
decoration: underline } .style-module--popup--1HA66 form
select.mktoField { outline: 0; width: 100% !important; padding: 7px 10px !important; background: #fff; border: 2px solid
rgba(130, 148, 148, .25) !important; color: #829494; font-size: 14px !important; font-weight: 300; height: 40px; -webkit-
appearance: none; -moz-appearance: none; appearance: none; background-
image: url(https://cdn.confluent.io/images/arrow-down-blue.png); background-position: calc(100% - 10px)
50%; background-repeat: no-repeat; box-shadow: none } .style-module--popup--1HA66 form .mktoFormCol { min-
height: unset !important; width: 100% } .style-module--popup--1HA66 form .mktoAsterix, .style-module--popup--
1HA66 form .mktoClear, .style-module--popup--1HA66 form .mktoError, .style-module--popup--1HA66 form
.mktoGutter, .style-module--popup--1HA66 form .mktoOffset { display: none !important } .style-module--popup--
1HA66 form .mktoFieldWrap { width: 100% } .style-module--popup--1HA66 form
.mktoFieldWrap>div { padding: 0; width: 100% !important } .style-module--popup--1HA66 form .mktoFieldWrap
.mktoCheckboxList { padding: 20px 0 } .style-module--popup--1HA66 form .mktoFieldWrap
.mktoHtmlText { color: #829494; font-size: 10px; font-weight: 300; line-height: 2 } .style-module--popup--1HA66 form
.mktoFieldWrap .mktoHtmlText br { display: none } .style-module--popup--1HA66 form .mktoFieldWrap
.mktoInvalid { border: 2px solid #d8365d !important } .style-module--popup--1HA66 form .mktoFieldWrap
.mktoInvalid.mktoCheckboxList { border: 1px solid #d8365d } .style-module--popup--1HA66 form
.mktoButtonRow { margin: 20px 0; width: 100%; text-align: center } .style-module--popup--1HA66 form
.mktoButtonRow .mktoButtonWrap { margin: 0 !important } .style-module--popup--1HA66 form .mktoButtonRow
.mktoButtonWrap .mktoButton, .style-module--popup--1HA66 form .mktoButtonRow
.mktoButtonWrap.mktoSimple .mktoButton { transition: all .5s ease-in-out; transition: all .5s cubic-
bezier(.785, .135, .15, .86); border-radius: 6px; display: inline-block; font-size: 12px; font-weight: 700; letter-
spacing: .9px; line-height: 1.5; padding: 12px 30px; text-align: center; text-decoration: none; text-
transform: uppercase; background-color: #173361; border: 1px solid #173361; color: #fff; background-image: none; box-
shadow: none } .style-module--popup--1HA66 form .mktoButtonRow .mktoButtonWrap .mktoButton: hover, .style-
module--popup--1HA66 form .mktoButtonRow .mktoButtonWrap.mktoSimple
.mktoButton: hover { cursor: pointer; text-decoration: none; background: #0074a2; border-color: #0074a2 } .style-module--
popup--1HA66 .style-module--title--3jrsZ, .style-module--popup--1HA66 h4 { color: #173361; font-size: 18px; font-

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weight:700;text-align:center;margin:0 0 25px}.style-module--popup--1HA66 .style-module--title--3jrsZ br,.style-module--popup--1HA66 h4 br{display:none}.style-module--popup--1HA66 .style-module--thankyou--3gN4F{color:#173361;font-size:28px;font-weight:700;text-align:center}#mktoForm\_4261 .mktoFormRow:first-of-type{-ms-flex-order:1;order:1}.style-module--formWrapper--3Qo2L{width:800px;margin:auto;max-width:95%}.style-module--formWrapper--3Qo2L .style-module--wrapper--1-KWg{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}.style-module--formWrapper--3Qo2L .style-module--wrapper--1-KWg .style-module--checkBoxSpan--Wfipq{width:22px;height:22px}.style-module--formWrapper--3Qo2L .style-module--inputFieldWrapper--3MFi-.style-module--formWrapper--3Qo2L button div{text-align:center}.style-module--formWrapper--3Qo2L .style-module--inputFieldWrapper--3MFi-{padding:10px;background-color:rgba(130,148,148,.25);border-radius:4px}.style-module--formWrapper--3Qo2L .style-module--label--3wd4p{padding-left:10px}.style-module--formWrapper--3Qo2L .style-module--thankYou--3K4Q8{text-align:center}.style-module--confirmation--3GwEz{margin:100px 0 150px}.style-module--confirmation--3GwEz h4{margin-bottom:10px}.style-module--confirmation--3GwEz img{width:40px;margin-bottom:10px}.style-module--confirmation--3GwEz p{color:#0074a2;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.style-module--agreeTellMore--1XsxA{position:relative}.style-module--agreeTellMore--1XsxA .style-module--errorMessage--zEzEL{position:absolute;top:0;background:#fbebef;width:100%;z-index:1;border:1px solid #d8365d;padding:20px;text-align:center;border-radius:4px;font-size:13px;color:#d8365d;opacity:0;visibility:hidden;transition:all .3s ease-in-out}.style-module--agreeTellMore--1XsxA .style-module--errorMessage--zEzEL:first-of-type{font-weight:700;font-size:15px}.style-module--agreeTellMore--1XsxA .style-module--errorMessage--zEzEL.style-module--show--1arAG{opacity:1;visibility:visible}.style-module--us--6zV9S .style-module--tos--31nfQ{display:none}.style-module--tos--1ShSb{font-size:11px;font-weight:300;color:#829494;margin-top:25px;line-height:21px}.style-module--tosUS--30ljb,.style-module--us--2VtUI .style-module--tos--1ShSb{display:none}.style-module--us--2VtUI .style-module--tosUS--30ljb{display:block}.style-module--confirmation--KDDmz{margin:100px 0 150px}.style-module--confirmation--KDDmz h4{margin-bottom:10px}.style-module--confirmation--KDDmz img{width:40px;margin-bottom:10px}.style-module--confirmation--KDDmz>p{color:#0074a2;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;margin-top:25px}.style-module--confirmation--KDDmz>p a{text-decoration:underline}.style-module--cardContainer--3lwMG{margin-top:50px}.style-module--cardContainer--3lwMG .style-module--card--LeUB9{background:#e6f5fb;padding:25px 10px}.style-module--cardContainer--3lwMG .style-module--card--LeUB9 h3{font-size:14px;font-weight:700}.style-module--us--3qmiT .style-module--tos--GbbpQ{display:none}.style-module--tos--2V0no{font-size:11px;font-weight:300;color:#829494;margin-top:25px;line-height:21px}.style-module--tosUS--PyizL,.style-module--us--2bsmN .style-module--tos--2V0no{display:none}.style-module--us--2bsmN .style-module--tosUS--PyizL{display:block}.style-module--tos--3mMRP{font-size:11px;font-weight:300;color:#829494;margin-top:25px;line-height:21px}.compare-module--heroSection--jsMPY{padding-bottom:220px}.compare-module--heroSection--jsMPY .compare-module--content--3J24J{width:auto!important}.compare-module--heroSection--jsMPY .compare-module--content--3J24J p{color:#173361;font-size:24px;margin-top:15px!important}.compare-module--heroSection--jsMPY .compare-module--content--3J24J p a{color:#38cccd}.compare-module--heroSection--jsMPY .compare-module--content--3J24J p+p{font-size:14px;margin-top:30px!important}.compare-module--contentSection--Idew\_{padding-top:0;padding-bottom:0}.compare-module--contentSection--Idew\_>div{position:relative;top:-290px}@media screen and (max-width:767px){.compare-module--contentSection--Idew\_>div{top:-240px}}.compare-module--customList--330aP{margin:0;padding:0;list-style:none}.compare-module--customList--330aP li{display:inline-block}.compare-module--customList--330aP li+li{margin-left:15px}.compare-module--card--1U3nw{display:-ms-flexbox;display:flex;box-shadow:0 30px 60px -30px rgba(0,0,0,.06),0 50px 100px -20px rgba(69,107,122,.24);border-radius:4px;max-width:900px;margin:0 auto}@media screen and (max-width:767px){.compare-module--card--1U3nw{-ms-flex-direction:column;flex-direction:column}}.compare-module--card--1U3nw+.compare-module--card--1U3nw{margin-top:60px}.compare-module--card--

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1U3nw.compare-module--hide--rBHxL{display:none}.compare-module--leftColumn--
1lpXq{background:#fff;width:60%;padding:50px 75px}@media screen and (max-width:767px){.compare-module--
leftColumn--1lpXq{padding:35px;width:100%}}.compare-module--leftColumn--1lpXq h2{color:#173361;font-
size:40px;font-weight:500;margin:0 0 10px}@media screen and (max-width:767px){.compare-module--
leftColumn--1lpXq h2{font-size:24px}}.compare-module--leftColumn--1lpXq a{color:#38cccd}.compare-module--
rightColumn--1YbBG{background:#f5f5f5;-ms-flex:1 1;flex:1 1;padding:50px}@media screen and (max-
width:767px){.compare-module--rightColumn--1YbBG{padding:35px}}.compare-module--rightColumn--1YbBG
h3{color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;font-weight:700}.compare-
module--rightColumn--1YbBG .compare-module--cloudProvider--O3phl{border-bottom:2px solid
rgba(130,148,148,.25);margin-bottom:85px;padding-bottom:35px}.compare-module--rightColumn--1YbBG
.compare-module--cloudProvider--O3phl h3{margin:0}.compare-module--rightColumn--1YbBG .compare-module-
-cloudProvider--O3phl .compare-module--customList--330aP{display:-ms-flexbox;display:flex;margin:25px 0
10px}.compare-module--rightColumn--1YbBG .compare-module--feature--1SBsN{padding:0}.compare-module--
rightColumn--1YbBG .compare-module--feature--1SBsN h3{font-size:15px;line-height:21px}.compare-module--
rightColumn--1YbBG .compare-module--feature--1SBsN+.compare-module--feature--1SBsN{margin-
top:40px}.compare-module--rightColumn--1YbBG .compare-module--featureBlurb--36n_N{margin-
top:5px}.compare-module--rightColumn--1YbBG .compare-module--featureBlurb--36n_N p{color:#0074a2;font-
size:16px;font-weight:300;line-height:25px;letter-spacing:0;font-size:14px;line-height:21px;margin:0}.compare-
module--form--3C4lg{margin-top:25px}.compare-module--form--3C4lg h4{color:#173361;font-size:16px;font-
weight:300;line-height:25px;letter-spacing:0;font-weight:700;margin:0 0 25px}.compare-module--form--3C4lg
.compare-module--title--
16y3G:before{content:"";background:#38cccd;width:30px;display:block;height:4px;border-radius:20px;margin-
bottom:10px}.compare-module--form--3C4lg button{width:100%}.compare-module--form--3C4lg .compare-
module--formConfluentCloud--3p_Qj>*,.compare-module--form--3C4lg .compare-module--
formConfluentPlatform--1GPOM>*,.compare-module--form--3C4lg .compare-module--
formConfluentPlatformCommunity--3voiH>*{margin-bottom:10px}.compare-module--form--3C4lg .compare-
module--formConfluentCloud--3p_Qj>:last-child,.compare-module--form--3C4lg .compare-module--
formConfluentPlatform--1GPOM>:last-child,.compare-module--form--3C4lg .compare-module--
formConfluentPlatformCommunity--3voiH>:last-child{margin-bottom:0}.compare-module--footer--3Qjxv{margin-
top:10px}.compare-module--footer--3Qjxv .compare-module--existingAccount--2h1CU{text-align:center;font-
size:13px;font-weight:500;color:#504f6c}.compare-module--footer--3Qjxv .compare-module--
additionalInformation--1uuzb{margin:35px 0 0;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-
wrap:wrap}.compare-module--footer--3Qjxv .compare-module--additionalInformation--1uuzb
p{color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;font-weight:700;margin-
right:15px;width:200px}.compare-module--footer--3Qjxv .compare-module--additionalInformation--1uuzb
ul{width:150px}.compare-module--blurb--1ZA6n{color:#504f6c;font-size:16px;font-weight:300;line-
height:25px;letter-spacing:0}.compare-module--cpCommunity--2GCVu .compare-module--leftColumn--
1lpXq{width:100%}.style-module--switch--13P_i{position:relative;display:inline-
block;width:60px;height:34px;margin-right:15px!important;margin-top:30px!important;margin-
bottom:30px!important;min-width:60px}.style-module--switchInput--2NPF7{opacity:0;width:0;height:0}.style-
module--slider--3eAa2{position:absolute;cursor:pointer;top:0;left:0;right:0;bottom:0;background-
color:rgba(142,144,147,.15);transition:.4s}.style-module--slider--
3eAa2:before{position:absolute;content:"";height:26px;width:26px;left:4px;bottom:4px;background-color:#fff;box-
shadow:1px 1px 3px 0 rgba(0,0,0,.25);transition:.4s}input:checked+.style-module--slider--
3eAa2:before{background-color:#4698cb;-ms-transform:translateX(26px);transform:translateX(26px)}.style-
module--round--Gt-XR{border-radius:34px}.style-module--slider--3eAa2.style-module--round--Gt-
XR:before{border-radius:50%}.style-module--toggleWrapper--u8bXz{display:-ms-flexbox;display:flex;-ms-flex-
align:center;align-items:center}.style-module--error--AAShr{border:1px solid #8c0005}.wp .email-preferences-

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page .container{padding-left:21px;padding-right:25px}.wp .email-preferences-page .section__preference-center-
header .title{font-family:MarkOT;font-size:36px;font-weight:700;font-style:normal;font-stretch:normal;line-
height:1.45;letter-spacing:normal;text-align:left;color:#003b49;padding-top:8px;padding-bottom:36px}.wp .email-
preferences-page .section__preference-center-header .sub_title{font-family:MarkOT;font-size:16px!important;font-
weight:400;font-style:normal;font-stretch:normal;line-height:2!important;letter-spacing:2px;text-
align:left;color:#173361;padding-top:89px}.wp .email-preferences-page .section_preference_center form.mktoForm
select.mktoField{background-color:#fff!important}.wp .email-preferences-page .section_preference_center
.mktoForm .mktoFormRow{display:inline-block;width:40.6%;clear:inherit;background:#fff;margin-
bottom:50px!important}.wp .email-preferences-page .mktoForm .mktoLabel{padding-top:0!important}.wp .email-
preferences-page form.mktoForm .mktoFormRow{background-color:#fff}.wp .email-preferences-page
form.mktoForm .mktoRequiredField label.mktoLabel,.wp .email-preferences-page form.mktoForm
label.mktoLabel{font-family:MarkOT;font-size:12px;font-weight:400;font-style:normal;font-stretch:normal;line-
height:2.67;letter-spacing:2px;text-align:left;color:#4a4a4a;text-transform:uppercase}.wp .email-preferences-page
form.mktoForm input.mktoField,.wp .email-preferences-page form.mktoForm select.mktoField,.wp .email-
preferences-page form.mktoForm textarea.mktoField{height:48px;font-family:MarkOT;font-size:16px;font-
weight:300;font-style:normal;font-stretch:normal;line-height:2!important;letter-spacing:.2px;text-
align:left;color:#4a4a4a;padding:8px 12px!important;border:1px solid #a7a7a8!important;background-
color:#fff;border-radius:2px}.wp .email-preferences-page form.mktoForm .mktoRequiredField
label.mktoLabel[for=Email]:after{left:125px}.wp .email-preferences-page form.mktoForm .mktoRequiredField
label.mktoLabel[for=Country]:after{left:185px}.wp .email-preferences-page form.mktoForm .mktoRequiredField
label.mktoLabel:after{content:"*";font-size:12px;color:#173361;position:absolute;left:95px}.wp .email-preferences-
page hr{height:5px;background-color:#000;opacity:.06;margin-top:75px;margin-right:28px}.wp .email-preferences-
page .subscription_sub_title,.wp .email-preferences-page .subscription_title{color:#4a4a4a;font-
family:MarkOT;font-style:normal;font-stretch:normal;text-align:left}.wp .email-preferences-page
.subscription_title{font-size:24px;font-weight:700;line-height:1.58;letter-spacing:.7px;padding-top:0}.wp .email-
preferences-page .subscription_sub_title{height:92px;font-size:16px;font-weight:300;line-height:2;letter-
spacing:.2px}.wp .email-preferences-page .marketo_video_title{font-family:MarkOT;font-size:36px;font-
weight:700;font-style:normal;font-stretch:normal;line-height:1.45;letter-spacing:normal;text-
align:left;color:#003b49;padding-bottom:90px;text-align:center;padding-top:15px}.wp .email-preferences-page
.mktoForm div .marketo_video_container{padding-top:85px}.wp .email-preferences-page
.video_container{position:relative;background-repeat:no-repeat;background-size:contain;background-
position:50%;margin:auto;border-radius:15px}.wp .email-preferences-page .gdpr-video{display:block;margin-
bottom:90px!important;margin-left:96px!important;margin-
right:auto!important;border:0;height:auto;outline:0;width:83.5%}.wp .email-preferences-page .gdpr-video
a.play_btn{background-image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/video-button-
585.png)!important;background-
size:contain!important;position:absolute;content:"play";display:block;width:68px;height:82px;text-align:left;text-
indent:-9999px;background-repeat:no-repeat;top:70%;left:46%;margin-top:-41px;margin-left:-34px}.wp .email-
preferences-page #subscriptionBlogs,.wp .email-preferences-page #subscriptionEducational,.wp .email-preferences-
page #subscriptionEvents,.wp .email-preferences-page #subscriptionNewsletter,.wp .email-preferences-page
#subscriptionProductUpdates,.wp .email-preferences-page #Unsubscribed,.wp .email-preferences-page
form.mktoForm input#subscriptionWebinars{height:0}.wp .email-preferences-page .section_preference_center
form.mktoForm .mktoButtonWrap.mktoRound .mktoButton{width:168px;height:48px;border-
radius:100px;background-color:#4698cb;transition:all .3s ease;float:left;margin-bottom:120px}.wp .email-
preferences-page .UnsubscribedReason--hide{display:none!important}.wp .email-preferences-page form.mktoForm
.mktoFormRow .mktoFormCol:first-child:nth-last-child(3){width:15%;float:left}.wp .email-preferences-page
form.mktoForm .mktoFormRow .mktoFormCol:first-child:nth-last-child(3)+.mktoFormCol{width:58%}.wp .email-
preferences-page form.mktoForm .mktoFormRow .mktoFormCol:first-child:nth-last-child(3)+.mktoFormCol

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strong{display:block;margin-top:6px;position:relative}.wp .email-preferences-page [for=Unsubscribed]:after,.wp
.email-preferences-page [for=UnsubscribedReason]:after{content:"";display:none!important}.wp .email-
preferences-page .switch{position:relative;display:inline-block;width:50px;height:28px;margin-
left:0!important}.wp .email-preferences-page .mktoForm input[type=checkbox]+label:before,.wp .email-
preferences-page .switch input{display:none}.wp .email-preferences-page
.slider{position:absolute;cursor:pointer;top:0;left:0;right:0;bottom:0;background-
color:rgba(142,144,147,.15);transition:.4s}.wp .email-preferences-page
.slider:before{position:absolute;content:"";height:28px;width:28px;background-color:#fff;transition:.4s;box-
shadow:1px 1px 3px 0 rgba(0,0,0,.25)}.wp .email-preferences-page input:focus+.slider{box-shadow:0 0 1px
#2196f3}.wp .email-preferences-page input:checked+.slider:before{background-color:#4698cb;-ms-
transform:translateX(26px);transform:translateX(26px)}.wp .email-preferences-page .slider.round{border-
radius:34px}.wp .email-preferences-page .slider.round:before{border-radius:50%}.wp .email-preferences-page
.update_message{float:left;margin-top:100px!important;margin-bottom:120px!important;margin-
left:25px!important;font-family:MarkOT;font-size:12px;font-weight:300;font-style:normal;font-stretch:normal;line-
height:1.67;letter-spacing:.2px;text-align:left;color:#8e9093}@media only screen and (max-width:760px) and (min-
width:479px){.wp .email-preferences-page form.mktoForm .mktoHtmlText{margin-left:25px}}@media only screen
and (max-width:400px){.wp .email-preferences-page form.mktoForm .mktoFieldWrap{width:350px!important}.wp
.email-preferences-page hr{height:1px!important;padding:1px!important}.wp .email-preferences-page .gdpr-video
a.play_btn{top:88%;width:30px}.wp .email-preferences-page .mktoForm div .marketo_video_container{padding-
top:20px}}@media only screen and (max-width:697px){.wp .email-preferences-page .section_preference_center
.mktoForm .mktoFormRow{width:100%}}.wp .email-preferences-page .section_preference_center
#mktoForm_2386 .mktoFieldDescriptor{float:none;width:100%}.wp .email-preferences-page
.section_preference_center #mktoForm_2386 .mktoFormRow{display:block;float:none;width:100%}.wp .email-
preferences-page .section_preference_center #mktoForm_2386
input{height:auto!important;opacity:1!important}.wp .email-preferences-page .section_preference_center
#mktoForm_2386 .mktoFieldWrap{width:100%!important}.wp .email-preferences-page .section_preference_center
#mktoForm_2386 div.mktoLogicalField{width:auto!important}.wp .email-preferences-page
.section_preference_center #mktoForm_2386 .mktoFieldWrap label,.wp .email-preferences-page
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(5)
.mktoHtmlText{width:100%!important}.wp .email-preferences-page .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(7){margin-top:86px;padding-top:86px;border-top:5px solid #dce0e4}@media only screen
and (min-width:768px){.wp .email-preferences-page .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(7){display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-
between}.wp .email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(7)
.mktoFieldDescriptor{width:50%}.wp .email-preferences-page .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(7) .mktoFormCol:nth-child(2){display:none}}.wp .email-preferences-page
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(7) .mktoFieldDescriptor
.mktoFieldWrap{display:-ms-flexbox;display:flex;-ms-flex-direction:row-reverse;flex-direction:row-reverse}.wp
.email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(7)
.mktoFieldDescriptor .mktoFieldWrap label{display:block;margin-bottom:40px;position:relative;top:-2px}.wp
.email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-
n+13){display:-ms-flexbox;display:flex;-ms-flex-pack:start;justify-content:flex-start}@media only screen and (min-
width:768px){.wp .email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-
child(n+8):nth-child(-n+13){float:left;width:50%}}.wp .email-preferences-page .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol b{padding:0!important}.wp
.email-preferences-page .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-
n+13) .mktoFormCol b span{color:#4a4a4a;font-size:24px!important;font-weight:700;line-height:1.58;letter-
spacing:.7px;padding-top:0}.wp .email-preferences-page .section_preference_center #mktoForm_2386

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.mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol b+span{ color:#4a4a4a;display:block;font-size:16px!important;font-weight:300;line-height:30px;margin-bottom:40px }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFieldDescriptor{ position:relative;padding-right:24px;width:auto }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol{ width:auto!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(14){ clear:both }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15){ display:-ms-flexbox;display:flex;margin-top:40px }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) h1{ color:grey!important;font-size:16px!important;font-weight:400!important;letter-spacing:2px!important;text-transform:uppercase }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldDescriptor{ position:relative;width:auto!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap label{ width:auto!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap>label,.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap label .slider.round{ display:none!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap label input{ display:block!important;margin:0!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFormCol{ width:auto!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap .mktoHtmlText{ width:100%!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap h1{ padding:0!important;width:100%!important }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoFormRow:nth-child(16) label:after{ left:175px }.wp .email-preferences-page .section\_preference\_center #mktoForm\_2386 .mktoButtonWrap.mktoRound .mktoButton{ margin:60px 0 100px;width:auto!important }.wp .email-preferences-page .input-field-wrapper{ display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between }.wp .email-preferences-page .line-dot-right{ margin-top:75px;max-width:100%;margin-bottom:20px }.wp .email-preferences-page .line-dot-right:before{ content:"";display:block;width:calc(100% - 10px);height:1px;border:2.5px solid #dce0e4;position:absolute;left:0;border-radius:5px }.wp .email-preferences-page .preferences-toggle-wrapper{ display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between;margin-top:100px }.wp .email-preferences-page .preferences-toggle{ width:45%;-ms-flex-align:start;align-items:flex-start;margin-bottom:40px }.wp .email-preferences-page .subscription\_sub\_title{ height:auto }.wp .email-preferences-page .mktoForm button.mktoButton{ width:168px;height:48px;border-radius:100px;background-color:#4698cb;transition:all .3s ease;float:left;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center;color:#fff;border:none;margin-bottom:40px }.wp .email-preferences-page .small{ font-size:18px }.wp .email-preferences-page .reason-wrapper{ width:456px;max-width:90%;margin-bottom:50px }.wp .email-preferences-page .mktoForm .mktoAsterix{ display:block;color:#bf0000;font-size:13px }.wp .email-preferences-page .mktoForm label{ font-family:MarkOT;font-size:12px;font-weight:400;font-style:normal;font-stretch:normal;line-height:2.67;letter-spacing:2px;text-align:left;color:#4a4a4a;text-transform:uppercase }.wp .email-preferences-page .preferences-thank-you{ font-size:18px;letter-spacing:.2px;color:#8e9093 } @media (max-width:768px){ .wp .email-preferences-page .preferences-toggle{ width:100% } }.wp .email-preferences-page .unsubscribe-reason-wrapper{ margin-bottom:20px }.wp .email-preferences-page .unsubscribe-reason-wrapper .mktoField{ float:none;font-size:inherit;line-height:inherit }.wp .email-preferences-page .unsubscribe-reason-wrapper .mktoField>div{ padding:6px 15px;height:48px;max-width:none;border-width:1px;border-color:#a7a7a8;border-radius:0;font-size:16px;color:#4a4a4a }.wp .email-preferences-page .unsubscribe-reason-wrapper .mktoField>div>div:last-child{ max-width:none;top:47px;border-

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width:1px;border-color:#a7a7a8;border-radius:0;font-size:16px;color:#4a4a4a;width:calc(100% + 2px);left:-
1px}.wp .email-preferences-page .unsubscribe-reason-wrapper .mktoField>div .icon{margin-right:15px}.wp .page-
template-unsubscribe{margin-bottom:50px}.wp .page-template-unsubscribe .section__preference-center-header
.title{color:#343941}.wp .page-template-unsubscribe .mktoButton{width:168px;height:48px;border-
radius:100px;background-color:#4698cb;transition:all .3s ease;margin-bottom:120px;color:#fff;display:-ms-
flexbox;display:flex;-ms-flex-pack:center;justify-content:center;border:none}.wp .page-template-unsubscribe
.container{padding-left:21px;padding-right:25px}.wp .page-template-unsubscribe .section__preference-center-
header .title{font-family:MarkOT;font-size:36px;font-weight:700;font-style:normal;font-stretch:normal;line-
height:1.45;letter-spacing:normal;text-align:left;color:#003b49;padding-top:8px;padding-bottom:36px}.wp .page-
template-unsubscribe .section__preference-center-header .sub_title{font-family:MarkOT;font-
size:16px!important;font-weight:400;font-style:normal;font-stretch:normal;line-height:2!important;letter-
spacing:2px;text-align:left;color:#173361;padding-top:89px}.wp .page-template-unsubscribe
.section__preference_center form.mktoForm select.mktoField{background-color:#fff!important}.wp .page-template-
unsubscribe .section__preference_center .mktoForm .mktoFormRow{display:inline-
block;width:40.6%;clear:inherit;background:#fff}.wp .page-template-unsubscribe .mktoForm .mktoLabel{padding-
top:0!important}.wp .page-template-unsubscribe form.mktoForm .mktoFormRow{background-color:#fff}.wp
.page-template-unsubscribe form.mktoForm .mktoRequiredField label.mktoLabel,.wp .page-template-unsubscribe
form.mktoForm label.mktoLabel{font-family:MarkOT;font-size:12px;font-weight:400;font-style:normal;font-
stretch:normal;line-height:2.67;letter-spacing:2px;text-align:left;color:#4a4a4a;text-transform:uppercase}.wp .page-
template-unsubscribe form.mktoForm input.mktoField,.wp .page-template-unsubscribe form.mktoForm
select.mktoField,.wp .page-template-unsubscribe form.mktoForm textarea.mktoField{height:48px;font-
family:MarkOT;font-size:16px;font-weight:300;font-style:normal;font-stretch:normal;line-height:2!important;letter-
spacing:.2px;text-align:left;color:#4a4a4a;padding:8px 12px!important;border:1px solid
#a7a7a8!important;background-color:#fff;border-radius:2px}.wp .page-template-unsubscribe form.mktoForm
.mktoRequiredField label.mktoLabel[for=Email]:after{left:125px}.wp .page-template-unsubscribe form.mktoForm
.mktoRequiredField label.mktoLabel[for=Country]:after{left:185px}.wp .page-template-unsubscribe
form.mktoForm .mktoRequiredField label.mktoLabel:after{content:"*";font-
size:12px;color:#173361;position:absolute;left:95px}.wp .page-template-unsubscribe hr{height:5px;background-
color:#000;opacity:.06;margin-top:75px;margin-right:28px}.wp .page-template-unsubscribe
.subscription_sub_title,.wp .page-template-unsubscribe .subscription_title{color:#4a4a4a;font-family:MarkOT;font-
style:normal;font-stretch:normal;text-align:left}.wp .page-template-unsubscribe .subscription_title{font-
size:24px;font-weight:700;line-height:1.58;letter-spacing:.7px;padding-top:0;margin-top:40px}.wp .page-template-
unsubscribe .subscription_title .asterix{color:#bf0000;font-size:13px;vertical-align:top}.wp .page-template-
unsubscribe .subscription_sub_title{height:92px;font-size:16px;font-weight:300;line-height:2;letter-
spacing:.2px}.wp .page-template-unsubscribe .marketo_video_title{font-family:MarkOT;font-size:36px;font-
weight:700;font-style:normal;font-stretch:normal;line-height:1.45;letter-spacing:normal;text-
align:left;color:#003b49;padding-bottom:90px;text-align:center;padding-top:15px}.wp .page-template-unsubscribe
.mktoForm div .marketo_video_container{padding-top:85px}.wp .page-template-unsubscribe
.video_container{position:relative;background-repeat:no-repeat;background-size:contain;background-
position:50%;margin:auto;border-radius:15px}.wp .page-template-unsubscribe .gdpr-video{display:block;margin-
bottom:90px!important;margin-left:96px!important;margin-
right:auto!important;border:0;height:auto;outline:0;width:83.5%}.wp .page-template-unsubscribe .gdpr-video
a.play_btn{background-image:url(//www.confluent.io/wp-content/themes/confluent/assets/images/video-button-
585.png)!important;background-
size:contain!important;position:absolute;content:"play";display:block;width:68px;height:82px;text-align:left;text-
indent:-9999px;background-repeat:no-repeat;top:70%;left:46%;margin-top:-41px;margin-left:-34px}.wp .page-
template-unsubscribe #subscriptionBlogs,.wp .page-template-unsubscribe #subscriptionEducational,.wp .page-
template-unsubscribe #subscriptionEvents,.wp .page-template-unsubscribe #subscriptionNewsletter,.wp .page-

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template-unsubscribe #subscriptionProductUpdates,.wp .page-template-unsubscribe #Unsubscribed,.wp .page-
template-unsubscribe form.mktoForm input#subscriptionWebinars{height:0}.wp .page-template-unsubscribe
.section_preference_center form.mktoForm .mktoButtonWrap.mktoRound
.mktoButton{width:168px;height:48px;border-radius:100px;background-color:#4698cb;transition:all .3s
ease;float:left;margin-bottom:120px}.wp .page-template-unsubscribe .UnsubscribedReason--
hide{display:none!important}.wp .page-template-unsubscribe form.mktoForm .mktoFormRow .mktoFormCol:first-
child:nth-last-child(3){width:15%;float:left}.wp .page-template-unsubscribe form.mktoForm .mktoFormRow
.mktoFormCol:first-child:nth-last-child(3)+.mktoFormCol{width:58%}.wp .page-template-unsubscribe
form.mktoForm .mktoFormRow .mktoFormCol:first-child:nth-last-child(3)+.mktoFormCol
strong{display:block;margin-top:6px;position:relative}.wp .page-template-unsubscribe
[for=Unsubscribed]:after,.wp .page-template-unsubscribe
[for=UnsubscribedReason]:after{content:"";display:none!important}.wp .page-template-unsubscribe
.switch{position:relative;display:inline-block;width:50px;height:28px;margin-left:0!important}.wp .page-template-
unsubscribe .mktoForm input[type=checkbox]+label:before,.wp .page-template-unsubscribe .switch
input{display:none}.wp .page-template-unsubscribe
.slider{position:absolute;cursor:pointer;top:0;left:0;right:0;bottom:0;background-
color:rgba(142,144,147,.15);transition:.4s}.wp .page-template-unsubscribe
.slider:before{position:absolute;content:"";height:28px;width:28px;background-color:#fff;transition:.4s;box-
shadow:1px 1px 3px 0 rgba(0,0,0,.25)}.wp .page-template-unsubscribe input:focus+.slider{box-shadow:0 0 1px
#2196f3}.wp .page-template-unsubscribe input:checked+.slider:before{background-color:#4698cb;-ms-
transform:translateX(26px);transform:translateX(26px)}.wp .page-template-unsubscribe .slider.round{border-
radius:34px}.wp .page-template-unsubscribe .slider.round:before{border-radius:50%}.wp .page-template-
unsubscribe .update_message{float:left;margin-top:100px!important;margin-bottom:120px!important;margin-
left:25px!important;font-family:MarkOT;font-size:12px;font-weight:300;font-style:normal;font-stretch:normal;line-
height:1.67;letter-spacing:.2px;text-align:left;color:#8e9093}@media only screen and (max-width:760px) and (min-
width:479px){.wp .page-template-unsubscribe form.mktoForm .mktoHtmlText{margin-left:25px}}@media only
screen and (max-width:400px){.wp .page-template-unsubscribe form.mktoForm
.mktoFieldWrap{width:350px!important}.wp .page-template-unsubscribe
hr{height:1px!important;padding:1px!important}.wp .page-template-unsubscribe .gdpr-video
a.play_btn{top:88%;width:30px}.wp .page-template-unsubscribe .mktoForm div
.marketo_video_container{padding-top:20px}}@media only screen and (max-width:697px){.wp .page-template-
unsubscribe .section_preference_center .mktoForm .mktoFormRow{width:100%}}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFieldDescriptor{float:none;width:100%}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow{display:block;float:none;width:100%}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 input{height:auto!important;opacity:1!important}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFieldWrap{width:100%!important}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 div.mktoLogicalField{width:auto!important}.wp .page-
template-unsubscribe .section_preference_center #mktoForm_2386 .mktoFieldWrap label,.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(5)
.mktoHtmlText{width:100%!important}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(7){margin-top:86px;padding-top:86px;border-top:5px solid
#dce0e4}@media only screen and (min-width:768px){.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(7){display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-
content:space-between}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(7) .mktoFieldDescriptor{width:50%}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(7) .mktoFormCol:nth-
child(2){display:none}}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386

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.mktoFormRow:nth-child(7) .mktoFieldDescriptor .mktoFieldWrap{display:-ms-flexbox;display:flex;-ms-flex-
direction:row-reverse;flex-direction:row-reverse}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(7) .mktoFieldDescriptor .mktoFieldWrap label{display:block;margin-
bottom:40px;position:relative;top:-2px}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13){display:-ms-flexbox;display:flex;-ms-flex-
pack:start;justify-content:flex-start}@media only screen and (min-width:768px){.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-
n+13){float:left;width:50%}}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol b{padding:0!important}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13)
.mktoFormCol b span{color:#4a4a4a;font-size:24px!important;font-weight:700;line-height:1.58;letter-
spacing:.7px;padding-top:0}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(n+8):nth-child(-n+13) .mktoFormCol b+span{color:#4a4a4a;display:block;font-
size:16px!important;font-weight:300;line-height:30px;margin-bottom:40px}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13)
.mktoFieldDescriptor{position:relative;padding-right:24px;width:auto}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(n+8):nth-child(-n+13)
.mktoFormCol{width:auto!important}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(14){clear:both}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(15){display:-ms-flexbox;display:flex;margin-top:40px}.wp .page-
template-unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15)
h1{color:grey!important;font-size:16px!important;font-weight:400!important;letter-spacing:2px!important;text-
transform:uppercase}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(15) .mktoFieldDescriptor{position:relative;width:auto!important}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap
label{width:auto!important}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(15) .mktoFieldWrap>label,.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap label .slider.round{display:none!important}.wp
.page-template-unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15)
.mktoFieldWrap label input{display:block!important;margin:0!important}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15)
.mktoFormCol{width:auto!important}.wp .page-template-unsubscribe .section_preference_center #mktoForm_2386
.mktoFormRow:nth-child(15) .mktoFieldWrap .mktoHtmlText{width:100%!important}.wp .page-template-
unsubscribe .section_preference_center #mktoForm_2386 .mktoFormRow:nth-child(15) .mktoFieldWrap
h1{padding:0!important;width:100%!important}.wp .page-template-unsubscribe .section_preference_center
#mktoForm_2386 .mktoFormRow:nth-child(16) label:after{left:175px}.wp .page-template-unsubscribe
.section_preference_center #mktoForm_2386 .mktoButtonWrap.mktoRound .mktoButton{margin:60px 0
100px;width:auto!important}.wp .page-template-unsubscribe .unsubscribe-title.small{font-size:14px;font-
weight:700}.wp .page-template-unsubscribe #UnsubscribedReason{height:48px;font-size:16px;font-
weight:300;line-height:2!important;letter-spacing:.2px;text-align:left;color:#4a4a4a;padding:8px
12px!important;border:1px solid #a7a7a8!important;background-color:#fff;border-radius:2px;margin-
bottom:30px}.wp .page-template-unsubscribe .mktoForm .mktoAsterix{display:block}.wp .page-template-
unsubscribe .unsubscribe-reason-wrapper{margin-bottom:20px}.wp .page-template-unsubscribe .unsubscribe-
reason-wrapper .mktoField{float:none;font-size:inherit;line-height:inherit}.wp .page-template-unsubscribe
.unsubscribe-reason-wrapper .mktoField>div{padding:6px 15px;height:48px;max-width:none;border-
width:1px;border-color:#a7a7a8;border-radius:0;font-size:16px;color:#4a4a4a}.wp .page-template-unsubscribe
.unsubscribe-reason-wrapper .mktoField>div>div:last-child{max-width:none;top:47px;border-width:1px;border-
color:#a7a7a8;border-radius:0;font-size:16px;color:#4a4a4a;width:calc(100% + 2px);left:-1px}.wp .page-template-

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unsubscribe .unsubscribe-reason-wrapper .mktoField>div .icon{margin-right:15px}.wp .get-subscription-template .header-two{font-size:24px;font-weight:400;margin-bottom:100px;line-height:32px;padding-bottom:0}.wp .get-subscription-template #ThankYouRedirect{display:none}.wp .get-subscription-template .image{height:90px}.wp .get-subscription-template .content{height:120px}.wp .get-subscription-template .item{min-height:340px}.wp .get-subscription-template #mktoForm\_1051 .mktoButtonRow button{border:none}.style-module--item--3bS8-{min-height:340px;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center}.style-module--button--1YC3d{-ms-flex-item-align:start;align-self:flex-start}@font-face{font-family:IsidoraSans-Medium;src:url(https://cdn.confluent.io/fonts/IsidoraSans/IsidoraSans-Medium.woff) format("woff");font-style:normal}@font-face{font-family:IsidoraSans-MediumIt;src:url(https://cdn.confluent.io/fonts/IsidoraSans/IsidoraSans-MediumIt.woff) format("woff");font-style:normal}@font-face{font-family:IsidoraSans-Regular;src:url(https://cdn.confluent.io/fonts/IsidoraSans/IsidoraSans-Regular.woff) format("woff");font-style:normal}@font-face{font-family:IsidoraSans-SemiBold;src:url(https://cdn.confluent.io/fonts/IsidoraSans/IsidoraSans-SemiBold.woff) format("woff");font-style:normal}.wp .page-livestream .video-container{margin-top:60px}.wp .page-livestream .cnfl a{font-size:12px;color:#257bd7;transition:all .3s ease-in-out;text-decoration:none!important}.wp .page-livestream .cnfl a:hover{opacity:.6}.wp .page-livestream .title-arrow{width:20px;height:20px;display:inline-block;position:absolute;top:0;left:120px;top:24px}.wp .page-livestream .title-arrow:after,.wp .page-livestream .title-arrow:before{content:"";position:absolute;background-color:#8e9093;width:15px;height:1px;transition:all .4s cubic-bezier(1,.07,.28,1.04)}.wp .page-livestream .title-arrow:before{-ms-transform:rotate(45deg);transform:rotate(45deg)}.wp .page-livestream .title-arrow:after{-ms-transform:rotate(-45deg);transform:rotate(-45deg);left:11px}.wp .page-livestream .expanded .title-arrow:before{-ms-transform:rotate(135deg);transform:rotate(135deg)}.wp .page-livestream .expanded .title-arrow:after{-ms-transform:rotate(-135deg);transform:rotate(-135deg)}.wp .page-livestream .error,.wp .page-livestream .error+.checkmark{border-color:#df2d58!important}.wp .page-livestream .br-4{border-radius:4px}.wp .page-livestream .fz-12{font-size:12px}.wp .page-livestream .light-black{color:rgba(0,0,0,.7)}.wp .page-livestream .bg-white{background-color:#fff}.wp .page-livestream .uppercase{text-transform:uppercase}.wp .page-livestream .rebrand-cloud-color{color:#9678ff}.wp .page-livestream .rebrand-platform-color{color:#5d80eb}.wp .page-livestream .cnfl-input::-webkit-input-placeholder{text-transform:uppercase}.wp .page-livestream .cnfl-input::-webkit-input-placeholder,.wp .page-livestream .cnfl-input::placeholder{text-transform:uppercase}.wp .page-livestream .cnfl-input:-moz-placeholder,.wp .page-livestream .cnfl-input:-ms-input-placeholder,.wp .page-livestream .cnfl-input::-moz-placeholder{text-transform:uppercase}.wp .page-livestream input.valid,.wp .page-livestream input.valid+.checkmark{border-color:#ecef2!important}.wp .page-livestream .cnfl-input{-webkit-appearance:none;letter-spacing:1px;border:1.1px solid #ecef2;padding:10px 0 10px 25px;margin-bottom:5px;font-size:12px;border-radius:4px;background:#fff;width:100%}.wp .page-livestream .cnfl-input-wrapper{width:100%;display:inline-block}.wp .page-livestream .cnfl-input-wrapper.cnfl-width-50{width:calc(50% - 5px)}.wp .page-livestream .cnfl-input-wrapper label{display:none}.wp .page-livestream div.cnfl-select{text-transform:uppercase;text-align:left;color:rgba(0,0,0,.7);position:relative;padding:0;border-bottom:0;border-bottom-left-radius:0;border-bottom-right-radius:0}.wp .page-livestream div.cnfl-select>div{padding:0 10px}.wp .page-livestream div.cnfl-select .options-container{position:absolute;left:-1px;right:-2px;z-index:9;background:#fff;border-right:1.1px solid #ecef2;border-left:1.1px solid #ecef2;border-bottom:1.1px solid #ecef2;top:44px;transition:max-height .5s ease-in-out;overflow:hidden;max-height:0;border-bottom-left-radius:4px;border-bottom-right-radius:4px;border-top-left-radius:0;border-top-right-radius:0}.wp .page-livestream div.cnfl-select.error .options-container{border-right-color:#df2d58;border-left-color:#df2d58;border-bottom-color:#df2d58}.wp .page-livestream div.cnfl-select.expanded .options-container{max-height:220px}.wp .page-livestream div.cnfl-select>div:first-child{padding:10px 0 10px 25px;cursor:pointer}.wp .page-livestream div.cnfl-select .title-arrow{right:20px;left:auto}.wp .page-livestream div.cnfl-select .option{margin-bottom:10px;padding:10px 10px 20px;background:#edf0f5;position:relative}.wp .page-livestream div.cnfl-select

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.divider{position:absolute;top:-20px;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%);border:3px solid #fff;width:30px;height:30px;text-align:center;border-radius:50%;background:#f7f9fc;font-
weight:700;text-transform:uppercase}.wp .page-livestream div.cnfl-select .option ul{display:-ms-
flexbox;display:flex;margin:0;list-style:none;padding:0}.wp .page-livestream div.cnfl-select .option
li{background:#fff;-ms-flex:1 1;flex:1 1;text-align:center;border:1px solid #e3e4e5;border-radius:4px;font-
size:12px;text-transform:uppercase;font-weight:300;letter-spacing:1px;color:#000;margin:0 10px 0 0;padding:10px
0;cursor:pointer}.wp .page-livestream div.cnfl-select .option li:hover{background-
color:rgba(37,123,215,.5);color:#fff;font-weight:500}.wp .page-livestream div.cnfl-select .option
li.selected{background-color:#257bd7;color:#fff;font-weight:500}.wp .page-livestream div.cnfl-select .option
li:last-child{margin-right:0}.wp .page-livestream div.cnfl-select h6{font-size:12px;text-align:center;margin:10px
0;color:#000;font-weight:500}.wp .page-livestream .checkbox-container{display:block;position:relative;padding-
left:35px;margin-bottom:12px;cursor:pointer;-webkit-user-select:none;-moz-user-select:none;-ms-user-
select:none;user-select:none;text-align:left}.wp .page-livestream .embed-form-checkbox{cursor:pointer;line-
height:1.5}.wp .page-livestream .checkbox-container
input{position:absolute;opacity:0;cursor:pointer;height:0;width:0}.wp .page-livestream
.checkmark{position:absolute;top:0;left:0;height:25px;width:25px;border:1.1px solid #e3e4e5;transition:all .2s ease-
in-out}.wp .page-livestream .checkmark:after{content:"";position:absolute;display:none}.wp .page-livestream
.checkbox-container input:checked~.checkmark:after{display:block}.wp .page-livestream .checkbox-container
.checkmark:after{left:9px;top:5px;width:5px;height:10px;border-color:#ff6620;border-style:solid;border-width:0
2px 2px 0;-ms-transform:rotate(45deg);transform:rotate(45deg)}.wp .page-livestream .cnfl-
button{border:none;border-radius:4px;background-color:#ff6620;color:#fff;padding:10px 20px;font-
size:13px;transition:all .3s ease-in-out;display:inline-block;letter-spacing:1px;text-transform:uppercase}.wp .page-
livestream .cnfl-button span{color:#fff}.wp .page-livestream .cnfl-button:hover{-ms-
transform:scale(1.03);transform:scale(1.03);opacity:.6}.wp .page-livestream .cnfl-button-secondary-outline{border-
radius:4px;background-color:#fff;border:1px solid #00004b;color:#00004b;padding:10px 20px;font-size:14px;font-
weight:500}.wp .page-livestream .cnfl-link-item{color:#257bd7}.wp .page-livestream .title-container{text-
align:center}.wp .page-livestream .title-with-line{padding-bottom:0;font-size:50px;font-
weight:300;position:relative;padding-top:25px}.wp .page-livestream .title-with-
line:before{content:"";width:40px;height:.1px;border-style:solid;border-width:2px;border-image-source:linear-
gradient(270deg,#80c0ec,#257bd7);border-image-slice:1;background-image:linear-
gradient(270deg,#80c0ec,#257bd7);position:absolute;left:50%;-ms-transform:translateX(-
50%);transform:translateX(-50%);margin-bottom:24px;top:0}.wp .page-livestream .rebrand-h3{font-size:28px;font-
weight:300;color:#000;padding:0}.wp .page-livestream .rebrand-h5{font-size:18px;font-weight:700;padding:0}.wp
.page-livestream .rebrand-h6{font-size:16px;font-weight:500;color:#2a2a2d}.wp .page-livestream .cnfl .gs-tooltip
.tooltip-icon{display:inline-block;position:relative;vertical-align:top}.wp .page-livestream .cnfl .gs-tooltip .tooltip-
icon span{border-radius:20px;border:1px solid #8e9093;color:#8e9093;font-family:MarkOT;font-
size:12px;padding:0 6px}.wp .page-livestream .cnfl .tooltip-hidden{background:#fff;border:1px solid #eee;box-
shadow:0 0 15px 0 rgba(70,152,203,.15);visibility:hidden;position:absolute;top:0;left:-20px;margin:30px 5px
5px;padding:10px;width:300px;z-index:2}.wp .page-livestream .cnfl .gs-tooltip .tooltip-icon:hover .tooltip-
hidden{visibility:visible}.wp .page-livestream .cnfl .gs-tooltip .tooltip-
hidden:before{content:"";display:block;position:absolute;top:-8px;left:14px;width:0;height:0;border-left:10px solid
transparent;border-right:10px solid transparent;border-bottom:10px solid #fff}.wp .page-livestream .cnfl .gs-
tooltip{position:relative}.wp .page-livestream .cnfl .tooltiptext{font-size:12px}.wp .page-livestream .cnfl .gs-tooltip
.tooltip-icon span{font-size:10px;padding:0 4px}.wp .page-livestream .cnfl .gs-tooltip .tooltip-hidden
.tooltiptext{margin-bottom:0}@media screen and (max-width:768px){.wp .page-livestream .title-with-line{line-
height:1}}@media screen and (min-width:992px){.wp .page-livestream .cnfl-last-row{margin-bottom:0}}@media
screen and (min-width:768px) and (max-width:992px){.wp .page-livestream div.cnfl-select .options-
container{overflow-y:scroll}.wp .page-livestream .cnfl-input.cnfl-select span{font-size:10px}}@media screen and

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(max-width:992px){.wp .page-livestream .cnfl .gs-tooltip .tooltip-hidden.tooltip-push-left{left:-224px}.wp .page-
livestream .cnfl .gs-tooltip .tooltip-hidden.tooltip-push-left:before{left:212px}}.wp .oem-program,.wp .verified-
program{margin-top:40px}.wp .oem-program li,.wp .oem-program p,.wp .verified-program li,.wp .verified-program
p{color:#505050;font-size:16px;line-height:1.63;font-weight:400}.wp .oem-program ul,.wp .verified-program
ul{padding:0 0 0 20px;margin:0 0 20px}.wp .oem-program img,.wp .verified-program img{margin:0}.wp .oem-
program .content,.wp .verified-program .content{padding:40px 0}.wp .oem-program .content.bb,.wp .verified-
program .content.bb{border-bottom:1px solid #c2c2c2}.wp .oem-program h1,.wp .verified-program
h1{color:#fff;font-size:37px;padding:0}.wp .oem-program h2,.wp .verified-program h2{color:#fff;font-
size:20px;line-height:1.3;padding:0;margin:20px 0 40px}.wp .oem-program h3,.wp .verified-program
h3{color:#454545;font-size:36px;font-weight:400;padding:0;margin:0 0 30px}.wp .oem-program h4,.wp .verified-
program h4{color:#505050;font-size:18px;font-weight:700;padding:0;margin:20px 0;line-height:1.2}.wp .oem-
program .mb-20,.wp .verified-program .mb-20{margin-bottom:20px}.wp .oem-program #mktoForm_3911
.mktoButton,.wp .oem-program #mktoForm_4028 .mktoButton,.wp .oem-program .button,.wp .verified-program
#mktoForm_3911 .mktoButton,.wp .verified-program #mktoForm_4028 .mktoButton,.wp .verified-program
.button{display:inline-block;padding:15px 30px;border-radius:8px;text-transform:uppercase;font-size:15px;letter-
spacing:1px;font-weight:700;background:#173361;color:#fff;border:2px solid #173361}.wp .oem-program
.button:hover,.wp .verified-program .button:hover{background:#fff;color:#173361;border-color:#173361}.wp .oem-
program .img-wrapper:not(.non-icon),.wp .verified-program .img-wrapper:not(.non-icon){height:95px}.wp .oem-
program .img-wrapper img,.wp .verified-program .img-wrapper
img{margin:0;width:auto;height:100%;position:relative;left:50%;-ms-transform:translateX(-
50%);transform:translateX(-50%)}.wp .oem-program .img-wrapper .infographic,.wp .verified-program .img-
wrapper .infographic{background-position:50%;background-repeat:no-repeat}.wp .oem-program .img-wrapper
.infographic1,.wp .verified-program .img-wrapper .infographic1{background-image:url(https://cdn.confluent.io/wp-
content/themes/confluent/assets/images/verified-integration-program/infographic1.png);height:318px;background-
size:contain}.wp .oem-program .img-wrapper .infographic2,.wp .verified-program .img-wrapper
.infographic2{background-image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/verified-
integration-program/infographic2.png);height:466px;background-size:contain}@media (-webkit-min-device-pixel-
ratio:2),(min-resolution:192dpi){.wp .oem-program .img-wrapper .infographic1,.wp .verified-program .img-wrapper
.infographic1{background-image:url(https://cdn.confluent.io/wp-content/themes/confluent/assets/images/verified-
integration-program/infographic1_2x.png)}.wp .oem-program .img-wrapper .infographic2,.wp .verified-program
.img-wrapper .infographic2{background-image:url(https://cdn.confluent.io/wp-
content/themes/confluent/assets/images/verified-integration-program/infographic2_2x.png)}}.wp .oem-program
.content-info .row,.wp .verified-program .content-info .row{display:-ms-flexbox;display:flex;-ms-flex-
direction:row;flex-direction:row}.wp .oem-program .content-info.content-reverse .row,.wp .verified-program
.content-info.content-reverse .row{-ms-flex-direction:row-reverse;flex-direction:row-reverse}.wp .oem-program
#mktoForm_3911,.wp .oem-program #mktoForm_4028,.wp .verified-program #mktoForm_3911,.wp .verified-
program #mktoForm_4028{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}.wp .oem-
program #mktoForm_3911 .mktoFormRow,.wp .oem-program #mktoForm_4028 .mktoFormRow,.wp .verified-
program #mktoForm_3911 .mktoFormRow,.wp .verified-program #mktoForm_4028 .mktoFormRow{-ms-flex:1 0
48%;flex:1 0 48%;margin-bottom:20px;margin-right:2%;background:none}.wp .oem-program #mktoForm_3911
.mktoButtonRow,.wp .oem-program #mktoForm_4028 .mktoButtonRow,.wp .verified-program #mktoForm_3911
.mktoButtonRow,.wp .verified-program #mktoForm_4028 .mktoButtonRow{position:absolute;bottom:0;left:50%;-
ms-transform:translateX(-50%);transform:translateX(-50%)}.wp .oem-program .connector>div:first-child,.wp
.verified-program .connector>div:first-child{height:230px}.wp .oem-program .verified-connectors a,.wp .verified-
program .verified-connectors a{display:inline-block;margin:0 20px 20px 0;max-width:150px}.wp .oem-program
.verified-connectors .img-wrapper,.wp .verified-program .verified-connectors .img-wrapper{text-align:center}.wp
.oem-program .connector-benefit .blurb h4,.wp .verified-program .connector-benefit .blurb h4{height:45px}.wp
.oem-program .connector-benefit .blurb p,.wp .verified-program .connector-benefit .blurb p{height:130px}@media

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(min-width:768px) and (max-width:1199px){.wp .oem-program .connector-benefit .blurb p,.wp .verified-program
.connector-benefit .blurb p{height:85px}}@media (max-width:767px){.wp .oem-program .blurb h4,.wp .oem-
program .blurb p,.wp .verified-program .blurb h4,.wp .verified-program .blurb p{height:auto!important}.wp .oem-
program .blurb p,.wp .verified-program .blurb p{margin-bottom:40px!important}.wp .oem-program .connector-
benefit img,.wp .oem-program .verification-process img,.wp .verified-program .connector-benefit img,.wp .verified-
program .verification-process img{position:relative;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%)}.wp .oem-program .blurb,.wp .verified-program .blurb{text-align:center}.wp .oem-program
.connector>div:first-child,.wp .verified-program .connector>div:first-child{height:auto;margin-
bottom:40px}}@media (max-width:991px){.wp .oem-program #mktoForm_3911 .mktoFormRow,.wp .oem-
program #mktoForm_4028 .mktoFormRow,.wp .verified-program #mktoForm_3911 .mktoFormRow,.wp .verified-
program #mktoForm_4028 .mktoFormRow{-ms-flex-preferred-size:100%;flex-basis:100%}.wp .oem-program
#mktoForm_3911 .mktoButtonRow,.wp .oem-program #mktoForm_4028 .mktoButtonRow,.wp .verified-program
#mktoForm_3911 .mktoButtonRow,.wp .verified-program #mktoForm_4028 .mktoButtonRow{bottom:75px}.wp
.oem-program .button-wrapper,.wp .verified-program .button-wrapper{text-align:center;margin-bottom:20px}.wp
.oem-program .content,.wp .verified-program .content{padding:0 0 20px}.wp .oem-program .content-info .row,.wp
.verified-program .content-info .row{-ms-flex-direction:column-reverse;flex-direction:column-reverse;-ms-flex-
pack:center;justify-content:center}.wp .oem-program .content-info.content-reverse .row,.wp .verified-program
.content-info.content-reverse .row{-ms-flex-direction:column;flex-direction:column}.wp .oem-program
.content.bb,.wp .oem-program .img-wrapper.non-icon,.wp .verified-program .content.bb,.wp .verified-program .img-
wrapper.non-icon{margin-bottom:40px}}.wp .oem-program #sign-up{margin-bottom:40px}@media (max-
width:991px){.wp .oem-program .content{padding:0 0 20px}}.wp .verified-program .img-wrapper.non-icon
img{height:auto}.solutions-module--container--2CFNs section.solutions-module--grid2--3MgK5
ul.items,.solutions-module--container--2CFNs section.solutions-module--grid3--3Zuny ul.items,.solutions-module-
container--2CFNs section.solutions-module--grid4--3Iiba ul.items{display:-ms-flexbox;display:flex;-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.solutions-module--container--
2CFNs section.solutions-module--grid2--3MgK5 ul.items>li{background-color:#e6f5fb;width:100%}.solutions-
module--container--2CFNs section.solutions-module--grid2--3MgK5 ul.items>li h3,.solutions-module--container--
2CFNs section.solutions-module--grid2--3MgK5 ul.items>li li{color:#173361}@media screen and (min-
width:760px){.solutions-module--container--2CFNs section.solutions-module--grid2--3MgK5
ul.items>li{width:49%}}.solutions-module--container--2CFNs section.solutions-module--grid3--3Zuny
ul.items>li{width:100%}@media screen and (min-width:640px){.solutions-module--container--2CFNs
section.solutions-module--grid3--3Zuny ul.items>li{width:33%}}.solutions-module--container--2CFNs
section.solutions-module--grid4--3Iiba ul.items>li{width:100%}@media screen and (min-width:992px){.solutions-
module--container--2CFNs section.solutions-module--grid4--3Iiba ul.items>li{-ms-flex:1 1;flex:1 1}}@media
screen and (min-width:480px){.solutions-module--container--2CFNs section.solutions-module--grid4--3Iiba
ul.items>li{width:49%}}.solutions-module--container--2CFNs li svg{margin-
bottom:40px;width:60px;height:60px}.wp .stay-in-touch-wrapper .contact_form_section{padding:80px 0}.wp .stay-
in-touch-wrapper .contact_form_section .container{max-width:500px;text-align:left}.wp .stay-in-touch-wrapper
.stay-in-touch-input{width:100%;font-family:MarkOT;font-weight:400;border:0;font-size:16px;outline:0;line-
height:1.3;padding:20px!important;color:#999;border-bottom:1px solid
#a7a7a8;background:#f6f6f6!important;border:#a7a7a8!important;box-shadow:none!important}.wp .stay-in-touch-
wrapper .stay-in-touch-input:first-of-type{border-bottom:1px solid #a7a7a8!important}.wp .stay-in-touch-wrapper
.stay-in-touch-button{background:#4597cb;color:#fff;border:0;width:100%;padding:15px 20px}.wp .stay-in-touch-
wrapper .stay-in-touch-button div{text-align:center}.subscribe-to-sub-processor-updates-module--page--2vBIP
.section.subscribe-to-sub-processor-updates-module--form--2Us-Y{min-height:408px}.subscribe-to-sub-processor-
updates-module--page--2vBIP .subscribe-to-sub-processor-updates-module--thankyou--
2NBgk{position:absolute;top:50%;left:50%;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-
50%);transition:all .3s ease;font-size:18px}.style-module--container--o7cqV .image-animation{border-

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radius:8px}.style-module--container--o7cqV .cta-links-section{padding-top:30px}.style-module--container--o7cqV .cta-links-section .style-module--title--1SscH p{margin-bottom:2px}.style-module--container--o7cqV .style-module--ctaWrap--w3EQ9{padding-top:0}.style-module--row--21104{position:relative}.style-module--ctaLinksSection--6nbxU{padding:80px 0;background:#fafafa}.style-module--colSm3--3LKvo{left:auto!important;right:0!important;width:35%!important}.style-module--colSm3--3LKvo img{max-width:100%!important}.style-module--imageWrapper--1hLWR{position:relative}.style-module--imageWrapper--1hLWR .play\_btn{left:50%!important;top:50%!important;-ms-transform:translate(-50%,-30%);transform:translate(-50%,-30%);margin-left:0!important;margin-top:0!important}.style-module--formCloudSignUpModal--1AQ3A .style-module--thankyou--32jb6{font-weight:500;margin-top:20px;text-align:center}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt{text-align:center}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt h4{display:inline-block;font-size:20px;color:#8e9093;padding:0;line-height:52px;font-weight:500}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt>p,.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt h6{font-size:16px}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt .style-module--formContainer--hGadi form{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt .style-module--formContainer--hGadi form .style-module--buttonContainer--pKinf{width:100%;margin:20px 0}.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt .style-module--formContainer--hGadi form>input{width:49%}@media screen and (max-width:992px){.style-module--formCloudSignUpModal--1AQ3A .style-module--content--2KGwt .style-module--formContainer--hGadi form>input{width:100%}}.style-module--checkboxWrapper--3sEqj{position:relative;width:100%;margin-top:20px;color:rgba(0,0,0,.7);text-align:left}.style-module--checkboxWrapper--3sEqj input{position:absolute;opacity:0;cursor:pointer;height:0;width:0}.style-module--checkboxWrapper--3sEqj label{cursor:pointer;padding-left:30px}.style-module--checkboxWrapper--3sEqj .style-module--checkboxContainer--1foY9{display:block;position:relative;padding-left:35px;margin-top:12px;-webkit-user-select:none;-moz-user-select:none;-ms-user-select:none;user-select:none}.style-module--errorContainer--3beGu{position:absolute;top:0;border:1px solid #df2d58;font-size:14px;padding:15px 50px;width:100%;background-color:#fff;transition:all .2s ease-in-out;opacity:0;visibility:hidden;border-radius:4px;text-align:center;z-index:10}.style-module--errorContainer--3beGu p{text-align:center;font-size:13px;color:#df2d58}.style-module--errorContainer--3beGu.style-module--show--3nUPD{opacity:1;visibility:visible}.style-module--existingAccount--3qZ8p{margin-bottom:20px}.style-module--existingAccount--3qZ8p a{letter-spacing:1px;margin-right:0;font-weight:500;color:#257bd7;font-size:12px}.style-module--tos--2owUx{font-size:12px}.style-module--tos--2owUx p{font-size:12px;width:80%;line-height:1.4;color:rgba(0,0,0,.7);text-align:justify;margin:auto auto 15px}.style-module--tosUS--FgYmU,.style-module--us--1yRjm .style-module--tos--2owUx{display:none}.style-module--us--1yRjm .style-module--tosUS--FgYmU{display:block}.modal-is-visible .style-module--formCloudSignUpModal--1AQ3A.style-module--show--3nUPD{top:50%;left:50%;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-50%)}.style-module--form--3BUsB .mktoFormRow:nth-child(13) .mktoFieldWrap,.style-module--form--3BUsB .mktoFormRow:nth-child(15) .mktoFieldWrap{display:-ms-flexbox;display:flex;-ms-flex-direction:row-reverse;flex-direction:row-reverse;-ms-flex-align:center;align-items:center}.style-module--form--3BUsB .mktoFormRow:nth-child(13) .mktoFieldWrap label,.style-module--form--3BUsB .mktoFormRow:nth-child(15) .mktoFieldWrap label{display:block;-ms-flex:1 1;flex:1 1}.style-module--form--3BUsB .mktoFormRow:nth-child(13) .mktoFieldWrap .mktoCheckboxList,.style-module--form--3BUsB .mktoFormRow:nth-child(15) .mktoFieldWrap .mktoCheckboxList{width:25px!important;margin-right:10px;padding:5px 0}.style-module--form--3BUsB .mktoForm input[type=checkbox]+label:before{border:1px solid #173361;border-radius:2px;-webkit-appearance:none;-moz-appearance:none;appearance:none;height:14px;width:14px;outline:0;box-shadow:none}.style-module--form--3BUsB .mktoForm input[type=checkbox]:checked+label:before{background:#173361}.style-module--wp--1dpxq{-webkit-

appearance:none;letter-spacing:1px;border:1.1px solid #eccc2;padding:10px 0 10px 25px;margin-bottom:5px;font-size:12px;font-weight:400;border-radius:4px;background:#fff;box-shadow:none;line-height:inherit;width:100% }.style-module--wp--1dpxq.style-module--error--2WcVI{border:1px solid #df2d58}.style-module--sectionContent--3CzBg{background-color:transparent;border-radius:8px;background:hsla(0,0%,96.1%,.85);text-align:center;padding:100px 0;margin:0 25px 25px}@media screen and (max-width:767px){.style-module--sectionContent--3CzBg{border-radius:0;margin-left:0;margin-right:0;padding-top:50px;padding-bottom:50px}}.style-module--sectionContent--3CzBg:last-child{margin-bottom:0}.style-module--sectionContent--3CzBg.style-module--robinsEgg--1TK5a{background:#b4e1e4}.style-module--sectionContent--3CzBg.style-module--ice--kDgc2{background:#e6f5fb}.style-module--sectionContent--3CzBg .style-module--contentContainer--NXLbe{margin:0 auto;max-width:1170px;padding-left:15px;padding-right:15px;width:100%}@media screen and (min-width:768px) and (max-width:991px){.style-module--sectionContent--3CzBg .style-module--contentContainer--NXLbe.style-module--noBackground--2v\_Ea{padding-left:0;padding-right:0}}@media screen and (min-width:992px) and (max-width:1199px){.style-module--sectionContent--3CzBg .style-module--contentContainer--NXLbe.style-module--noBackground--2v\_Ea{padding-left:0;padding-right:0}}.style-module--sectionContent--3CzBg .style-module--svg--1POtP{width:40px}.style-module--sectionContent--3CzBg .style-module--paragraph--3Uuc4{width:35%;margin:0 auto;line-height:1.63;color:#000;font-size:18px;font-weight:300}.style-module--sectionContent--3CzBg .style-module--title--1sbHU{text-align:center;margin-bottom:50px}.style-module--sectionContent--3CzBg .style-module--title--1sbHU h3{color:#000;font-size:28px;font-weight:500;padding:0}.style-module--sectionContent--3CzBg .style-module--ctaContainer--MtFCh{margin:100px auto 0;display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}@media screen and (max-width:575px){.style-module--sectionContent--3CzBg .style-module--ctaContainer--MtFCh{-ms-flex-direction:column;flex-direction:column;-ms-flex-align:center;align-items:center}}.style-module--sectionContent--3CzBg .style-module--ctaContainer--MtFCh>:not(:first-child){margin-left:20px}@media screen and (max-width:575px){.style-module--sectionContent--3CzBg .style-module--ctaContainer--MtFCh>:not(:first-child){margin-top:20px;margin-left:0}}@media (max-width:768px){.style-module--sectionContent--3CzBg .style-module--paragraph--3Uuc4{width:90%}.style-module--sectionContent--3CzBg h2{line-height:1}}.rules-of-engagement-module--codeOfConduct--1\_ejT p{font-weight:700;font-size:18px}.rules-of-engagement-module--sectionSummary--1qeSs{margin-bottom:100px}.rules-of-engagement-module--wrapper--1eCh6{border:2px solid hsla(0,0%,96.1%,.85);border-radius:8px;padding:20px;text-align:left;margin:10px 0}.rules-of-engagement-module--wrapper--1eCh6 div,.rules-of-engagement-module--wrapper--1eCh6 h4,.rules-of-engagement-module--wrapper--1eCh6 li,.rules-of-engagement-module--wrapper--1eCh6 ul{margin:20px 0}.rules-of-engagement-module--wrapper--1eCh6 h4{color:#173361;font-weight:700}.rules-of-engagement-module--disclaimer--Blzoi{font-weight:700}.rules-of-engagement-module--disclaimer--Blzoi span{color:#d8365d}.confluent-cloud-faqs-module--faqSection--3V0x1,.startup-program-faq-module--faqSection--142Xk{padding-top:25px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt{color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-align:left}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt ul{list-style:none;margin:0;padding:0}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt ul li:not(:last-child){margin-bottom:30px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt h4{color:#b78142;font-size:18px;font-weight:700;margin-bottom:20px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt h5{color:#000;font-size:12px;font-weight:500;letter-spacing:1.2px;line-height:24px;margin:0;text-transform:uppercase}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt strong{display:block}@media screen and (max-width:767px){.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt .support-module--desktop--1me3a{display:none}}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2XuPt .support-module--desktop--1me3a .support-module--row--1za5f{display:-ms-

flexbox;display:flex}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f:not(:first-child){border-top:2px solid hsla(0,0%,96.1%,.85)}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f:not(:first-child):last-child{border-bottom:2px solid hsla(0,0%,96.1%,.85)}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f:not(:first-child)>div:first-child{border-left:2px solid hsla(0,0%,96.1%,.85)}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f:not(:first-child)>div:last-child{border-right:2px solid hsla(0,0%,96.1%,.85)}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div{padding:20px 10px;width:20%}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div:nth-child(2){width:14%}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div:nth-child(3),.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div:nth-child(4),.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--desktop--1me3a .support-module--row--1za5f>div:nth-child(5){width:22%}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi{display:none;text-align:center}@media screen and (max-width:767px){.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi{display:block}}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi h4{font-size:24px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi .support-module--tier--3WH2D .support-module--row--1za5f{border-bottom:2px solid hsla(0,0%,96.1%,.85);padding:40px 0 20px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi .support-module--tier--3WH2D .support-module--row--1za5f:last-child{border-bottom-width:7px}.support-module--page--dS7DG .support-module--ccSupportPlanSection--1A0mm .support-module--content--2Xupt .support-module--mobile--nieXi .support-module--tier--3WH2D .support-module--row--1za5f>div:first-child{margin-bottom:20px}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 h2{margin-bottom:50px}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt p{color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt>p{margin-bottom:80px}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i .support-module--option--Tw8U2{background:#fff;display:-ms-flexbox;display:flex;margin:0 0 10px;padding:50px 30px;text-align:left;width:calc(50% - 5px);-ms-flex:none!important;flex:none!important}@media screen and (max-width:767px){.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i .support-module--option--Tw8U2{width:100%}}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-module--itemContainer--\_ZvPa>div:first-child{margin-right:20px;width:30px}.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2Xupt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-

module--itemContainer--\_ZvPa>div:first-child svg{ width:100% }.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2XuPt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-module--itemContainer--\_ZvPa>div:last-child{-ms-flex:1 1;flex:1 1 }.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2XuPt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-module--itemContainer--\_ZvPa>div:last-child h4{margin:0 0 15px }.support-module--page--dS7DG .support-module--communitySupportSection--Cm7J7 .support-module--content--2XuPt .support-module--options--3Jk8i .support-module--option--Tw8U2 .support-module--itemContainer--\_ZvPa>div:last-child h4 a{color:#000;font-size:18px;font-weight:700}.covid-19-faq-module--page--110ut .covid-19-faq-module--hero--1wWkF .covid-19-faq-module--content--17\_we{width:90%}.covid-19-faq-module--page--110ut .covid-19-faq-module--hero--1wWkF .covid-19-faq-module--content--17\_we p{color:#000;margin-top:50px}.covid-19-faq-module--page--110ut .covid-19-faq-module--introSection--30To6{color:#000;font-size:14px;font-weight:300;text-align:left;padding-bottom:0}.covid-19-faq-module--page--110ut .covid-19-faq-module--introSection--30To6 li{margin:20px 0}.covid-19-faq-module--page--110ut .covid-19-faq-module--faqSection--AjKdN{text-align:left}.covid-19-faq-module--page--110ut .covid-19-faq-module--faqSection--AjKdN .covid-19-faq-module--content--17\_we{margin-bottom:50px}.covid-19-faq-module--page--110ut .covid-19-faq-module--faqSection--AjKdN .covid-19-faq-module--content--17\_we h4{color:#173361;font-size:18px;font-weight:700}.covid-19-faq-module--page--110ut .covid-19-faq-module--faqSection--AjKdN .covid-19-faq-module--content--17\_we p{color:#000;font-size:14px;font-weight:300}.request-kafka-tco-assessment-module--formSection--64K9s h3,.request-kafka-tco-assessment-module--formSection--64K9s p,.request-kafka-tco-assessment-module--formSection--64K9s ul{color:#173361;font-weight:700;font-size:18px }.request-kafka-tco-assessment-module--formSection--64K9s h3{width:60%;font-weight:500;font-size:28px;margin:0 auto 50px }.request-kafka-tco-assessment-module--formSection--64K9s p,.request-kafka-tco-assessment-module--formSection--64K9s ul{list-style:none }.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww{width:800px;max-width:95%;margin:25px auto}@media screen and (min-width:768px){.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap }}.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww input{width:100%;margin:5px 0}@media screen and (min-width:768px){.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww .request-kafka-tco-assessment-module--select---gaxw,.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww input{width:calc(50% - 10px);margin:5px }}.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--formContainer--3noww .request-kafka-tco-assessment-module--select---gaxw:last-of-type{width:100%;margin-bottom:25px }.request-kafka-tco-assessment-module--formSection--64K9s .request-kafka-tco-assessment-module--thankYou--2eESF{margin-top:50px;font-size:24px }.style-module--postItem--3UA1F{display:-ms-flexbox;display:flex;-ms-flex-align:start;align-items:flex-start;margin-bottom:65px;text-align:left}@media screen and (max-width:767px){.style-module--postItem--3UA1F{-ms-flex-direction:column;flex-direction:column }}.style-module--postItem--3UA1F ul{list-style:none;padding:0;margin:0}.style-module--postItem--3UA1F.style-module--protected--2LnYL h2:before{content:"\1F512"}.style-module--postItem--3UA1F .style-module--imageContainer--1coFo{margin-right:55px;max-width:378px;width:100% }.style-module--postItem--3UA1F .style-module--imageContainer--1coFo img{width:100% }.style-module--postItem--3UA1F .style-module--content--2cWa9{-ms-flex:1 1;flex:1 1 }.style-module--postItem--3UA1F .style-module--content--2cWa9 h2{margin:10px 0 20px }.style-module--postItem--3UA1F .style-module--content--2cWa9 h2 a{color:#0074a2;font-size:18px;font-weight:700}.style-module--postItem--3UA1F .style-module--content--2cWa9 .style-module--metadata--dt9Hb{color:#0074a2;font-size:14px;font-weight:500;margin-bottom:10px;display:-ms-flexbox;display:flex;-ms-flex-pack:start;justify-

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content:flex-start;-ms-flex-wrap:wrap;flex-wrap:wrap}.style-module--postItem--3UA1F .style-module--content--2cWa9 .style-module--metadata--dt9Hb time{color:rgba(0,0,0,.85);font-weight:300;margin-right:10px}.style-module--postItem--3UA1F .style-module--content--2cWa9 .style-module--metadata--dt9Hb .style-module--tagContainer--3Xdt8 li{display:inline-block}.style-module--postItem--3UA1F .style-module--content--2cWa9 .style-module--metadata--dt9Hb .style-module--tagContainer--3Xdt8 li:not(:last-child):after{content:" ";margin-right:2px}.style-module--postItem--3UA1F .style-module--content--2cWa9 .style-module--metadata--dt9Hb .style-module--tagContainer--3Xdt8 li a{color:#0074a2}.style-module--postItem--3UA1F .style-module--content--2cWa9 .style-module--summary--2CPjk{color:rgba(0,0,0,.85);font-size:16px;font-weight:400;line-height:1.79}.style-module--listHeader--2FIuN{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-align:center;align-items:center;margin-bottom:40px}@media screen and (max-width:767px){.style-module--listHeader--2FIuN{-ms-flex-direction:column;flex-direction:column}}.style-module--listHeader--2FIuN .style-module--categorySelector--fjNB4{position:relative}@media screen and (max-width:767px){.style-module--listHeader--2FIuN .style-module--categorySelector--fjNB4{margin-bottom:15px}}.style-module--listHeader--2FIuN .style-module--categorySelector--fjNB4:after{position:absolute;top:12px;right:13px;content:"";display:inline-block;-ms-transform:rotate(135deg);transform:rotate(135deg);height:12px;width:12px;border-color:#0074a2;border-style:solid;border-width:2px 2px 0 0}.style-module--listHeader--2FIuN .style-module--categorySelector--fjNB4 select{color:#173361;width:240px;padding:8px;height:40px;border:1px solid #173361;outline:0;border-radius:6px;background-color:#fff;-webkit-appearance:none;-moz-appearance:none;appearance:none;cursor:pointer}.style-module--listHeader--2FIuN .style-module--buttonContainer--2bc55>:first-child{margin-right:10px}.style-module--searchResultHeader--3ERwZ{margin-bottom:25px;text-align:left}.style-module--bottomBannerSection--3t8WQ{background:hsla(0,0%,96.1%,.85)}@media print{.style-module--bottomBannerSection--3t8WQ{display:none}}.style-module--bottomBannerSection--3t8WQ .style-module--content--2cWa9 p{color:#173361;font-size:28px;font-weight:500}.style-module--bottomBannerSection--3t8WQ .style-module--content--2cWa9+div{margin:45px 0 0}.style-module--authors--3Ppc_{list-style:none;padding:0;margin:0;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}.style-module--authors--3Ppc_ .style-module--author--2AFBY{margin:10px 20px 0 0}.style-module--authors--3Ppc_ .style-module--author--2AFBY a{color:#173361;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;text-transform:uppercase}.style-module--authors--3Ppc_ .style-module--author--2AFBY img{width:55px;height:55px;border-radius:50%;border:1px solid #979797;margin-right:10px}.style-module--authors--3Ppc_ .style-module--author--2AFBY li{display:inline-block;margin-right:20px;margin-bottom:15px}@media print{.style-module--relatedPostSection--2BQQq{display:none}}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-width:767px){.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9{-ms-flex-direction:column;flex-direction:column}}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV{-ms-flex:1 1;flex:1 1;margin-right:20px;margin-bottom:20px;text-align:left;display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV:last-child{margin-right:0}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV img{max-height:200px}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV h3 a{color:rgba(0,0,0,.85);font-size:18px;font-weight:700;letter-spacing:normal}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV .style-module--summary--2CPjk{margin-bottom:20px;color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--FIMvV .style-module--author--2AFBY{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;margin-bottom:20px}.style-module--relatedPostSection--2BQQq .style-module--content--2cWa9 .style-module--post--

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FIMvV .style-module--metadata--dt9Hb{margin:auto 0 0}.style-module--sharePostSection--3GHmv{padding-top:0}@media print{.style-module--sharePostSection--3GHmv{display:none}}.style-module--sharePostSection--3GHmv h2{color:rgba(0,0,0,.85);font-size:28px;font-weight:500;margin:0 0 30px}@media screen and (max-width:767px){.style-module--sharePostSection--3GHmv h2{font-size:21px}}.style-module--sharePostSection--3GHmv .style-module--shareContainer--2JWTe{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center}.style-module--sharePostSection--3GHmv .style-module--shareContainer--2JWTe>div: hover svg{opacity:.5}.style-module--sharePostSection--3GHmv .style-module--shareContainer--2JWTe>div:nth-of-type(2){margin:0 40px}.style-module--summary--2CPjk p:after{content:" [...]"}.style-module--blogList--2d8qC .style-module--bannerSection--1hj1f{background:hsla(0,0%,96.1%,.85);padding:30px 0;color:rgba(0,0,0,.85);font-size:14px;font-weight:300}.style-module--blogList--2d8qC .style-module--bannerSection--1hj1f a{color:#0074a2;font-weight:500}.style-module--blogList--2d8qC .style-module--mainSection--3uX12{padding-top:20px}.style-module--blogList--2d8qC .style-module--sectionBottomBanner--3Hesn{background:#b4e1e4}.style-module--blogList--2d8qC .style-module--sectionBottomBanner--3Hesn p{line-height:1.4;max-width:52rem;margin:0 auto}@media screen and (max-width:767px){.style-module--blogList--2d8qC .style-module--sectionBottomBanner--3Hesn p{max-width:none}}.style-module--blogPost--1pOcN.style-module--protected--1y8oU .style-module--heroSection--eUZVN h1:before{content:"\1F512"}.style-module--blogPost--1pOcN .style-module--heroSection--eUZVN{background-color:#e6f5fb}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12{text-align:left;padding-top:0;max-width:780px;margin:0 auto}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .cflt-pp img{border-radius:50%;margin:0}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-align:start;align-items:flex-start;text-transform:uppercase;margin:30px 0;-ms-flex-wrap:wrap;flex-wrap:wrap;border-bottom:2px solid rgba(130,148,148,.25)}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT{display:-ms-flexbox;display:flex;-ms-flex:1 1;flex:1 1;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (max-width:575px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT{-ms-flex-direction:column;flex-direction:column}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;margin-right:20px;margin-bottom:20px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio a{color:#000;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;line-height:1}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio .cflt-pp{margin-right:10px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio .cflt-pp img{height:45px;width:45px}@media screen and (max-width:767px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--author--msXYT .cflt-bio .cflt-pp img{height:25px;width:25px}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--right--202Fi{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (max-width:767px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--right--202Fi{display:none}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--right--202Fi svg{margin-left:35px;height:30px;width:30px;cursor:pointer}@media print{.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--metadata--3fkLj .style-module--right--202Fi svg{display:none}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--date--24xyw{color:#829494;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;display:block;margin-bottom:10px;text-transform:uppercase}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje{position:relative;color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12

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.style-module--content--3iWje pre{padding:30px 10px 20px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje a{color:#257bd7}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje sup{top:-2px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje img{max-width:100%;margin:10px auto;display:block}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje img.alignleft{float:left;margin-right:10px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje img.alignright{float:right;margin-left:10px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h2{color:#000;font-size:28px;font-weight:500}@media screen and (max-width:767px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h2{font-size:21px}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h3{color:#000;font-size:21px;font-weight:500;line-height:27px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h2.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h3.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h4.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h5.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h6.style-module--bookmarkable--Vemwc .style-module--bookmark--1S0Xm{display:none;font-size:14px;margin-left:5px;vertical-align:middle;text-decoration:none}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h2.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h3.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h4.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h5.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje h6.style-module--bookmarkable--Vemwc:hover .style-module--bookmark--1S0Xm{display:inline-block}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje iframe{max-width:100%}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje p{margin-bottom:20px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>ol li,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>ol span:not(.embed-gist),.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>p,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>ul li,.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje div>ul span:not(.embed-gist){color:#000!important;font-size:16px;font-weight:300}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje blockquote h4{line-height:inherit;font-size:16px;font-weight:400}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje blockquote br{display:none}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje blockquote em{font-size:20px;display:block}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje blockquote span{display:block;margin-top:10px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .style-module--copy--YJWu8{position:absolute;right:0}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .style-module--copy--YJWu8 i{cursor:pointer;position:relative;top:5px;right:8px;z-index:10;font-size:16px;opacity:.7}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .style-module--copy--YJWu8 i:hover{opacity:1}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje li .style-module--copy--YJWu8 i{top:30px}.style-

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module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje li p+.style-module--
copy--YJWu8 i{top:5px}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--
content--3iWje .style-module--tableWrapper--3giJw{width:100%}@media screen and (max-width:767px){.style-
module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .style-module--
tableWrapper--3giJw{overflow:scroll}}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-
module--content--3iWje .download_blue.rounded_button,.style-module--blogPost--1pOcN .style-module--
mainSection--3uX12 .style-module--content--3iWje .orange_button{transition:all .5s ease-in-out;transition:all .5s
cubic-bezier(.785,.135,.15,.86);border-radius:6px;display:inline-block;font-size:12px;font-weight:700;letter-
spacing:.9px;line-height:1.5;padding:12px 30px;text-align:center;text-decoration:none;text-
transform:uppercase;background-color:transparent;border:1px solid
#173361;color:#173361;color:#173361!important}.style-module--blogPost--1pOcN .style-module--mainSection--
3uX12 .style-module--content--3iWje .download_blue.rounded_button:hover,.style-module--blogPost--1pOcN
.style-module--mainSection--3uX12 .style-module--content--3iWje .orange_button:hover{cursor:pointer;text-
decoration:none}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--
3iWje .image-caption{display:block;font-size:14px;font-style:italic;font-weight:400;text-align:center}.style-
module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .cflt-bio{border-
top:2px solid hsla(0,0%,96.1%,.85);border-bottom:2px solid hsla(0,0%,96.1%,.85);margin-top:100px;padding:20px
0;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}@media screen and (max-
width:575px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje
.cflt-bio{-ms-flex-direction:column;flex-direction:column}}.style-module--blogPost--1pOcN .style-module--
mainSection--3uX12 .style-module--content--3iWje .cflt-bio .cflt-blurb{font-size:14px;font-weight:300;margin-
bottom:0}.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .cflt-
bio .cflt-blurb>*.style-module--blogPost--1pOcN .style-module--mainSection--
3uX12 .style-module--content--3iWje .cflt-bio .cflt-pp{margin-right:30px}@media print{.style-module--blogPost--
1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .cflt-bio .cflt-pp{display:none}}@media
screen and (max-width:575px){.style-module--blogPost--1pOcN .style-module--mainSection--3uX12 .style-module-
-content--3iWje .cflt-bio .cflt-pp{margin-right:0;margin-bottom:30px}}.style-module--blogPost--1pOcN .style-
module--mainSection--3uX12 .style-module--content--3iWje .cflt-bio .cflt-
pp>div{width:70px!important;height:70px!important}.style-module--blogPost--1pOcN .style-module--mainSection-
-3uX12 .style-module--content--3iWje .cflt-bio .cflt-pp img{height:70px;width:70px}.style-module--blogPost--
1pOcN .style-module--mainSection--3uX12 .style-module--content--3iWje .cflt-bio.cflt-default .cflt-
blurb{color:#173361!important;font-size:20px;font-weight:700}@media screen and (max-width:767px){.style-
module--blogPost--1pOcN .style-module--mainSection--3uX12 code{word-break:break-word}}.style-module--
contentSection--2SdyY{padding-top:40px;padding-bottom:40px}.style-module--contentSection--2SdyY .style-
module--nav--3Yw6O li{font-weight:700;letter-spacing:1.2px;font-size:14px;display:inline-block;text-
transform:uppercase}@media screen and (max-width:575px){.style-module--contentSection--2SdyY .style-module-
-nav--3Yw6O li{display:block}}.style-module--contentSection--2SdyY .style-module--nav--3Yw6O
li+li:before{content:" | ";margin:0 15px}@media screen and (max-width:575px){.style-module--contentSection--
2SdyY .style-module--nav--3Yw6O li+li:before{display:none}}.style-module--contentSection--2SdyY .style-
module--nav--3Yw6O li.style-module--active--3XD4X a{color:#000}.style-module--contentSection--2SdyY .style-
module--item--2pvTa{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;border-bottom:1px
solid #efefef;padding:40px 0}.style-module--contentSection--2SdyY .style-module--item--2pvTa:last-child{border-
bottom:none}.style-module--contentSection--2SdyY .style-module--imageContainer--jy83c{margin-
right:20px}.style-module--contentSection--2SdyY .style-module--imageContainer--jy83c img{max-
width:none;width:110px}@media screen and (max-width:575px){.style-module--contentSection--2SdyY .style-
module--imageContainer--jy83c{display:none}}.style-module--contentSection--2SdyY .style-module--content--
32ux0{text-align:left}.style-module--contentSection--2SdyY .style-module--content--32ux0 .style-module--date--
woPnD{color:#000;font-size:18px;font-weight:700;line-height:23px;font-weight:400}.style-module--

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contentSection--2SdyY .style-module--content--32ux0 .style-module--title--F4YNt{color:#173361;font-size:21px;font-weight:500;line-height:27px} .style-module--pageList--letxG .style-module--contentSection--jSGp3 {padding-top:40px;padding-bottom:40px} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li{font-weight:700;letter-spacing:1.2px;font-size:14px;display:inline-block;text-transform:uppercase}@media screen and (max-width:575px){.style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li{display:block}} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li+li:before{content:" | ";margin:0 15px}@media screen and (max-width:575px){.style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li+li:before{display:none}} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--nav--2VDJx li.style-module--active---WwI6 a{color:#000} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--item--1kvxe{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;border-bottom:1px solid #efefef;padding:40px 0} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--item--1kvxe:last-child{border-bottom:none} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--imageContainer--3CFtC{margin-right:20px} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--imageContainer--3CFtC img{max-width:none;width:110px}@media screen and (max-width:575px){.style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--imageContainer--3CFtC{display:none}} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--content--1WyTq{text-align:left} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--content--1WyTq .style-module--date--2FYZI{color:#000;font-size:18px;font-weight:700;line-height:23px;font-weight:400} .style-module--pageList--letxG .style-module--contentSection--jSGp3 .style-module--content--1WyTq .style-module--title--1yiWy{color:#173361;font-size:21px;font-weight:500;line-height:27px} .style-module--pageTemplate--2eJab .style-module--contentSection--jSGp3{color:#000;font-size:18px;font-weight:300;line-height:1.39;text-align:left}@media screen and (max-width:767px){.style-module--pageTemplate--2eJab .style-module--contentSection--jSGp3 {margin-top:20px}} .style-module--pageTemplate--2eJab .style-module--contentSection--jSGp3 h2{margin-bottom:40px} .style-module--pageTemplate--2eJab .style-module--contentSection--jSGp3 .style-module--section--LDg5t{margin:20px 0} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--card--_rdUr,.style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL .style-module--card--_rdUr{padding:25px;color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--card--_rdUr h3,.style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL .style-module--card--_rdUr h3{color:#173361;font-size:18px;font-weight:700;line-height:23px;margin-bottom:25px;padding-bottom:0} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl h1{margin-bottom:50px} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--content--1Sy2Q{width:100%} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--content--1Sy2Q .style-module--card--_rdUr{background:#c4eff2} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--content--1Sy2Q .style-module--card--_rdUr: hover{border-color:#0074a2} .style-module--pageResourceList--2xJSM .style-module--hero--3gfzl .style-module--content--1Sy2Q .style-module--card--_rdUr img{max-height:160px;width:auto} .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL{padding-top:20px}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL{padding-top:0}} .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL .style-module--card--_rdUr{background:hsla(0,0%,96.1%,.85)} .style-module--pageResourceList--2xJSM .style-module--resourceList--ci7VL .style-module--card--_rdUr .style-module--cardContent--3dK28{overflow:hidden;text-overflow:ellipsis;display:-webkit-box;-webkit-line-clamp:4;-webkit-box-orient:vertical} .style-module--pageResourceList--2xJSM .style-module--header--32Kgf{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;margin-bottom:50px}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf{-ms-flex-direction:column-reverse;flex-direction:column-reverse}} .style-module--pageResourceList--2xJSM .style-module--

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header--32Kgf form{display:-ms-flexbox;display:flex;-ms-flex-pack:start;justify-content:flex-start;-ms-flex-wrap:wrap;flex-wrap:wrap;width:100%;max-width:calc(100% - 140px)}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form{-ms-flex-direction:column;flex-direction:column;max-width:none;padding-top:10px;border-top:2px solid hsla(0,0%,96.1%,.85)}.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS{margin-right:10px;width:calc((100% - 40px)/5)}@media screen and (min-width:768px) and (max-width:991px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS{margin-bottom:10px;width:calc((100% - 30px)/3)}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS{width:100%;margin-bottom:10px;margin-right:0}}.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS:last-child{margin-right:0}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf form .style-module--select--2IqDS:last-child{margin-bottom:0}}.style-module--pageResourceList--2xJSM .style-module--header--32Kgf button{-ms-flex-item-align:start;align-self:flex-start}@media screen and (max-width:767px){.style-module--pageResourceList--2xJSM .style-module--header--32Kgf button{width:100%;margin-bottom:10px}}@media screen and (max-width:767px){.style-module--coverModule--1neFV{text-align:center}}.style-module--coverModule--1neFV img{max-height:250px;height:auto}.style-module--contentModule--2GbeI.style-module--fullWidth--3WdfM{max-width:none!important}.style-module--contentModule--2GbeI ol li,.style-module--contentModule--2GbeI ol span,.style-module--contentModule--2GbeI p,.style-module--contentModule--2GbeI ul li,.style-module--contentModule--2GbeI ul span{color:#000;font-size:14px;font-weight:300;line-height:25px}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ .col-sm-6{width:49%}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx [id^=vidyard_] {max-width:599px!important;width:100%!important}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx:not(.style-module--slide--2TjeV) .row .col-sm-6{width:100%}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx.style-module--slide--2TjeV .row{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (max-width:767px){.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx.style-module--slide--2TjeV .row .col-sm-6{width:100%;text-align:center}.style-module--contentModule--2GbeI .style-module--genericContent--jUIVQ.style-module--video--2Lodx.style-module--slide--2TjeV .row .col-sm-6+.col-sm-6{margin-top:20px}}.style-module--contentModule--2GbeI .style-module--recordingTime--1eBRY p{font-size:18px;font-weight:700}.style-module--contentModule--2GbeI h2{color:#000;font-size:28px}.style-module--contentModule--2GbeI .style-module--content--1Smjq img{width:100%;max-width:100px;border-radius:50%;margin-right:20px}.style-module--contentModule--2GbeI .style-module--content--1Smjq .style-module--speakerContainer--1AYAJ .style-module--speaker--r_Ydq{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}.style-module--contentModule--2GbeI .style-module--content--1Smjq .style-module--speakerContainer--1AYAJ .style-module--speaker--r_Ydq img{max-width:100px;width:auto}.style-module--formModule--2QTTW{max-width:480px;width:100%}@media screen and (min-width:768px){.style-module--formModule--2QTTW{position:absolute;right:0;top:0}}.style-module--formModule--2QTTW .style-module--formContainer--2LkcV{background:hsla(0,0%,96.1%,.85);border-radius:8px;padding:25px;position:relative}.style-module--formModule--2QTTW .style-module--formContainer--2LkcV h3{color:#173361;font-size:18px;font-weight:700;text-align:center;margin-bottom:20px}.style-module--formModule--2QTTW .style-module--formContainer--2LkcV form.style-module--form--1G1ba{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;width:100%!important}.style-module--formModule--2QTTW .style-module--formContainer--2LkcV form.style-module--form--1G1ba input,.style-module--formModule--2QTTW .style-module--formContainer--2LkcV form.style-module--form--1G1ba select{background-color:#fff!important;border:2px solid hsla(0,0%,73.3%,.5)!important;border-radius:4px;width:100%!important;margin-bottom:5px;color:#000;font-size:14px;line-height:1.2!important;padding:10px!important}.style-module--formModule--2QTTW .style-module--

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formContainer--2LkcV form.style-module--form--1G1ba input::-webkit-input-placeholder,.style-module--
formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba select::-webkit-
input-placeholder{ color:#829494 }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV
form.style-module--form--1G1ba input::-moz-placeholder,.style-module--formModule--2QTWW .style-module--
formContainer--2LkcV form.style-module--form--1G1ba select::-moz-placeholder{ color:#829494 }.style-module--
formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba input:-ms-input-
placeholder,.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--
form--1G1ba select:-ms-input-placeholder{ color:#829494 }.style-module--formModule--2QTWW .style-module--
formContainer--2LkcV form.style-module--form--1G1ba input::placeholder,.style-module--formModule--2QTWW
.style-module--formContainer--2LkcV form.style-module--form--1G1ba select::placeholder{ color:#829494 }.style-
module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-module--form--1G1ba
select{ cursor:pointer;color:#829494 }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV
form.style-module--form--1G1ba .mktoButtonRow{ text-align:center;margin-top:25px;-ms-flex-
order:15;order:15 }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-
module--form--1G1ba .mktoButtonRow button{ transition:all .5s ease-in-out;transition:all .5s cubic-
bezier(.785,.135,.15,.86);border-radius:6px;border-style:solid;border-width:1px;display:inline-block;font-
size:12px;font-weight:700;letter-spacing:.9px;line-height:1.5;padding:12px 30px;text-align:center;text-
decoration:none;text-transform:uppercase;background-color:#173361 !important;border-
color:#173361 !important;color:#fff !important;width:auto !important;font-size:12px !important;font-
weight:400 !important }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV form.style-
module--form--1G1ba .mktoButtonRow button:hover{ cursor:pointer;text-decoration:none;border:1px solid
#173361 !important }.style-module--formModule--2QTWW .style-module--formContainer--2LkcV
.mktoRequiredField label.mktoHasWidth{ color:#173361;width:auto !important }.style-module--
thankyouCtaModule--3D9ye{ margin-bottom:100px }.style-module--thankyouCtaModule--3D9ye .style-module--
contentContainer--N9Zhx{ display:-ms-flexbox;display:flex } @media screen and (max-width:991px){ .style-module-
thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx { -ms-flex-direction:column;flex-
direction:column } }.style-module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-
module--card--2kGFK{ -ms-flex:1 1;flex:1 1;margin-right:10px;position:relative } @media screen and (max-
width:991px){ .style-module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-module--
card--2kGFK{ margin-right:0;margin-bottom:50px } }.style-module--thankyouCtaModule--3D9ye .style-module--
contentContainer--N9Zhx .style-module--card--2kGFK:last-child{ margin-right:0 } @media screen and (max-
width:991px){ .style-module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-module--
card--2kGFK:last-child{ margin-bottom:0 } }.style-module--thankyouCtaModule--3D9ye .style-module--
contentContainer--N9Zhx .style-module--card--2kGFK>div{ text-align:center }.style-module--thankyouCtaModule--
3D9ye .style-module--contentContainer--N9Zhx .style-module--card--2kGFK>div a{ margin-top:20px }.style-
module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-module--card--2kGFK
h3{ color:#173361;font-size:12px;font-weight:500;letter-spacing:1.2px;text-transform:uppercase;margin:20px 0
30px }.style-module--thankyouCtaModule--3D9ye .style-module--contentContainer--N9Zhx .style-module--card--
2kGFK .style-module--icon--2vg1C{ position:absolute;top:0;left:50%;-ms-transform:translate(-50%,-
50%);transform:translate(-50%,-50%) }.style-module--thankyouCtaModule--3D9ye .style-module--
contentContainer--N9Zhx .style-module--card--2kGFK .style-module--icon--2vg1C
svg{ height:60px;width:auto }.style-module--page--2eWr8 .style-module--heroSection--2gXmv{ margin-
bottom:25px }.style-module--page--2eWr8 .style-module--heroSection--2gXmv>div{ -ms-flex-pack:start;justify-
content:flex-start;text-align:left }.style-module--page--2eWr8 .style-module--pageContent--21Evr{ margin-
bottom:100px }.style-module--page--2eWr8 .style-module--pageContent--21Evr>section{ padding-top:0;padding-
bottom:0;min-height:640px }.style-module--page--2eWr8 .style-module--pageContent--21Evr p{ margin:15px
0 }.style-module--page--2eWr8 .style-module--content--3ZqVM{ display:-ms-flexbox;display:flex;-ms-flex-
direction:column;flex-direction:column;text-align:left;position:relative }.style-module--page--2eWr8 .style-module--
```

content--3ZqvM .style-module--columns--rMAvt{display:-ms-flexbox;display:flex}@media screen and (max-width:767px){.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt{-ms-flex-align:center;align-items:center;-ms-flex-direction:column;flex-direction:column}}.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div{-ms-flex:1 1;flex:1 1}@media screen and (min-width:768px){.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div:first-child{min-width:360px;width:100%;max-width:600px}}.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div.style-module--spacer--1vFos{max-width:480px;width:100%;position:relative}@media screen and (min-width:768px){.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div.style-module--spacer--1vFos{margin-left:40px}}.style-module--page--2eWr8 .style-module--content--3ZqvM .style-module--columns--rMAvt>div.style-module--spacer--1vFos.style-module--noPointer--aUuu8{pointer-events:none}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow:first-of-type,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow:first-of-type{-ms-flex-order:14;order:14}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText{margin-top:15px;width:100%!important}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText span,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText span{color:#829494!important}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText span span,.style-module--page--

2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText span span,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText span span{text-decoration:none!important}.style-module--page--2eWr8 #mktoForm\_1734 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3762 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3768 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3774 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_3924 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4143 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4154 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4162 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4164 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4169 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4248 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4371 .mktoFormRow .mktoHtmlText span a,.style-module--page--2eWr8 #mktoForm\_4381 .mktoFormRow .mktoHtmlText span a{color:#257bd7!important}.style-module--thankyouPage--q8Sx\_ iframe {max-width:100%}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv>div {padding:70px}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv .style-module--content--3ZqvM {width:90%}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv .style-module--content--3ZqvM .style-module--button--xWcox {margin-top:50px}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv .style-module--content--3ZqvM .orange\_button{transition:all .5s ease-in-out;transition:all .5s cubic-bezier(.785,.135,.15,.86);border-radius:6px;display:inline-block;font-size:12px;font-weight:700;letter-spacing:.9px;line-height:1.5;padding:12px 30px;text-align:center;text-decoration:none;text-transform:uppercase;background-color:#fff;border:1px solid #fff;color:#173361;display:block;width:260px;margin:50px auto 0}.style-module--thankyouPage--q8Sx\_ .style-module--heroSection--2gXmv .style-module--content--3ZqvM .orange\_button: hover{cursor:pointer;text-decoration:none}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur [id^=vidyard\_]{max-width:599px!important;width:100%!important}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur .style-module--caption--3c1g\_ .style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur p {font-size:14px}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur: not(.style-module--slide--NvD8Q) .row .col-sm-6 {width:100%}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur .style-module--slide--NvD8Q .row {display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}@media screen and (max-width:767px){.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur .style-module--slide--NvD8Q .row .col-sm-6 {width:100%;text-align:center}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--video--zS5ur .style-module--slide--NvD8Q .row .col-sm-6+.col-sm-6 {margin-top:20px}}.style-module--thankyouPage--q8Sx\_ .style-module--webinarContent--1UBae .style-module--

```

thankyouMessage--1L9PD{margin-top:40px}@media screen and (max-width:767px){.style-module--testimonials--
2eY00 .style-module--header--C0_Br{margin:20px 0}}.style-module--testimonials--2eY00 .style-module--pager--
1Lh_S{margin-top:0;margin-bottom:0;padding:0;list-style:none;display:-ms-
flexbox!important;display:flex!important;overflow-x:scroll}@media screen and (min-width:992px){.style-module--
testimonials--2eY00 .style-module--pager--1Lh_S{-ms-flex-pack:center;justify-content:center;margin-
left:auto;margin-right:auto;overflow-x:hidden}}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S
li{display:-ms-flexbox;display:flex;-ms-flex-align:end;align-items:flex-end;margin-left:20px;margin-
right:20px}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S li:first-child{margin-left:0}.style-
module--testimonials--2eY00 .style-module--pager--1Lh_S li:last-child{margin-right:0}.style-module--testimonials-
2eY00 .style-module--pager--1Lh_S div{padding:20px;position:relative;border-bottom:2px solid
#fff;cursor:pointer}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S span{display:inline-
block}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--logo_demonware--2NWgW
span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/c007816e3c3e863cc1ba2e56c5ff
cdb24675cea7/demonware-inactive@1x.png") no-repeat;background-size:177px
52px;width:177px;height:52px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_demonware--2NWgW span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/dfccd6b0f1f5dfa154397dc93c713adeb407b7
7c/demonware-inactive@2x.png")}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-
module--logo_demonware--2NWgW:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid
transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-
50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_demonware--2NWgW:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_demonware--2NWgW:hover:after{border-bottom-color:#2bc7f6}.style-module--testimonials--2eY00 .style-
module--pager--1Lh_S .style-module--logo_demonware--2NWgW:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/3ede249ffc57be8a8c1ebf27df25d3f79819f
71/demonware-active@1x.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_demonware--2NWgW:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/137fe5177082deef18bd8d1ca809c3ba4c98e
a09/demonware-active@2x.png")}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active
.style-module--logo_demonware--2NWgW,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-
active .style-module--logo_demonware--2NWgW:after{border-bottom-color:#2bc7f6}.style-module--testimonials--
2eY00 .style-module--pager--1Lh_S .slick-active .style-module--logo_demonware--2NWgW span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/3ede249ffc57be8a8c1ebf27df25d3f79819f
71/demonware-active@1x.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-
module--logo_demonware--2NWgW span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/137fe5177082deef18bd8d1ca809c3ba4c98e
a09/demonware-active@2x.png")}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_uronext--3Amyq
span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/0e71eaf193cff199816be9f59b67
add6e04b3d16/uronext-inactive@1x.png") no-repeat;background-size:155px
52px;width:155px;height:52px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_uronext--3Amyq span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/102e3d9fe091abc385c4c1a52a090c39763a0
010/uronext-inactive@2x.png")}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--

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logo\_uronext--3Amyq:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_uronext--3Amyq:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_uronext--3Amyq:hover:after{border-bottom-color:#009484}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_uronext--3Amyq:hover span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/6a70a772d4c833324186561d036dfca1c2297fca/uronext-active@1x.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_uronext--3Amyq:hover span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/86ef10cb5881342b97a6c9119c9616aaa77ca2ba/uronext-active@2x.png")}}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_uronext--3Amyq,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_uronext--3Amyq:after{border-bottom-color:#009484}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_uronext--3Amyq span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/6a70a772d4c833324186561d036dfca1c2297fca/uronext-active@1x.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_uronext--3Amyq span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/86ef10cb5881342b97a6c9119c9616aaa77ca2ba/uronext-active@2x.png")}}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_audi--1TXrG span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/07a005ec92f2dc0f02941ca0b1ce1bec5c3c7669/audi-inactive@1x.png")}no-repeat;background-size:99px 52px;width:99px;height:52px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_audi--1TXrG span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/aa9024c2305edd3c9c89eb4b859c06153ce83d71/audi-inactive@2x.png")}}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_audi--1TXrG:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_audi--1TXrG:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_audi--1TXrG:hover:after{border-bottom-color:#f53d42}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_audi--1TXrG:hover span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/a562069b623aa86fc226014cc9dec768a6af759c/audi-active@1x.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_audi--1TXrG:hover span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/80c01a3d2964e2c4190542098d570785f9f96844/audi-active@2x.png")}}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_audi--1TXrG,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_audi--1TXrG:after{border-bottom-color:#f53d42}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_audi--1TXrG span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/a562069b623aa86fc226014cc9dec768a6af759c/audi-active@1x.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_audi--1TXrG span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/80c01a3d2964e2c4190542098d570785f9f96

844/audi-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP

span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/7ad37ca2b928e30340dd1915e506ed4c87d1b80b/tivo-inactive@1x.png") no-repeat;background-size:94px 52px;width:94px;height:52px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/f8f80f57af322ca3011028ff76a8a88697103fe0/tivo-inactive@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:hover:after{border-bottom-color:#0398cc}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/b72ed025599af4bef5003d7b7c4624db94fdf6d4/tivo-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_tivo--2zWPP:span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/fe5b8286b9637b2a6ce3c5e65f9185aa145db9c3/tivo-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_tivo--2zWPP,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_tivo--2zWPP:after{border-bottom-color:#0398cc}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_tivo--2zWPP span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/b72ed025599af4bef5003d7b7c4624db94fdf6d4/tivo-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--logo\_tivo--2zWPP span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/fe5b8286b9637b2a6ce3c5e65f9185aa145db9c3/tivo-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK

span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/7c00f1dcadcea2cc04db4e5da9d3f63f88fed239/recursion-inactive@1x.png") no-repeat;background-size:148px 59px;width:148px;height:59px}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/326e1553106d5ccf0a708363688645e0fa163cb2/recursion-inactive@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:hover:after{border-bottom-color:#9e4e9b}.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/614ce0dc7760e2497100a0011d80a7777438604b/recursion-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_recursion--WqzQK:span{background-image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/8451aabc5bacc0d92dc5ddc9f77f114d8af38c

```

02/recursion-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active
.style-module--logo_recursion--WqzQK,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-
active .style-module--logo_recursion--WqzQK:after{border-bottom-color:#9e4e9b}.style-module--testimonials--
2eY00 .style-module--pager--1Lh_S .slick-active .style-module--logo_recursion--WqzQK span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/614ce0dc7760e2497100a0011d80a7777438
604b/recursion-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and
(min-resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-
module--logo_recursion--WqzQK span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/8451aabc5bacc0d92dc5ddc9f77f114d8af38c
02/recursion-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_lyft--1JA6P
span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/b9a5d25b421feeb7ce7bf1da1cbc
de167d5f2718/lyft-inactive@1x.png") no-repeat;background-size:54px 59px;width:54px;height:59px}@media only
screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--
testimonials--2eY00 .style-module--pager--1Lh_S .style-module--logo_lyft--1JA6P span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/b393ae7b01d02b01e19760682ef3c4fe4b24b
6b5/lyft-inactive@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_lyft--1JA6P:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid transparent;border-
bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-
50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_lyft--1JA6P:hover,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--logo_lyft--
1JA6P:hover:after{border-bottom-color:#ea0a8c}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S
.style-module--logo_lyft--1JA6P:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/6dafee3586397cc46c412282c822f6e911732
054/lyft-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-
resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--logo_lyft--
1JA6P:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/7d01fbc53d2cd6596907cd5e227fd21fcef41c
ba/lyft-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-
module--logo_lyft--1JA6P,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-
module--logo_lyft--1JA6P:after{border-bottom-color:#ea0a8c}.style-module--testimonials--2eY00 .style-module--
pager--1Lh_S .slick-active .style-module--logo_lyft--1JA6P span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/6dafee3586397cc46c412282c822f6e911732
054/lyft-active@1x.png"))}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-
resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-module--
logo_lyft--1JA6P span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/7d01fbc53d2cd6596907cd5e227fd21fcef41c
ba/lyft-active@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_bosch--1am6O
span{background:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/fd140b4c26f3c1d87ee13771867
9d179bcbcd65d/bosch-inactive@1x.png") no-repeat;background-size:107px 59px;width:107px;height:59px}@media
only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-resolution:1.25dppx){.style-module--
testimonials--2eY00 .style-module--pager--1Lh_S .style-module--logo_bosch--1am6O span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/f04f8c26bb76670a060dc747bf61a5730ac64
350/bosch-inactive@2x.png"))}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_bosch--1am6O:after{width:0;height:0;border-left:5px solid transparent;border-right:5px solid
transparent;border-bottom:5px solid #fff;content:"";position:absolute;left:50%;bottom:0;-ms-transform:translateX(-
50%);transform:translateX(-50%)}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--

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logo\_bosch--1am6O: hover, .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_bosch--1am6O: hover: after { border-bottom-color: #ea0215 } .style-module--testimonials--2eY00 .style-module--  
pager--1Lh\_S .style-module--logo\_bosch--1am6O: hover span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/530eb0282bb3d318576eb05cb58ef0afb3e33e3/bosch-active@1x.png")} @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and (min-  
resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_bosch--  
1am6O: hover span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/6505032981159f7aaacf97ff8cb80f2d2576ab  
b5/bosch-active@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-  
module--logo\_bosch--1am6O, .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-  
module--logo\_bosch--1am6O: after { border-bottom-color: #ea0215 } .style-module--testimonials--2eY00 .style-  
module--pager--1Lh\_S .slick-active .style-module--logo\_bosch--1am6O span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/530eb0282bb3d318576eb05cb58ef0afb3e33e3/bosch-active@1x.png")} @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and (min-  
resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--  
logo\_bosch--1am6O span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/6505032981159f7aaacf97ff8cb80f2d2576ab  
b5/bosch-active@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE  
span { background: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/00596b513d0ed47a67b69b966f9  
ea42e6a8474b2/nuuly-inactive@1x.png") no-repeat; background-size: 104px  
59px; width: 104px; height: 59px } @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and  
(min-resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/65f0a6c5b63c689da45792e095deb364aa7be  
ef8/nuuly-inactive@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE: after { width: 0; height: 0; border-left: 5px solid transparent; border-right: 5px solid  
transparent; border-bottom: 5px solid #fff; content: ""; position: absolute; left: 50%; bottom: 0; -ms-transform: translateX(-  
50%); transform: translateX(-50%)} .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE: hover, .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_nuuly--9d-UE: hover: after { border-bottom-color: #000 } .style-module--testimonials--2eY00 .style-module--  
pager--1Lh\_S .style-module--logo\_nuuly--9d-UE: hover span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/f0e1ff6ba8439f6e254a46b2495e03288d8e7  
873/nuuly-active@1x.png")} @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and (min-  
resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--logo\_nuuly--  
9d-UE: hover span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/cdaa71ec4ef4c1fdaeb06c54ab580e9b437e87  
64/nuuly-active@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-  
module--logo\_nuuly--9d-UE, .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-  
module--logo\_nuuly--9d-UE: after { border-bottom-color: #000 } .style-module--testimonials--2eY00 .style-module--  
pager--1Lh\_S .slick-active .style-module--logo\_nuuly--9d-UE span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/f0e1ff6ba8439f6e254a46b2495e03288d8e7  
873/nuuly-active@1x.png")} @media only screen and (-webkit-min-device-pixel-ratio: 1.25), only screen and (min-  
resolution: 1.25dppx) { .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .slick-active .style-module--  
logo\_nuuly--9d-UE span { background-  
image: url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/cdaa71ec4ef4c1fdaeb06c54ab580e9b437e87  
64/nuuly-active@2x.png")} } .style-module--testimonials--2eY00 .style-module--pager--1Lh\_S .style-module--  
logo\_forbes--3sEAE





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logo_googlecloud--2trjN:hover:after{border-bottom-color:#2b84e7}.style-module--testimonials--2eY00 .style-
module--pager--1Lh_S .style-module--logo_googlecloud--2trjN:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/17372a5dec0afcd56933c047fbb5a1fa23e2ec
b6/googlecloud-active.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-
resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .style-module--
logo_googlecloud--2trjN:hover span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/17372a5dec0afcd56933c047fbb5a1fa23e2ec
b6/googlecloud-active.png")}}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-
module--logo_googlecloud--2trjN,.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active
.style-module--logo_googlecloud--2trjN:after{border-bottom-color:#2b84e7}.style-module--testimonials--2eY00
.style-module--pager--1Lh_S .slick-active .style-module--logo_googlecloud--2trjN span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/17372a5dec0afcd56933c047fbb5a1fa23e2ec
b6/googlecloud-active.png")}@media only screen and (-webkit-min-device-pixel-ratio:1.25),only screen and (min-
resolution:1.25dppx){.style-module--testimonials--2eY00 .style-module--pager--1Lh_S .slick-active .style-module--
logo_googlecloud--2trjN span{background-
image:url("https://d33wubrfki0l68.cloudfront.net/images/rebrand/logos/17372a5dec0afcd56933c047fbb5a1fa23e2ec
b6/googlecloud-active.png")}}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S
.container{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-
align:end;align-items:flex-end;min-width:760px}.style-module--testimonials--2eY00 .style-module--pager--1Lh_S
.container>div{padding:20px;position:relative;border-bottom:2px solid #fff;cursor:pointer}.style-module--
testimonials--2eY00 .slick-list{padding:40px 0}.style-module--testimonials--2eY00 .slick-list .slick-track{display:-
ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}.style-module--testimonials--2eY00 .style-module-
-testimonial--qVXIA{text-align:center}.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA
header{font-size:12px;font-weight:300;letter-spacing:2px;line-height:2.67;text-transform:uppercase}.style-module--
testimonials--2eY00 .style-module--testimonial--qVXIA header .style-module--name--1KjXx{color:#173361;font-
size:12px;font-weight:500;line-height:2.67;letter-spacing:2px}.style-module--testimonials--2eY00 .style-module--
testimonial--qVXIA blockquote{border:0;color:#38cccd;font-size:30px;font-weight:700;font-style:italic;line-
height:1.25;margin:20px auto;max-width:780px;padding:0}.style-module--testimonials--2eY00 .style-module--
testimonial--qVXIA blockquote:after,.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA
blockquote:before{content:""}.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA blockquote
a{color:inherit}.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA .style-module--
ctaContainer--305F4{position:relative}.style-module--testimonials--2eY00 .style-module--testimonial--qVXIA
.style-module--ctaContainer--305F4:after{content:"\203A";color:#0074a2;position:absolute;top:-7px;line-
height:1;font-size:30px;right:-15px}@media screen and (max-width:767px){.style-module--testimonials--2eY00
.style-module--testimonial--qVXIA .style-module--ctaContainer--305F4:after{display:none}}.style-module--
testimonials--2eY00 .style-module--testimonial--qVXIA .style-module--ctaContainer--305F4 a{color:#0074a2;text-
decoration:underline}.style-module--card--1fsSo{transition:all .5s ease-in-out;transition:all .5s cubic-
bezier(1,0,0,1);border-radius:8px;background-color:#fff;padding:30px 30px 0;margin:0 auto 40px}.style-module--
card--1fsSo .slick-list{padding:20px 0 0}.style-module--card--34klN{transition:all .5s ease-in-out;transition:all .5s
cubic-bezier(1,0,0,1);border-radius:8px;background-color:#fff;padding:30px}.style-module--card--34klN.style-
module--clickable--2Yaw8{cursor:pointer;border:2px solid transparent}.style-module--card--34klN.style-module--
clickable--2Yaw8:hover{border-color:#173361;-ms-transform:scale(1.05);transform:scale(1.05)}.style-module--
card--34klN .style-module--label--1lqnK{margin-bottom:13px;text-transform:uppercase}.style-module--card--
34klN .style-module--label--1lqnK h4{background:#0074a2;border-radius:4px;color:#fff;display:inline-block;font-
size:12px;font-weight:500;letter-spacing:1.2px;margin:0;padding:5px 10px}.style-module--card--34klN .style-
module--label--1lqnK.style-module--denim--urWOq h4{background:#173361}.style-module--card--34klN .style-
module--label--1lqnK.style-module--academy--88tr5 h4{background:#0074a2}.style-module--card--34klN .style-
module--label--1lqnK.style-module--island--3Prwv h4{background:#38cccd}.style-module--card--34klN .style-

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module--label--1lqnK.style-module--robinSEggBlue--1da6r h4{background:#b4e1e4}.style-module--card--34klN
.style-module--label--1lqnK.style-module--sahara--iUZFc h4{background:#c5832e}.style-module--card--34klN
.style-module--label--1lqnK.style-module--canary--28W1H h4{background:#ffc40c}.style-module--card--34klN
.style-module--wrapper--1at_H{color:inherit;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-
align:left;margin:0;display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-
direction:column;height:100%}.style-module--card--34klN .style-module--wrapper--1at_H.style-module--
image_left--19IAJ,.style-module--card--34klN .style-module--wrapper--1at_H.style-module--image_right--
3CHGD{display:-ms-flexbox;display:flex}@media screen and (max-width:767px){.style-module--card--34klN
.style-module--wrapper--1at_H.style-module--image_left--19IAJ,.style-module--card--34klN .style-module--
wrapper--1at_H.style-module--image_right--3CHGD{display:block}}.style-module--card--34klN .style-module--
wrapper--1at_H.style-module--image_left--19IAJ .style-module--imageWrapper--1FRHo,.style-module--card--
34klN .style-module--wrapper--1at_H.style-module--image_right--3CHGD .style-module--imageWrapper--1FRHo{-
ms-flex:2 1;flex:2 1;max-width:160px}@media screen and (max-width:767px){.style-module--card--34klN .style-
module--wrapper--1at_H.style-module--image_left--19IAJ .style-module--imageWrapper--1FRHo,.style-module--
card--34klN .style-module--wrapper--1at_H.style-module--image_right--3CHGD .style-module--imageWrapper--
1FRHo{text-align:left;margin-bottom:15px}}.style-module--card--34klN .style-module--wrapper--1at_H.style-
module--image_left--19IAJ .style-module--imageWrapper--1FRHo img,.style-module--card--34klN .style-module--
wrapper--1at_H.style-module--image_right--3CHGD .style-module--imageWrapper--1FRHo img{max-
width:200px}.style-module--card--34klN .style-module--wrapper--1at_H.style-module--image_left--19IAJ .style-
module--copy--3YFnP,.style-module--card--34klN .style-module--wrapper--1at_H.style-module--image_right--
3CHGD .style-module--copy--3YFnP{-ms-flex:4 1;flex:4 1}.style-module--card--34klN .style-module--wrapper--
1at_H.style-module--image_left--19IAJ{-ms-flex-direction:row;flex-direction:row}.style-module--card--34klN
.style-module--wrapper--1at_H.style-module--image_left--19IAJ .style-module--imageWrapper--1FRHo{margin-
right:25px}.style-module--card--34klN .style-module--wrapper--1at_H.style-module--image_right--3CHGD{-ms-
flex-direction:row-reverse;flex-direction:row-reverse}.style-module--card--34klN .style-module--wrapper--
1at_H.style-module--image_right--3CHGD .style-module--imageWrapper--1FRHo{margin-left:25px;text-
align:right}.style-module--card--34klN .style-module--wrapper--1at_H.style-module--image_top--39SWu .style-
module--imageWrapper--1FRHo{margin-bottom:15px;text-align:center}.style-module--card--34klN .style-module--
wrapper--1at_H.style-module--image_top--39SWu .style-module--copy--3YFnP{-ms-flex:1 1;flex:1 1;display:-ms-
flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}.style-module--card--34klN .style-module--
wrapper--1at_H .style-module--imageWrapper--1FRHo img{width:100%}.style-module--card--34klN .style-
module--wrapper--1at_H .style-module--copy--3YFnP h3{color:#000;font-size:18px;font-weight:700;line-
height:1.5;margin:0;padding:0 0 10px;overflow:hidden;text-overflow:ellipsis}.style-module--card--34klN .style-
module--wrapper--1at_H .style-module--copy--3YFnP h3 a{color:inherit;pointer-events:none;text-
decoration:none}.style-module--card--34klN .style-module--wrapper--1at_H .style-module--copy--3YFnP
p{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;max-width:450px;margin:0
auto}.style-module--card--34klN .style-module--wrapper--1at_H .style-module--copy--3YFnP .style-module--meta-
2DoOH{color:#0074a2;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;display:block;line-
height:normal;text-transform:uppercase;margin-bottom:10px}.style-module--card--34klN .style-module--wrapper--
1at_H .style-module--copy--3YFnP .style-module--contentContainer--WACfF{margin-bottom:20px}.style-module--
card--34klN .style-module--wrapper--1at_H .style-module--copy--3YFnP .style-module--contentContainer--
WACfF p{margin-left:0;margin-right:0}.style-module--card--34klN .style-module--wrapper--1at_H .style-module--
copy--3YFnP .style-module--contentContainer--WACfF.style-module--noCta--_nvte{margin-bottom:0}.style-
module--card--34klN .style-module--wrapper--1at_H .style-module--copy--3YFnP .style-module--buttonContainer--
GiF5v{margin:auto 0 0}.style-module--card--34klN .style-module--wrapper--1at_H .style-module--copy--3YFnP
.style-module--buttonContainer--GiF5v a{display:inline-block}.style-module--denim--urWOq.style-module--active-
2sKU1{border:2px solid #173361;background-color:rgba(23,51,97,.05)}.style-module--denim--urWOq .style-
module--label--1lqnK h4{background:none;color:#173361}.style-module--denim--urWOq .style-module--wrapper--

```



```
1at_H .style-module--copy--3YFnP h3{color:#173361}.style-module--purple--nb0ge.style-module--active--
2sKU1{border:2px solid #551d9d;background-color:rgba(85,29,157,.05)}.style-module--purple--nb0ge .style-
module--label--1lqnK h4{background:none;color:#551d9d}.style-module--purple--nb0ge .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#551d9d}.style-module--green--3SxHv.style-module--active--
2sKU1{border:2px solid #159e86;background-color:rgba(21,158,134,.05)}.style-module--green--3SxHv .style-
module--label--1lqnK h4{background:none;color:#159e86}.style-module--green--3SxHv .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#159e86}.style-module--blue--1XZoW.style-module--active--
2sKU1{border:2px solid #0daccc;background-color:rgba(13,172,204,.05)}.style-module--blue--1XZoW .style-
module--label--1lqnK h4{background:none;color:#0daccc}.style-module--blue--1XZoW .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#0daccc}.style-module--orange--1rWcw.style-module--active--
2sKU1{border:2px solid #e37d62;background-color:rgba(227,125,98,.05)}.style-module--orange--1rWcw .style-
module--label--1lqnK h4{background:none;color:#e37d62}.style-module--orange--1rWcw .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#e37d62}.style-module--grey--3LMDj.style-module--active--
2sKU1{border:2px solid #58788c;background-color:rgba(88,120,140,.05)}.style-module--grey--3LMDj .style-
module--label--1lqnK h4{background:none;color:#58788c}.style-module--grey--3LMDj .style-module--wrapper--
1at_H .style-module--copy--3YFnP h3{color:#58788c}.index-module--pageCommunity--2w1tS h2{font-
size:26px;font-weight:400}.index-module--pageCommunity--2w1tS h3{font-size:18px!important;line-
height:1.2!important}.index-module--pageCommunity--2w1tS ul{list-style:none;margin:0;padding:0}.index-
module--pageCommunity--2w1tS .index-module--button--2A-hL{border-radius:4px;border:1px solid #2a2a2d;text-
transform:uppercase;font-size:12px;color:#2a2a2d;letter-spacing:.75px;font-weight:700;text-
decoration:none;padding:10px 40px}.index-module--pageCommunity--2w1tS .index-module--bgGrey--
Sx7Vvk{background-color:#f0f0f2}.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu
section>div{margin-bottom:0}.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu section
p{max-width:590px;margin:15px auto}.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu
.index-module--supportingLinks--1jeNd{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center;margin:50px auto 0}@media screen and (max-width:767px){.index-module--pageCommunity--
2w1tS .index-module--hero--2uRdu .index-module--supportingLinks--1jeNd{margin-top:25px}}@media screen and
(max-width:575px){.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu .index-module--
supportingLinks--1jeNd{-ms-flex-direction:column;flex-direction:column}}.index-module--pageCommunity--
2w1tS .index-module--hero--2uRdu .index-module--supportingLinks--1jeNd>{*margin-right:15px}.index-module--
pageCommunity--2w1tS .index-module--hero--2uRdu .index-module--supportingLinks--1jeNd>:last-child{margin-
right:0}@media screen and (max-width:575px){.index-module--pageCommunity--2w1tS .index-module--hero--
2uRdu .index-module--supportingLinks--1jeNd>:last-child{margin-bottom:0}}@media screen and (max-
width:575px){.index-module--pageCommunity--2w1tS .index-module--hero--2uRdu .index-module--
supportingLinks--1jeNd>{*margin-right:0;margin-bottom:15px}}.index-module--pageCommunity--2w1tS .index-
module--content--10g54>section{padding:60px 0;position:relative;text-align:center}.index-module--
pageCommunity--2w1tS .index-module--content--10g54>section:first-child{padding:160px 0 120px}.index-
module--pageCommunity--2w1tS .index-module--content--10g54>section .index-module--paragraph--3g3tT{max-
width:800px;margin:0 auto}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-
module--mapContainer--1bbeS .index-module--map--24bh5{width:100%;height:650px}.index-module--
pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ-{margin-
top:40px}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--
1rXZ->ul{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-
wrap:wrap;flex-wrap:wrap}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module-
-countryList--1rXZ->ul li{border:1px solid #f2f3f4;min-width:220px;text-align:left}.index-module--
pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li a{padding:13px
10px;display:block;text-decoration:none}.index-module--pageCommunity--2w1tS .index-module--content--10g54
.index-module--countryList--1rXZ->ul li a span:first-child{display:inline-block;font:normal normal normal 14px/1
```

FontAwesome;text-rendering:auto;-webkit-font-smoothing:antialiased;-moz-osx-font-smoothing:grayscale;font-size:16px;color:#fff;background-color:#173361;padding:14px;margin-right:16px}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li a span:first-child:before{content:"\F067"}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li a span:last-child{color:#000;font-size:16px;font-weight:700}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li.index-module--current--2byzP{background-color:#f2f3f4}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li.index-module--current--2byzP a span:first-child:before{content:"\F068"}@media screen and (max-width:1199px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul{-ms-flex-pack:center;justify-content:center}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li{min-width:220px;margin-top:10px;margin-right:20px}}@media screen and (max-width:991px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul{-ms-flex-pack:justify;justify-content:space-between}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li{width:48%;margin-top:10px;margin-right:0}}@media screen and (max-width:767px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul{-ms-flex-pack:center;justify-content:center}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ->ul li{width:100%;margin-top:10px}}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK{background-color:#f2f3f4;clear:both;display:none;text-align:left}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK ul{clear:both;padding:20px 0 40px;overflow:hidden}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK ul li{display:inline-block;width:16%;min-width:180px;padding:15px 20px;float:left}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK ul li span{display:block;color:#000}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK ul li a span{color:#4597cb}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--countryList--1rXZ- .index-module--countryContent--ez0uK.index-module--current--2byzP{display:block}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--sponsorRequestContainer--3FpUK ul{display:-ms-flexbox;display:flex;-ms-flex-pack:distribute;justify-content:space-around;margin:40px auto;max-width:800px}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--sponsorRequestContainer--3FpUK ul li{max-width:180px}@media screen and (max-width:991px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--sponsorRequestContainer--3FpUK ul{-ms-flex-wrap:wrap;flex-wrap:wrap}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--sponsorRequestContainer--3FpUK ul li{width:45%;margin-top:10px;max-width:none}}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--getInvolvedText--3IUwT{font-size:14px;margin:40px auto 20px}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU{padding-bottom:0}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--cardContainer--1WjI3{display:-ms-flexbox;display:flex;-ms-flex-direction:row;flex-direction:row;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-width:767px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--cardContainer--1WjI3{-ms-flex-direction:column;flex-direction:column}}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--card--3JCqV{margin:0;width:32.5%;background:hsla(0,0%,96.1%,.85)}@media screen and (max-width:767px){.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU

.index-module--card--3JCqV{width:100%;margin-top:1rem}}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--cardImage--X4ASv{display:-ms-flexbox;display:flex;width:100%;height:15rem}.index-module--pageCommunity--2w1tS .index-module--content--10g54 .index-module--slackCatalystContainer--1tkVU .index-module--cardImage--X4ASv

.style-module--copyParagraph--2sb3Z{margin-bottom:0} .style-module--copyContainer--3eWSz .style-module--listButton--3BcwF{min-width:175px;text-align:center}@media screen and (max-width:991px){.style-module--copyContainer--3eWSz .style-module--listButton--3BcwF{display:none} .style-module--listContainer--2NB6w .style-module--unorderedList--Mod8X{padding-left:20px;margin:20px 0 0 40px}@media screen and (max-width:991px){.style-module--listContainer--2NB6w .style-module--unorderedList--Mod8X{margin-left:0} .style-module--listContainer--2NB6w .style-module--unorderedListItem--1wqXF{text-align:left} .style-module--listContainer--2NB6w .style-module--noLink--3t5n5,.style-module--listContainer--2NB6w .style-module--unorderedListLink--3IE4p{font-size:14px;font-weight:300;line-height:1.79;margin-left:10px} .style-module--listContainer--2NB6w .style-module--noLink--3t5n5{color:rgba(0,0,0,.85)}.government-module--page--3ihGK .government-module--hero--2BDaj .government-module--heroContent--M1-ls{max-width:580px;width:100%} .government-module--page--3ihGK .government-module--hero--2BDaj .government-module--heroContent--M1-ls>a{max-width:245px}@media screen and (max-width:767px){.government-module--page--3ihGK .government-module--hero--2BDaj .government-module--heroContent--M1-ls>a{display:block;margin:20px auto}}@media screen and (min-width:768px){.government-module--page--3ihGK .government-module--missionSection--1n5\_j p,.government-module--page--3ihGK .government-module--operations--264Pz p{max-width:640px;width:100%;margin:auto} .government-module--page--3ihGK .government-module--missionSection--1n5\_j p,.government-module--page--3ihGK .government-module--operationsCopy--2Qahm{font-size:14px;font-weight:300;line-height:1.79;text-align:center;color:rgba(0,0,0,.85);margin-bottom:30px} .government-module--page--3ihGK .government-module--federalDataStrategy--1Q3ge{display:block} .government-module--page--3ihGK .government-module--federalDataStrategy--1Q3ge .government-module--content--33zR-{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-width:767px){.government-module--page--3ihGK .government-module--federalDataStrategy--1Q3ge .government-module--content--33zR-{-ms-flex-direction:column;flex-direction:column}} .government-module--page--3ihGK .government-module--federalDataStrategy--1Q3ge .government-module--card--1MI5R{max-width:49.5%;width:auto}@media screen and (max-width:767px){.government-module--page--3ihGK .government-module--federalDataStrategy--1Q3ge .government-module--card--1MI5R{max-width:none;margin-right:0;margin-bottom:20px}} .government-module--page--3ihGK .government-module--resourcesSection--IhntF{display:block} .government-module--page--3ihGK .government-module--resourcesSection--IhntF .government-module--content--33zR-{display:-ms-flexbox;display:flex}@media screen and (max-width:767px){.government-module--page--3ihGK .government-module--resourcesSection--IhntF .government-module--content--33zR-{-ms-flex-direction:column;flex-direction:column}} .government-module--page--3ihGK .government-module--resourcesSection--IhntF .government-module--content--33zR->div{-ms-flex:2 1;flex:2 1} .government-module--page--3ihGK .government-module--resourcesSection--IhntF .government-module--content--33zR- .government-module--card--1MI5R{background:hsla(0,0%,96.1%,.85)}.government-module--page--3ihGK .government-module--missionSection--1n5\_j .government-module--logoContainer--3EBWR{list-style:none;padding:0;display:-ms-flexbox;display:flex;-ms-flex-pack:distribute;justify-content:space-around;max-width:992px;margin:40px auto 0}@media screen and (max-width:767px){.government-module--page--3ihGK .government-module--missionSection--1n5\_j .government-module--logoContainer--3EBWR{-ms-flex-wrap:wrap;flex-wrap:wrap}} .government-module--page--3ihGK .government-module--missionSection--1n5\_j .government-module--logoContainer--3EBWR li{margin:20px 0} .government-module--page--3ihGK .government-module--missionSection--1n5\_j .government-module--logoContainer--3EBWR li img{width:150px!important;height:auto!important}@media screen and (max-width:767px){.government-module--page--3ihGK .government-module--missionSection--1n5\_j .government-module--logoContainer--3EBWR li{width:48%}} .government-module--page--3ihGK .government-module--missionSection--1n5\_j .government-module--logoContainer--3EBWR li img{width:auto} .government-module--page--3ihGK .government-module--contactSection--1IxQQ>div:first-child{margin:0 auto;max-width:520px} .government-module--page--3ihGK .government-module--formWrapper--3KVA9{width:700px;max-width:90%;margin:50px auto auto}@media screen

and (min-width:768px){.government-module--page--3ihGK .government-module--formWrapper--3KVA9{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}}.government-module--page--3ihGK .government-module--formWrapper--3KVA9 .government-module--textareaContainer--3XSY{padding:0;-ms-flex-preferred-size:100%;flex-basis:100%;height:120px}.government-module--page--3ihGK .government-module--compliance--Q5rFv{font-size:14px;color:#829494;margin:25px 0}.government-module--page--3ihGK .government-module--thankYou--3pp4v{margin-top:50px}.government-module--formInput--1cCde{margin:10px 0;padding:10px;border:2px solid rgba(130,148,148,.25);border-radius:4px;width:100%}@media screen and (min-width:768px){.government-module--formInput--1cCde{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px);margin:5px}}.government-module--formInput--1cCde textarea{width:100%;height:100%;padding:10px;border:none;resize:none;font-size:14px}.government-module--formInput--1cCde textarea::-webkit-input-placeholder{color:#829494;font-size:14px}.government-module--formInput--1cCde textarea::-moz-placeholder{color:#829494;font-size:14px}.government-module--formInput--1cCde textarea:-ms-input-placeholder{color:#829494;font-size:14px}.government-module--formInput--1cCde textarea::placeholder{color:#829494;font-size:14px}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--headerThree--CC-6d{color:#173361;font-size:28px;font-weight:500;margin-bottom:30px;text-align:left}@media screen and (max-width:767px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--headerThree--CC-6d{font-size:21px}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--fullWidthWrapper--1VTyF{text-align:left;margin:40px 0}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--fullWidthWrapper--1VTyF p{color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}@media screen and (max-width:991px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--pageSectionContent--27N0j{padding:50px 0}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO table{width:100%}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableRowNames--3Tf\_O,.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableTitle--qGSzL,.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td{padding:10px 0;width:25%;text-align:center}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableTitle--qGSzL,.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td:first-of-type{text-align:left;padding-left:20px}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableTitle--qGSzL{text-transform:uppercase;color:#0074a2;font-size:12px;background-color:#b4e1e4}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td{color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td span{display:block}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO td:first-of-type{color:#000;font-weight:700}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableHeaders--1E2Se{display:-ms-flexbox;display:flex}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableRowNames--3Tf\_O{color:#c5832e;font-size:18px;font-weight:700;letter-spacing:normal;text-transform:uppercase;font-weight:500}@media screen and (max-width:991px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableRowNames--3Tf\_O{font-size:14px}}@media screen and (max-width:991px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--tableRowNames--3Tf\_O span{display:block}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO svg{width:25px;height:25px;-ms-transform:rotate(-90deg);transform:rotate(-90deg);background:transparent;border-radius:50%}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO circle{fill:transparent;stroke:#173361;stroke-width:16;stroke-dasharray:0 50}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO tr:nth-

of-type(odd){background-color:#e6f5fb}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-4--2H9nU{stroke-dasharray:51 51}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-3--2T3IP{stroke-dasharray:37.5 50}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-2--1RpIo{stroke-dasharray:25 50}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-1--1u5c0{stroke-dasharray:12.5 50}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--tableWrapper--154KO .apache-vs-pulsar-module--harveyBall-0--3OY8d{stroke-dasharray:0 0;stroke-width:1}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardSectionWrapper--2g240{margin-top:50px}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardSectionWrapper--2g240 h3{margin:50px 0}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF{border:2px solid rgba(130,148,148,.25);margin:10px 0}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF{-ms-flex:1 1;flex:1 1;margin:5px;-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px);max-width:calc(50% - 10px)}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI{-ms-flex-preferred-size:100%;flex-basis:100%;max-width:100%}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--cardContentContainer--2cPsQ{display:-ms-flexbox;display:flex}}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--cardContentContainer--2cPsQ div{-ms-flex:1 1;flex:1 1}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--cardContentContainer--2cPsQ div:not(:last-of-type){margin-bottom:30px}@media screen and (min-width:768px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--cardContentContainer--2cPsQ div:not(:last-of-type){margin-right:30px;margin-bottom:0}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI p:not(:last-of-type){margin-bottom:20px}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--image--1fr2P{width:400px;max-width:100%;height:auto;-o-object-fit:cover;object-fit:cover;-ms-flex-item-align:start;align-self:flex-start}@media screen and (max-width:991px){.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF.apache-vs-pulsar-module--fullWidth--2kPSI .apache-vs-pulsar-module--image--1fr2P{margin-top:20px}}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF .apache-vs-pulsar-module--imageContentContainer--3yU8p{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;height:100%}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF .apache-vs-pulsar-module--imageContentContainer--3yU8p div{-ms-flex:1 1;flex:1 1}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF .apache-vs-pulsar-module--imageContentContainer--3yU8p a{text-align:center}.apache-vs-pulsar-module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF .apache-vs-pulsar-module--imageContentContainer--3yU8p img{margin-top:25px;height:320px}.apache-vs-pulsar-

module--apacheVsPulsar--PT3YX .apache-vs-pulsar-module--cardWrapper--2eDxc .apache-vs-pulsar-module--card--3iHuF h3{ color:#173361 }.apache-vs-pulsar-module--apacheVsPulsar--PT3YX section{ padding-bottom:0 }.apache-vs-pulsar-module--apacheVsPulsar--PT3YX section.apache-vs-pulsar-module--summary--1QHv0{ padding-bottom:100px }.apache-vs-pulsar-module--apacheVsPulsar--PT3YX section.apache-vs-pulsar-module--summary--1QHv0 p{ color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;margin:20px 0 }.style-module--customerStories--WM-QE{ display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-wrap:wrap;flex-wrap:wrap }.style-module--customerStories--WM-QE .style-module--card--T-iTb{ width:calc(33% - 10px) } @media screen and (max-width:767px){ .style-module--customerStories--WM-QE .style-module--card--T-iTb{ margin-bottom:20px;width:100% } }.style-module--customerStories--WM-QE .style-module--card--T-iTb.style-module--noCard--1o0Rp{ box-shadow:none }.style-module--customerStories--WM-QE .style-module--imageContainer--2lXR1:not(.style-module--fullWidth--1\_LRn){ height:80px }.style-module--customerStories--WM-QE .style-module--imageContainer--2lXR1:not(.style-module--fullWidth--1\_LRn) img{ height:100%;width:auto }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7{ display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs{ color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-align:left;min-width:350px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs h4{ color:#8e9093;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;text-transform:uppercase }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs h5{ color:rgba(0,0,0,.85);font-size:18px;font-weight:700;letter-spacing:normal }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs h5 a{ color:#173361;position:relative }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs h5 .style-module--arrow--3aY5x{ position:absolute;right:-15px;top:6px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs ul{ list-style:none;margin:0 20px;padding:0 }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li{ margin-bottom:5px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;position:relative }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li h6{ display:inline-block;padding-bottom:5px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tooltipContainer--1tJBT{ display:inline-block!important;margin-left:0 }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tooltipContainer--1tJBT h6{ border-bottom-color:#babe0;cursor:help }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tooltipContainer--1tJBT ul{ margin:0 }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tagline--283Q\_ { top:5px;margin-top:5px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--tagline--283Q\_ .style-module--taglineText--2HXa\_ { color:#81cfe2;font-size:8px;font-weight:700;letter-spacing:1.43px;position:absolute;top:-12px;left:0;text-transform:uppercase }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--licenseContainer--19yT6{ position:relative;right:-5px;display:-ms-inline-flexbox;display:inline-flex;-ms-flex-direction:column;flex-direction:column }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--licenseContainer--19yT6+.style-module--taglineText--2HXa\_ { left:11px }.style-module--productFeatureListing--3o-tq .style-module--featureContainer--3pom7 .style-module--feature--1cmjs .style-module--featureListing--1aaUS li .style-module--

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licenseContainer--19yT6+h6{border-bottom:none;padding-bottom:0}.style-module--
productFeatureListingLicenseLegend--NqHMT{padding:0;list-style:none;text-align:left}.style-module--
productFeatureListingLicenseLegend--NqHMT .style-module--licenseContainer--19yT6{display:-ms-
flexbox;display:flex;-ms-flex-align:center;align-items:center;margin-bottom:3px}.style-module--
productFeatureListingLicenseLegend--NqHMT .style-module--licenseContainer--19yT6>i{position:relative;left-
5px;margin-bottom:0}.style-module--productFeatureListingLicenseLegend--NqHMT .style-module--
licenseContainer--19yT6>span{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--license--3SFD4{margin-top:2px;margin-bottom:2px;border-
radius:50%;height:10px;width:10px;display:inline-block}.style-module--license--3SFD4:first-child{margin-
top:0}.style-module--license--3SFD4:last-child{margin-bottom:0}.style-module--license--3SFD4.style-module--
oss--1HiEF{background:#000}.style-module--license--3SFD4.style-module--community--
UzeSP{background:#b78142}.style-module--license--3SFD4.style-module--commercial--
2qBc3{background:#81cfe2}.style-module--form--Fb2IX{max-width:470px;margin:0 auto;width:100%}.style-
module--form--Fb2IX h4{color:#173361;font-size:18px;font-weight:700;margin-bottom:25px}.style-module--form--
Fb2IX .style-module--input--2JBor{line-height:1.9;padding-left:20px;padding-right:20px}.style-module--form--
Fb2IX .style-module--agreement--3H1Wu{color:#829494;font-size:10px;font-weight:300;line-height:2;margin-
top:15px}.style-module--form--Fb2IX .style-module--agreement--3H1Wu a{color:#829494;text-
decoration:underline}.style-module--form--Fb2IX .style-module--ctaContainer--3Ib9C{margin-top:30px}.style-
module--thankyou--IoZ3P{color:#173361;font-size:28px;font-weight:700}.trust-and-security-module--
trustAndSecurity--3rRmD .trust-and-security-module--content--LEELj{padding-bottom:0}.trust-and-security-
module--trustAndSecurity--3rRmD .trust-and-security-module--content--LEELj:last-of-type{padding-
bottom:100px}.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-security-module--content--LEELj
h3{font-size:40px;font-weight:500}.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-security-
module--noCardSection--rpkKy{color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}@media screen and (min-width:768px){.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-
security-module--noCardSection--rpkKy{width:50%}}@media screen and (min-width:768px){.trust-and-security-
module--trustAndSecurity--3rRmD .trust-and-security-module--cardSection--2DSJW{display:-ms-
flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center}}.trust-and-
security-module--trustAndSecurity--3rRmD .trust-and-security-module--cardSection--2DSJW p{margin-
bottom:100px;color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.trust-and-security-
module--trustAndSecurity--3rRmD .trust-and-security-module--cardSection--2DSJW .trust-and-security-module--
card--2nTeP{border:3px solid hsla(0,0%,96.1%,.85);margin:10px;padding:15px}@media screen and (min-
width:768px){.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-security-module--cardSection--
2DSJW .trust-and-security-module--card--2nTeP{-ms-flex-preferred-size:calc(33.33% - 20px);flex-
basis:calc(33.33% - 20px)}}.trust-and-security-module--trustAndSecurity--3rRmD .trust-and-security-module--
cardSection--2DSJW .trust-and-security-module--card--2nTeP>div{text-align:center}.trust-and-security-module--
trustAndSecurity--3rRmD .trust-and-security-module--cardSection--2DSJW .trust-and-security-module--card--
2nTeP img{width:70px;height:auto}@media screen and (max-width:991px){.what-is-apache-kafka-module--page--
1gMfr .what-is-apache-kafka-module--hero--1oBKZ>div{-ms-flex-direction:column;flex-
direction:column}}@media screen and (max-width:991px){.what-is-apache-kafka-module--page--1gMfr .what-is-
apache-kafka-module--hero--1oBKZ .what-is-apache-kafka-module--imageContainer--
3TVGK{display:block;margin-left:0;margin-top:60px}}.what-is-apache-kafka-module--page--1gMfr .what-is-
apache-kafka-module--hero--1oBKZ .what-is-apache-kafka-module--imageContainer--3TVGK img{border:9px
solid #81cfe2;cursor:pointer}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
kafkaCompanySection--3iQT6 .what-is-apache-kafka-module--logoContainer--1njON{display:-ms-
flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center}.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaCompanySection--3iQT6 .what-is-
apache-kafka-module--logoContainer--1njON>div{-ms-flex-positive:0;flex-grow:0;-ms-flex-negative:1;flex-

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shrink:1;-ms-flex-preferred-size:20%;flex-basis:20%;margin:20px 0}@media screen and (max-width:991px){.what-
is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaCompanySection--3iQT6 .what-is-
apache-kafka-module--logoContainer--1njON>div{-ms-flex-preferred-size:33.33333%;flex-
basis:33.33333%}}@media screen and (max-width:991px) and (max-width:575px){.what-is-apache-kafka-module--
page--1gMfr .what-is-apache-kafka-module--kafkaCompanySection--3iQT6 .what-is-apache-kafka-module--
logoContainer--1njON>div{-ms-flex-preferred-size:100%;flex-basis:100%}}.what-is-apache-kafka-module--page--
1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv .what-is-apache-kafka-module--container--
1JCvj{text-align:left}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
kafkaHelpSection--3tUwv .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--section-
-3nQ7u{display:-ms-flexbox;display:flex;-ms-flex-align:start;align-items:flex-start;padding:50px 0}.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv .what-is-apache-
kafka-module--container--1JCvj .what-is-apache-kafka-module--section--3nQ7u:nth-child(2n){-ms-flex-
direction:row-reverse;flex-direction:row-reverse}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-
kafka-module--kafkaHelpSection--3tUwv .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-
module--section--3nQ7u:nth-child(2n)>div:first-child{margin-right:0;margin-left:80px}.what-is-apache-kafka-
module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv .what-is-apache-kafka-module--
container--1JCvj .what-is-apache-kafka-module--section--3nQ7u:nth-child(odd)>div:first-child{margin-
right:80px}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv
.what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--section--3nQ7u>div{-ms-flex:1
1;flex:1 1}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv
.what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--section--3nQ7u>div:first-
child{max-width:200px}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
kafkaHelpSection--3tUwv .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--section-
-3nQ7u h4{color:rgba(0,0,0,.85);font-size:18px;font-weight:700;letter-spacing:normal;margin:0 0 25px}.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--kafkaHelpSection--3tUwv .what-is-apache-
kafka-module--container--1JCvj .what-is-apache-kafka-module--section--3nQ7u p{color:rgba(0,0,0,.85);font-
size:16px;font-weight:300;line-height:25px;letter-spacing:0}.what-is-apache-kafka-module--page--1gMfr .what-is-
apache-kafka-module--ebookSection--1F9gz .what-is-apache-kafka-module--card--22EH0{padding:55px}.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-
module--container--1JCvj{display:-ms-flexbox;display:flex}@media screen and (max-width:767px){.what-is-
apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-
module--container--1JCvj{-ms-flex-direction:column-reverse;flex-direction:column-reverse;-ms-flex-
align:center;align-items:center}}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
toolsetSection--3LYlq .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--content--
MHnSy{-ms-flex:1 1;flex:1 1;text-align:left;min-width:380px;color:rgba(0,0,0,.85);font-size:16px;font-
weight:300;line-height:25px;letter-spacing:0}@media screen and (max-width:767px){.what-is-apache-kafka-
module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-module--
container--1JCvj .what-is-apache-kafka-module--content--MHnSy{min-width:0}}.what-is-apache-kafka-module--
page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-module--container--
1JCvj .what-is-apache-kafka-module--content--MHnSy p{margin-bottom:20px}.what-is-apache-kafka-module--
page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq .what-is-apache-kafka-module--container--
1JCvj .what-is-apache-kafka-module--content--MHnSy .what-is-apache-kafka-module--ctaContainer--
3WaCb{margin-top:40px}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--
toolsetSection--3LYlq .what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--content--
MHnSy .what-is-apache-kafka-module--ctaContainer--3WaCb a:first-child{margin-right:20px;margin-
bottom:20px}.what-is-apache-kafka-module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYlq
.what-is-apache-kafka-module--container--1JCvj .what-is-apache-kafka-module--imageContainer--3TVGK{-ms-
flex:1 1;flex:1 1;max-width:440px;margin-left:60px}@media screen and (max-width:767px){.what-is-apache-

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kafka-module--page--1gMfr .what-is-apache-kafka-module--toolsetSection--3LYIq .what-is-apache-kafka-module--
container--1JCvj .what-is-apache-kafka-module--imageContainer--3TVGK{margin-left:0;margin-
bottom:20px} .style-module--pageList--3Lp5m h2{text-align:left;margin:0 0 50px}@media screen and (max-
width:991px){.style-module--pageList--3Lp5m h2{text-align:center}}.style-module--pageList--3Lp5m .style-
module--card--1Oi2-{background:hsla(0,0%,96.1%,.85)}.style-module--pageList--3Lp5m .style-module--
featureSection--2oJmJ{padding-top:25px;padding-bottom:50px}.style-module--pageList--3Lp5m .style-module--
featureSection--2oJmJ .style-module--cta--1oBkM{margin-top:50px}.style-module--pageList--3Lp5m .style-
module--upcomingSection--11yLX{padding-top:50px}.style-module--pageList--3Lp5m .style-module--
upcomingSection--11yLX .style-module--filters--2Blb4{display:-ms-flexbox;display:flex;-ms-flex-
pack:justify;justify-content:space-between}@media screen and (max-width:991px){.style-module--pageList--
3Lp5m .style-module--upcomingSection--11yLX .style-module--filters--2Blb4{-ms-flex-direction:column;flex-
direction:column}}@media screen and (max-width:991px){.style-module--pageList--3Lp5m .style-module--
upcomingSection--11yLX .style-module--filters--2Blb4 .style-module--filterContainer--1wo0p{margin-
bottom:50px} .style-module--pageList--3Lp5m .style-module--upcomingSection--11yLX .style-module--filters--
2Blb4 .style-module--filterContainer--1wo0p>{*margin-left:10px;display:inline-block}@media screen and (max-
width:991px){.style-module--pageList--3Lp5m .style-module--upcomingSection--11yLX .style-module--filters--
2Blb4 .style-module--filterContainer--1wo0p>{*margin-bottom:10px}}.style-module--pageList--3Lp5m .style-
module--upcomingSection--11yLX .style-module--filters--2Blb4 .style-module--filterContainer--
1wo0p>div{width:180px}@media screen and (max-width:575px){.style-module--pageList--3Lp5m .style-module--
upcomingSection--11yLX .style-module--filters--2Blb4 .style-module--filterContainer--1wo0p>button,.style-
module--pageList--3Lp5m .style-module--upcomingSection--11yLX .style-module--filters--2Blb4 .style-module--
filterContainer--1wo0p>div{width:100%}}.style-module--pageList--3Lp5m .style-module--upcomingSection--
11yLX .style-module--card--1Oi2-,.style-module--pageList--3Lp5m .style-module--upcomingSection--11yLX
.style-module--card--1Oi2- h3{color:#173361}@media screen and (max-width:767px){.style-module--pageList--
3Lp5m .style-module--upcomingSection--11yLX .style-module--card--1Oi2- .style-module--imageContainer--
2jiv2{display:none}}.style-module--pageList--3Lp5m .style-module--upcomingSection--11yLX .style-module--
pagination--XYbB4{margin-top:100px}.style-module--pageList--3Lp5m .style-module--subscribeSection--24ic1
h3{color:#173361}.style-module--pageList--3Lp5m .style-module--subscribeSection--24ic1 p{width:90%}.style-
module--pageList--3Lp5m .style-module--noResults--1__V8{color:#000;font-size:28px;font-weight:500;text-
align:center;width:100%}.style-module--itemsWrapper--14yen{display:-ms-flexbox;display:flex;-ms-flex-
wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-content:space-between;padding-left:0;margin-
bottom:0}.style-module--itemsWrapper--14yen .style-module--itemWrapper--RRnC6{margin:10px;text-
align:left;display:-ms-flexbox;display:flex}@media screen and (max-width:991px){.style-module--itemsWrapper--
14yen .style-module--itemWrapper--RRnC6{-ms-flex:0 1 100%!important;flex:0 1 100%!important}}.style-
module--itemsWrapper--14yen .style-module--itemContainer--2depM{display:-ms-
flexbox;display:flex;width:100%;text-decoration:none}.style-module--itemsWrapper--14yen .style-module--icon--
1rFOr{width:33px;height:33px;vertical-align:top;margin-right:10px;-ms-flex-negative:0;flex-shrink:0}.style-
module--itemsWrapper--14yen .style-module--itemContent--8xqYY{-ms-flex:1 1;flex:1 1 1}.style-module--
itemsWrapper--14yen .style-module--title--28I2K{font-size:18px;font-weight:700;color:#38cccd;line-
height:1.2;margin:0 0 10px;padding:0}.style-module--itemsWrapper--14yen .style-module--summary--
RCDk6{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;width:90%}.style-
module--itemsWrapper--14yen .style-module--tagline--2UXR8{font-size:12px;letter-spacing:1.2px;font-
weight:500;color:#8e9093;text-transform:uppercase;margin:0 0 10px}.style-module--itemsWrapper--14yen .style-
module--bulletPointList--ppPyb{color:rgba(0,0,0,.85);font-size:14px;font-weight:300;line-height:1.63;-ms-flex:1
1;flex:1 1 1;list-style-type:disc;padding:0 0 20px}.style-module--itemsWrapper--14yen .style-module--
bulletPointList--ppPyb li{margin-bottom:5px}.style-module--itemsWrapper--14yen .style-module--bulletPointList--
ppPyb li:last-child{margin-bottom:0}.style-module--itemsWrapper--14yen .style-module--ctaContainer--
QdgIZ{margin-top:auto}.style-module--itemsWrapper--14yen .style-module--ctaContainer--QdgIZ a{border-

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bottom:2px solid transparent;line-height:2;margin-bottom:-2px;text-decoration:none;color:#173361 }.style-module--
itemsWrapper--14yen .style-module--ctaContainer--QdgIZ a:hover{border-bottom-color:#38cccd}.style-module--
itemsWrapper--14yen .style-module--ctaIcon--3oViO{width:25px;height:25px;-ms-flex-negative:0;flex-shrink:0;-
ms-flex-item-align:center;align-self:center;margin-left:5px }.style-module--itemsWrapper--14yen .style-module--
ctaIcon--3oViO svg{width:100%;height:100%;fill:#0074a2}.style-module--itemsWrapper--14yen .style-module--
button--Dp9Wg{margin-top:20px }.get-involved-module--helpfulLinks--3_ckN p{margin-bottom:100px }.get-
involved-module--helpfulLinks--3_ckN .get-involved-module--item--2VYcO{border:2px solid
rgba(130,148,148,.25);padding:20px;border-radius:4px }.get-involved-module--helpfulLinks--3_ckN .get-involved-
module--item--2VYcO h4{color:#173361 }.get-involved-module--helpfulLinks--3_ckN .get-involved-module--item-
-2VYcO ul{list-style-type:none;padding-left:0 }.get-involved-module--cardWrapper--3LJmC{border:2px solid
rgba(130,148,148,.25);border-radius:4px;padding:20px;text-align:left;margin:10px 0 }.get-involved-module--
cardWrapper--3LJmC h5{font-size:18px;font-weight:700;color:#173361;margin:10px 0 }.get-involved-module--
cardWrapper--3LJmC li,.get-involved-module--cardWrapper--3LJmC p,.get-involved-module--cardWrapper--
3LJmC strong{margin:10px 0 }.s-dotted-line-module--svgGroup--2jY-S{stroke:#f5f5f5;stroke-opacity:.85;stroke-
width:7;stroke-miterlimit:10;stroke-linecap:round;stroke-linejoin:round }.lp-module--cloudPaid--3tJKb{overflow-
x:hidden;overflow-y:scroll }.lp-module--cloudPaid--3tJKb h3{color:#173361;font-size:28px;font-weight:500 }.lp-
module--cloudPaid--3tJKb .lp-module--primaryCta--3cJf0{position:relative;z-index:2 }.lp-module--cloudPaid--
3tJKb .lp-module--heroWrapper--1xp8_{position:relative }.lp-module--cloudPaid--3tJKb .lp-module--heroWrapper-
-1xp8_ .lp-module--heroImageContainer--3zPeI{position:absolute;max-width:none;right:-50px;top:80px;z-
index:1 } @media screen and (min-width:1690px){.lp-module--cloudPaid--3tJKb .lp-module--heroWrapper--1xp8_
.lp-module--heroImageContainer--3zPeI{max-width:400px;position:static } } @media screen and (max-
width:1550px){.lp-module--cloudPaid--3tJKb .lp-module--heroWrapper--1xp8_ .lp-module--heroImageContainer--
3zPeI{max-width:400px;position:static } } .lp-module--cloudPaid--3tJKb .lp-module--heroSummary--
1IiQn{margin:20px 0 }.lp-module--cloudPaid--3tJKb .lp-module--heroCtaContainer--2I2so{display:block;margin-
top:0 }.lp-module--cloudPaid--3tJKb .lp-module--heroItem--1feeF{margin:30px 0;position:relative;z-
index:2 } @media screen and (min-width:768px){.lp-module--cloudPaid--3tJKb .lp-module--heroItem--1feeF{-ms-
flex-preferred-size:calc(50% - 20px)!important;flex-basis:calc(50% - 20px)!important } } .lp-module--cloudPaid--
3tJKb .lp-module--heroItem--1feeF h4{color:#173361;font-weight:lighter } .lp-module--cloudPaid--3tJKb .lp-
module--providerContent--1RhDi{position:relative } @media screen and (max-width:991px){.lp-module--cloudPaid-
-3tJKb .lp-module--providerContent--1RhDi{width:90%;margin:auto;text-align:center } } .lp-module--cloudPaid--
3tJKb .lp-module--doMoreSection--3iPHv h4,.lp-module--cloudPaid--3tJKb .lp-module--providerContent--1RhDi
h4{color:#173361 }.lp-module--cloudPaid--3tJKb .lp-module--doMoreSection--3iPHv p,.lp-module--cloudPaid--
3tJKb .lp-module--providerContent--1RhDi p{font-size:16px;font-weight:lighter;line-height:25px;margin:25px
0 } @media screen and (min-width:992px){.lp-module--cloudPaid--3tJKb .lp-module--doMoreSection--3iPHv p,.lp-
module--cloudPaid--3tJKb .lp-module--providerContent--1RhDi p,.lp-module--cloudPaid--3tJKb .lp-module--
providerSummary--JM8tX{width:500px } } .lp-module--cloudPaid--3tJKb .lp-module--providerContentWrapper--
2CQ-L{position:relative }.lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF{display:-ms-
flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;-ms-flex-align:center;align-
items:center;padding:0 } @media screen and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--
providerSectionWrapper--3UeyF{-ms-flex-direction:column-reverse;flex-direction:column-reverse } } .lp-module--
cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF>{*z-index:1 }.lp-module--cloudPaid--3tJKb .lp-
module--providerSectionWrapper--3UeyF .lp-module--providerContent--1RhDi h4{color:#173361;font-
size:18px }.lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--
providerContent--1RhDi a:first-of-type{margin-right:10px } @media screen and (max-width:991px){.lp-module--
cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--providerContent--1RhDi a:first-of-
type{margin-bottom:20px } } .lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-
module--providersWrapper--24zGt{padding:20px;background:#fff;border-radius:8px } @media screen and (min-
width:768px){.lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--

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providersWrapper--24zGt{position:relative;left:20px}}.lp-module--cloudPaid--3tJKb .lp-module--
providerSectionWrapper--3UeyF .lp-module--providersWrapper--24zGt h5{margin:0 0 10px
5px;color:#173361} .lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--
providerBoxWrapper--26EGb{display:-ms-flexbox;display:flex}@media screen and (max-width:991px){.lp-
module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--providerBoxWrapper--
26EGb{-ms-flex-direction:column;flex-direction:column}}.lp-module--cloudPaid--3tJKb .lp-module--
providerSectionWrapper--3UeyF .lp-module--providerBoxWrapper--26EGb a{-ms-flex:1 1;flex:1 1}@media screen
and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--providerSectionWrapper--3UeyF .lp-module--
providerBoxWrapper--26EGb a{margin:10px 0}}.lp-module--cloudPaid--3tJKb .lp-module--connectorSvg--
17Rcb{position:absolute;max-width:none;z-index:0;top:-550px;left:-638px;display:none}@media screen and (min-
width:992px){.lp-module--cloudPaid--3tJKb .lp-module--connectorSvg--17Rcb{display:block}}@media screen and
(max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--connectorSvg--17Rcb{top:-390px;left:-677px}}.lp-
module--cloudPaid--3tJKb .lp-module--mobileConnectors--2IzTp{margin:40px 0;width:100%}@media screen and
(min-width:992px){.lp-module--cloudPaid--3tJKb .lp-module--mobileConnectors--2IzTp{display:none}}@media
screen and (min-width:992px){.lp-module--cloudPaid--3tJKb .lp-module--doMoreSection--
3iPHv{position:absolute;right:0;bottom:-677px}}@media screen and (min-width:992px){.lp-module--cloudPaid--
3tJKb .lp-module--democratizeSection--2vvoL{margin-top:700px;position:relative}}.lp-module--cloudPaid--3tJKb
.lp-module--democratizeSection--2vvoL .lp-module--contentWrapper--1Xboe{padding:20px 30px;border:7px solid
hsla(0,0%,96.1%,.85);border-radius:8px;background-color:#fff;display:-ms-flexbox;display:flex}@media screen
and (max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
contentWrapper--1Xboe{-ms-flex-direction:column;flex-direction:column;padding:20px}}@media screen and
(max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
textContent--2TwDa{text-align:center}}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-
module--textContent--2TwDa p{font-size:16px;font-weight:lighter}.lp-module--cloudPaid--3tJKb .lp-module--
democratizeSection--2vvoL .lp-module--content--4CKtc p{font-size:16px;font-weight:lighter;max-
width:100%;line-height:25px}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
cliWrapper--3tA0m{-ms-flex:1 1;flex:1 1;position:relative;top:130px;left:80px;left:10px;border-radius:8px;box-
shadow:0 0 12px 0 rgba(0,0,0,.25);border:7px solid #fff;background-color:rgba(0,0,0,.25)}@media screen and
(max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
cliWrapper--3tA0m{top:0;left:0;margin-top:50px}}@media (min-width:1250px){.lp-module--cloudPaid--3tJKb .lp-
module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m{left:80px}}@media screen and (min-
width:768px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--
3tA0m .lp-module--languages--iyhEB .lp-module--languagesDropDownMobile--2LY7x{display:none}}.lp-module-
cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--languages-
iyhEB .lp-module--languagesSelectDesktop--3tw1K{display:none}@media screen and (min-width:768px){.lp-
module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--
languages--iyhEB .lp-module--languagesSelectDesktop--3tw1K{display:block}}.lp-module--cloudPaid--3tJKb .lp-
module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--languages--iyhEB span{margin-
right:30px;font-weight:700;cursor:pointer;position:relative}.lp-module--cloudPaid--3tJKb .lp-module--
democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--languages--iyhEB span.lp-module--active-
29vL5:after{content:"";position:absolute;bottom:-14px;background-color:#0074a2;width:120%;height:2px;left:-
10%}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-
module--languages--iyhEB hr{margin:10px 0;border-top:1px solid #829494}.lp-module--cloudPaid--3tJKb .lp-
module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--cliCode--
HUVpw{position:relative;height:290px;width:600px}@media screen and (max-width:1199px){.lp-module--
cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--cliCode--
HUVpw{height:520px;width:100%;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-
between}}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m

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.lp-module--cliCode--HUVpw div{position:absolute;top:0;width:100%;height:100%;opacity:0;pointer-
events:none;transition:all .3s ease}@media screen and (max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-
module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--cliCode--HUVpw
div{top:20px}}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--
3tA0m .lp-module--cliCode--HUVpw div.lp-module--active--29vL5{opacity:1;pointer-events:all}@media screen
and (max-width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--
cliWrapper--3tA0m .lp-module--cliCode--HUVpw div>*{word-break:break-word}}.lp-module--cloudPaid--3tJKb
.lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--content--
4CKtc{padding:40px;background:#f5f5f5;font-size:14px;font-weight:500}@media screen and (max-
width:1199px){.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--
3tA0m .lp-module--content--4CKtc{padding:40px 20px}}.lp-module--cloudPaid--3tJKb .lp-module--
democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--content--4CKtc .red{color:#d8365d}.lp-
module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-module--cliWrapper--3tA0m .lp-module--
content--4CKtc .blue{color:#173361}.lp-module--cloudPaid--3tJKb .lp-module--democratizeSection--2vvoL .lp-
module--cliWrapper--3tA0m .lp-module--content--4CKtc .gray{color:#829494;font-weight:lighter}.lp-module--
cloudPaid--3tJKb .lp-module--linesSvgWrapper--1mOwj,.lp-module--cloudPaid--3tJKb .lp-module--
svgBlueDotWrapper--3UNbd{display:none}@media screen and (min-width:1200px){.lp-module--cloudPaid--3tJKb
.lp-module--linesSvgWrapper--1mOwj,.lp-module--cloudPaid--3tJKb .lp-module--svgBlueDotWrapper--
3UNbd{display:block}}.lp-module--cloudPaid--3tJKb .lp-module--linesSvgWrapper--
1mOwj{position:absolute;bottom:-297px;left:400px}.lp-module--cloudPaid--3tJKb .lp-module--linesSvgWrapper--
1mOwj img{max-width:none}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--
getStartedContentWrapper--jep6M{position:relative}@media screen and (min-width:1200px){.lp-module--
cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--getStartedContentWrapper--jep6M{padding-
top:100px}}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--contentWrapper--
1Xboe{text-align:center}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--
contentWrapper--1Xboe p{width:700px;max-width:100%;margin:40px auto 8rem;font-weight:lighter}.lp-module--
cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--svgBlueDotWrapper--
3UNbd{position:absolute;left:-450px;top:150px}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--
1x7um .lp-module--providersWrapper--24zGt{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-
content:center}@media screen and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--
getStartedWrapper--1x7um .lp-module--providersWrapper--24zGt{-ms-flex-direction:column;flex-
direction:column}}.lp-module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--
providersWrapper--24zGt img{margin:0 40px;height:25px;width:auto}@media screen and (max-width:991px){.lp-
module--cloudPaid--3tJKb .lp-module--getStartedWrapper--1x7um .lp-module--providersWrapper--24zGt
img{margin:20px 0;-o-object-fit:contain;object-fit:contain}}.lp-module--cloudPaid--3tJKb .lp-module--
pricingTierClassName--1v6FQ,.lp-module--cloudPaid--3tJKb .lp-module--rowClassName--2Ha3_>div{-ms-flex-
preferred-size:33.33%;flex-basis:33.33%}.lp-module--cloudPaid--3tJKb .lp-module--rowClassName--2Ha3_
div:last-of-type{display:none}.lp-module--cloudPaid--3tJKb .lp-module--rowClassName--2Ha3_ div:nth-of-
type(1n) div{display:block}.lp-module--cloudPaid--3tJKb .lp-module--accordionWrapper--8x0YM{border:7px
solid hsla(0,0%,96.1%,.85);max-height:70px;margin-bottom:10px}.lp-module--cloudPaid--3tJKb .lp-module--
accordionWrapper--8x0YM div{background-color:transparent}.lp-module--cloudPaid--3tJKb .lp-module--indicator-
nT6oI{top:30px}.lp-module--cloudPaid--3tJKb .lp-module--productClassName--3GJrk>div:first-of-type{text-
align:center;color:#0074a2}.lp-module--cloudPaid--3tJKb .lp-module--buttonWrappers--ORW6O{margin:50px
auto;text-align:center}@media screen and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--
buttonWrappers--ORW6O{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}}.lp-
module--cloudPaid--3tJKb .lp-module--buttonWrappers--ORW6O button{margin-right:20px;min-
width:333px}@media screen and (max-width:991px){.lp-module--cloudPaid--3tJKb .lp-module--buttonWrappers--
ORW6O button{margin-bottom:20px;margin-right:0}}.lp-module--cloudPaid--3tJKb .lp-module--notReadySection-

```

-2pAxi{padding-top:0}.lp-module--cloudPaid--3tJKb .lp-module--notReadySection--2pAxi .lp-module--heroSection--2-NgW{text-align:center}.lp-module--cloudPaid--3tJKb .lp-module--notReadySection--2pAxi .lp-module--heroSection--2-NgW p{margin:40px auto 100px}.lp-module--cloudPaid--3tJKb .lp-module--notReadySection--2pAxi .lp-module--card--3pJXp{background-color:hsla(0,0%,96.1%,.85)}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--startupProgram--1GBXj{text-align:center}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--startupProgram--1GBXj p{width:800px;max-width:100%;margin:50px auto;line-height:1.66}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--eligibilityItem--2RhUl,.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--whatYouGetItem--3qEMr{padding:20px;background-color:#fff}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--eligibilitySummary--1Du4x{margin-bottom:100px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--titleEyebrow--VeLOp{margin-top:100px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formWrapper--2cxAT{width:800px;margin:auto;max-width:100%}@media screen and (min-width:768px){.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formWrapper--2cxAT{display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap}}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formWrapper--2cxAT+button{margin:50px 0}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formInput--jPIzn,.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--select--3heGZ,.startup-program-module--confluentCloudStartupProgram--1Kzz4 fieldset{margin:5px}@media screen and (min-width:768px){.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--formInput--jPIzn,.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--select--3heGZ,.startup-program-module--confluentCloudStartupProgram--1Kzz4 fieldset{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px)}}.startup-program-module--confluentCloudStartupProgram--1Kzz4 fieldset label{font-size:16px;color:#173361;text-align:left;width:100%;margin-left:5px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 fieldset label+div{margin:5px 0!important}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--textareaContainer--1eQLn{padding:0;-ms-flex-preferred-size:calc(100% - 10px);flex-basis:calc(100% - 10px);height:120px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea{width:100%;height:100%;padding:10px;border:2px solid hsla(0,0%,73.3%,.5);border-radius:4px;resize:none;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea::-webkit-input-placeholder{color:#829494;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea::-moz-placeholder{color:#829494;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea:-ms-input-placeholder{color:#829494;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 textarea::placeholder{color:#829494;font-size:14px}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--compliance--1zJwM{font-size:14px;color:#829494}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--cardWrapper--3eY4F{text-align:left;border:2px solid rgba(130,148,148,.25);border-radius:4px;padding:20px;margin:10px 0}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--cardWrapper--3eY4F h4{font-size:16px;color:#173361;font-weight:700}.startup-program-module--confluentCloudStartupProgram--1Kzz4 .startup-program-module--cardWrapper--3eY4F p{font-weight:lighter}.style-module--congratsSection--2EQP8{transition:all .3s ease;position:absolute;top:-30px;width:100%}.style-module--congratsSection--2EQP8.style-module--deb--2TX30 .style-module--congratsSummary--TFgxt,.style-module--congratsSection--2EQP8.style-module--docker--2a\_E .style-module--congratsSummary--TFgxt,.style-module--congratsSection--2EQP8.style-module--rpm--2E0-u .style-module--congratsSummary--TFgxt{margin-top:0}.style-module--congratsSection--2EQP8.style-module--deb--2TX30 .style-module--congratsCardContainer--m4sNv,.style-module--congratsSection--2EQP8.style-module--docker--2a\_E .style-module--congratsCardContainer--m4sNv,.style-module--congratsSection--2EQP8.style-module--rpm--2E0-u .style-module--congratsCardContainer--

m4sNv{margin-top:25px}.style-module--congratsSection--2EQP8 h4{font-size:12px;color:#38cccd;letter-spacing:1.2px;text-transform:uppercase;margin-top:30px}.style-module--congratsSection--2EQP8 .style-module--congratslinkBelow--2UKCQ{font-size:28px;color:#173361;font-weight:500}.style-module--congratsSection--2EQP8 .style-module--congratsPrimaryCta--3W1pw{margin:25px 0}.style-module--congratsSection--2EQP8 .style-module--congratsCardSummary--2iw1g{font-size:14px;text-align:center;margin-bottom:15px}@media screen and (min-width:768px){.style-module--congratsSection--2EQP8 .style-module--congratsCardSummary--2iw1g{font-size:16px;margin-bottom:20px}}.style-module--congratsSection--2EQP8 .style-module--congratsSummary--TFgxt{color:#000;font-size:15px;width:450px;max-width:95%;margin:20px auto 0}.style-module--congratsSection--2EQP8 .style-module--congratsSummary--TFgxt p:first-of-type{margin-bottom:70px}.style-module--congratsSection--2EQP8 .style-module--congratsSummary--TFgxt p:nth-of-type(2n){width:90%;margin:auto;position:relative}.style-module--congratsSection--2EQP8 .style-module--congratsSummary--TFgxt p:nth-of-type(2n):after{content:"";width:100%;height:7px;position:absolute;left:0;right:0;background-color:hsla(0,0%,96.1%,.85);top:-40px}.style-module--congratsSection--2EQP8 .style-module--congratsCardContainer--m4sNv{margin-top:45px;display:-ms-flexbox;display:flex}.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR{background-color:hsla(0,0%,96.1%,.85);margin:0 5px;padding:15px;-ms-flex:1 1;flex:1 1;border-radius:4px;display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:center;justify-content:center}@media screen and (min-width:768px){.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR{padding:25px}}.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR h5{margin-top:0;margin-bottom:10px;-ms-flex:1 1;flex:1 1}@media screen and (min-width:768px){.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR h5{margin-bottom:25px}}.style-module--congratsSection--2EQP8 .style-module--congratsCard--3b0UR a{-ms-flex-item-align:end;align-self:flex-end}.style-module--cloudInlineContainer--3RAR4{position:absolute;top:-30px;width:100%;opacity:0;pointer-events:none;transition:all .3s ease}.style-module--cloudInlineContainer--3RAR4.style-module--active--1YH-z{opacity:1;pointer-events:auto}.style-module--cloudInlineContainer--3RAR4 .style-module--title--2Ke9N{margin:40px 0 35px;font-size:25px}@media screen and (min-width:768px){.style-module--cloudInlineContainer--3RAR4 .style-module--title--2Ke9N{font-size:28px}}.style-module--cloudInlineContainer--3RAR4 .style-module--summary--3MWFdf{font-size:14px;font-weight:700;width:80%;margin:auto auto 30px}.index-module--downloadPage--1B\_hx h1{margin-bottom:100px}.index-module--downloadPage--1B\_hx .index-module--downloadHeroContent--58OwQ{width:100% !important}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X{display:-ms-flexbox;display:flex}}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--tos--359VS{display:none}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--tosUS--1UABB{display:block}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--forminputWrapper--3mlZa>div{margin-bottom:10px}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--forminputWrapper--3mlZa>div{margin-bottom:100px}}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--customerSupport--38442,.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--existingAccount--2srAO{margin:10px 0}.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--submitButton--2h0Vq{margin-top:0}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solutionWrapper--LxF\_X.index-module--us--tw5hJ .index-module--submitButton--2h0Vq{margin-top:30px}}.index-module--downloadPage--1B\_hx .index-module--solution--FKf7o{padding:17px;background-color:#fff;margin:0 10px;border-radius:8px;-ms-flex:1 1;flex:1 1;transition:all .4s ease}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solution--FKf7o.index-module--active--1NdXX{transform:scale3d(1.1,1.1,1.1);box-shadow:0 0 40px

rgba(0,116,162,.2)} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_cloud--3nrz\_{margin-bottom:50px}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_cloud--3nrz\_{margin-bottom:0}} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_cloud--3nrz\_ .index-module--cardHero--1ArYr{background-color:#0074a2} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_platform--3vE12 .index-module--checkboxWrapper--2fIXh{padding-left:0} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--confluent\_platform--3vE12 .index-module--cardHero--1ArYr{background-color:#38cccd} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardHero--1ArYr{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center;-ms-flex-align:center;align-items:center;padding:25px 0;border-radius:8px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardHero--1ArYr svg{width:40px;height:40px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardHero--1ArYr h2{color:#fff;margin:0 0 15px;font-size:20px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT{position:relative} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU{transition:all .3s ease} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_cloud--3nrz\_ .index-module--inactive--2BK4x, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--confluentPlatformInactive--3WXY7, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--inactive--2BK4x{opacity:0;visibility:hidden;pointer-events:none}@media screen and (max-width:991px){.index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--confluentPlatformInactive--3WXY7 .index-module--solutionListItem--17-tZ, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--inactive--2BK4x .index-module--solutionListItem--17-tZ{padding:0} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--confluentPlatformInactive--3WXY7 .index-module--solutionCta--2m2qB, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_platform--3vE12 .index-module--inactive--2BK4x .index-module--solutionCta--2m2qB{display:none}} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT .index-module--initialCard--3c\_ZU .index-module--confluent\_cloud--3nrz\_ .index-module--summary--35fZk{font-weight:500} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--cardBody--2NwDT h3{margin:30px 0} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--summary--35fZk{margin:0 auto 40px;width:80%;font-size:16px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--providerLogosWrapper--pF2yE, .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--summary--35fZk{margin-bottom:40px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--providerLogosWrapper--pF2yE{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--providerLogosWrapper--pF2yE img{height:18px;width:auto;margin:0 10px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionListItemContainer--2floM div:first-of-type{margin-right:0} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionListItem--17-tZ{background-color:hsla(0,0%,96.1%,.85);padding:15px;border-radius:4px;margin:5px}@media screen and (min-width:992px){.index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--



solutionListItem--17-tZ{-ms-flex-preferred-size:calc(50% - 10px)!important;flex-basis:calc(50% - 10px)!important} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionListItem--17-tZ h4{color:#173361;font-size:16px;margin-bottom:5px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionListItem--17-tZ  
 svg{width:25px;height:25px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionCta--2m2qB{display:block;margin:30px auto 20px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--linkWrapper--AHrEN{display:-ms-flexbox;display:flex;-ms-flex-pack:center;justify-content:center} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionLinks--11NYN{font-size:12px;color:#0074a2;font-weight:500;text-transform:uppercase} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionLinks--11NYN:first-of-type{margin-right:10px} .index-module--downloadPage--1B\_hx .index-module--solution--FKf7o .index-module--solutionLinks--11NYN:last-of-type{margin-left:10px} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u{width:100%;margin:5px}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u{width:calc(50% - 10px);max-width:220px}} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u::-webkit-input-placeholder{font-size:14px} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u::-moz-placeholder{font-size:14px} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u::-ms-input-placeholder{font-size:14px} .index-module--downloadPage--1B\_hx .index-module--cloudInlineinputForm--2DP9u::placeholder{font-size:14px} .index-module--downloadPage--1B\_hx .index-module--customerSupport--38442,.index-module--downloadPage--1B\_hx .index-module--existingAccount--2srAO{text-align:center;font-size:14px;margin:10px 0} .index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh{position:relative;width:100%;margin:0 0 20px;color:rgba(0,0,0,.7);text-align:left}@media screen and (min-width:768px){.index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh{padding-left:33px}} .index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh input{position:absolute;opacity:0;cursor:pointer;height:0;width:0} .index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh label{cursor:pointer;padding-left:30px} .index-module--downloadPage--1B\_hx .index-module--checkboxWrapper--2fIXh .index-module--checkboxContainer--32hB2{display:block;position:relative;margin-top:12px;-webkit-user-select:none;-moz-user-select:none;-ms-user-select:none;user-select:none} .index-module--downloadPage--1B\_hx .index-module--tos--359VS{font-size:12px;margin-top:20px} .index-module--downloadPage--1B\_hx .index-module--tos--359VS p{font-size:12px;width:80%;margin:auto;line-height:1.4;color:#829494;text-align:center;line-height:20px} .index-module--downloadPage--1B\_hx .index-module--us--tw5hJ .index-module--tos--359VS{display:none} .index-module--downloadPage--1B\_hx .index-module--us--tw5hJ .index-module--tosUS--1UABB{display:block} .index-module--downloadPage--1B\_hx .index-module--submitButton--2h0Vq{margin-top:0} .index-module--downloadPage--1B\_hx .index-module--errorContainer--3w7-7{position:absolute;font-size:14px;padding:17px 50px;left:50%;width:448px;max-width:90%;-ms-transform:translateX(-50%);transform:translateX(-50%);background-color:#fbefef;transition:all .3s ease-in-out;opacity:0;visibility:hidden;border-radius:4px;text-align:center;z-index:10} .index-module--downloadPage--1B\_hx .index-module--errorContainer--3w7-7 p{text-align:center;font-size:13px;color:#d8365d} .index-module--downloadPage--1B\_hx .index-module--errorContainer--3w7-7 p:first-of-type{font-weight:700;font-size:15px} .index-module--downloadPage--1B\_hx .index-module--errorContainer--3w7-7 .index-module--show--3U7qP{opacity:1;visibility:visible} .index-module--downloadPage--1B\_hx .index-module--disabled--1CF62{opacity:.4;pointer-events:none} .index-module--downloadPage--1B\_hx .index-module--automatedInput--1LpO0 div,.index-module--downloadPage--1B\_hx .index-module--automatedInput--1LpO0 li{text-transform:capitalize} .index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4{width:100%} .index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::-webkit-input-placeholder{color:#173361} .index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::-moz-placeholder{color:#173361} .index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4:-ms-input-placeholder{color:#173361} .index-module--downloadPage--1B\_hx .index-module--formInput--

1jFp4::placeholder{ color:#173361 }.index-module--downloadPage--1B\_hx .index-module--forminputWrapper--3mZa>div{ display:inline-block;width:100%;margin-top:10px } @media screen and (min-width:768px){ .index-module--downloadPage--1B\_hx .index-module--forminputWrapper--3mZa>div{ width:calc(50% - 5px) } }.index-module--downloadPage--1B\_hx .index-module--forminputWrapper--3mZa>div:first-of-type{ margin-right:10px }.index-module--downloadPage--1B\_hx .index-module--communityForm--b6DJm,.index-module--downloadPage--1B\_hx form[name=platform-download]{ width:468px;max-width:95%;margin:auto }.index-module--downloadPage--1B\_hx .index-module--inputWrapper--QNdWD{ display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;margin-bottom:5px } @media screen and (min-width:768px){ .index-module--downloadPage--1B\_hx .index-module--inputWrapper--QNdWD{ margin-bottom:50px } }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4{ border:2px solid rgba(130,148,148,.25);border-radius:4px;margin-bottom:10px;font-size:14px }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::-webkit-input-placeholder{ font-size:14px }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::-moz-placeholder{ font-size:14px }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4:-ms-input-placeholder{ font-size:14px }.index-module--downloadPage--1B\_hx .index-module--formInput--1jFp4::placeholder{ font-size:14px }.index-module--downloadPage--1B\_hx .index-module--checkboxLabelWrapper--2nB\_R{ display:-ms-flexbox;display:flex;margin-top:15px }.index-module--downloadPage--1B\_hx .index-module--checkboxLabelWrapper--2nB\_R input{ position:absolute;top:0;left:5px }.index-module--downloadPage--1B\_hx .index-module--checkbox--2DhQ3{ width:20px;height:20px }.index-module--downloadPage--1B\_hx .index-module--label--3oQpp{ margin-left:30px;font-size:13px;text-align:left;font-weight:lighter }.index-module--downloadPage--1B\_hx .index-module--disclaimer--VRFBN{ color:#829494;font-size:12px;width:80%;margin:10px auto 0 } @media screen and (min-width:768px){ .index-module--downloadPage--1B\_hx .index-module--disclaimer--VRFBN{ margin:20px auto 0 } } @media screen and (min-width:992px){ .style-module--cyojButtons--1HfVa{-ms-flex:0 1 440px;flex:0 1 440px} }.style-module--cyojButtons--1HfVa .style-module--cyojButtonItemContainer--37zsn{ display:-ms-flexbox;display:flex } @media screen and (max-width:991px){ .style-module--cyojButtons--1HfVa .style-module--cyojButtonItemContainer--37zsn{-ms-flex-pack:center;justify-content:center} }.style-module--cyojButtons--1HfVa .style-module--cyojButtonItem--2sUGH{-ms-flex:0 1 100% !important;flex:0 1 100% !important;max-width:385px;padding:20px 15px;transition:all .3s ease;background-color:#c4eff2}.style-module--cyojButtons--1HfVa .style-module--cyojButtonItem--2sUGH: hover{ cursor:pointer;background-color:#d7eff6;-ms-transform:translateX(2px);transform:translateX(2px)}.style-module--cyojButtons--1HfVa .style-module--cyojButtonItem--2sUGH h4{ color:#000 }.index-module--page--2ZXnp .index-module--featuresSection--3SDMM{ border-bottom:1px solid #979797 }.index-module--page--2ZXnp .index-module--heroButton--IQFhB{ margin-top:70px }.index-module--page--2ZXnp .index-module--videoSection--251ZS{ display:none;padding-bottom:0;margin-bottom:15px }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h{ padding-bottom:50px }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_{ display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;-ms-flex-direction:column;flex-direction:column;text-align:left } @media screen and (min-width:992px){ .index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_{ -ms-flex-direction:row;flex-direction:row;padding:80px 0 }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_ :first-child{ padding-top:0 } }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_ h4{ color:#173361;font-size:28px;font-weight:500;margin:10px 0 25px } }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_ p{ color:#173361;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-align:left;max-width:100%;margin-bottom:50px } }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_>img{ margin:40px 0;max-width:80% } @media screen and (min-width:992px){ .index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_>img{ max-width:500px;width:50%;margin:0 } }.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH\_>div{ padding-bottom:20px } @media screen and (min-

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width:992px){.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--
3rXH_>div{margin-right:80px;width:50%}}@media screen and (min-width:992px){.index-module--page--2ZXnp
.index-module--howWeWorkSection--qf78h .index-module--content--3rXH_:nth-child(2n){-ms-flex-direction:row-
reverse;flex-direction:row-reverse}}@media screen and (min-width:992px){.index-module--page--2ZXnp .index-
module--howWeWorkSection--qf78h .index-module--content--3rXH_:nth-child(2n)>div{margin-right:0;margin-
left:80px}}.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--
3rXH_:last-child>img{box-shadow:0 7px 22px 0 rgba(0,0,0,.18)}.index-module--page--2ZXnp .index-module--
howWeWorkSection--qf78h .index-module--content--3rXH_ .index-module--ctaContainer--vPfYP{margin-
bottom:30px;display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center}@media screen and (min-
width:768px){.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--
3rXH_ .index-module--ctaContainer--vPfYP{text-align:left}}.index-module--page--2ZXnp .index-module--
howWeWorkSection--qf78h .index-module--content--3rXH_ .index-module--ctaContainer--vPfYP
img{margin:0}.index-module--page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--
3rXH_ .index-module--ctaContainer--vPfYP svg{margin-right:10px;width:30px}.index-module--page--2ZXnp
.index-module--howWeWorkSection--qf78h .index-module--content--3rXH_ .index-module--ctaContainer--
vPfYP>a{color:#173361;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;border-bottom:2px
solid transparent;line-height:2;margin-bottom:-2px;text-decoration:none;text-transform:uppercase}.index-module--
page--2ZXnp .index-module--howWeWorkSection--qf78h .index-module--content--3rXH_ .index-module--
ctaContainer--vPfYP>a:hover{border-bottom-color:#38cccd}.index-module--page--2ZXnp .index-module--
testimonial--1zkxh{background-color:transparent;border-radius:8px;margin:0 25px;border-bottom:1px solid
hsla(0,0%,59.2%,.44)}@media screen and (max-width:767px){.index-module--page--2ZXnp .index-module--
testimonial--1zkxh{border-radius:0;margin-left:0;margin-right:0}}.index-module--page--2ZXnp .index-module--
testimonial--1zkxh .index-module--carousel--3r2kH>div{background:hsla(0,0%,96.1%,.85);border-
radius:6px}.index-module--page--2ZXnp .index-module--testimonial--1zkxh .index-module--
indexPagerClassName--2tStW{overflow-x:hidden}@media screen and (max-width:991px){.index-module--page--
2ZXnp .index-module--testimonial--1zkxh .index-module--indexPagerClassName--2tStW{overflow-
x:scroll}}.index-module--page--2ZXnp .index-module--testCyoj2--1fi8L>div{padding:20px 15px}@media screen
and (max-width:991px){.index-module--page--2ZXnp .index-module--testCyoj2--1fi8L>div{text-align:center;-ms-
flex-direction:column;flex-direction:column;padding:50px 15px}}.index-module--page--2ZXnp .index-module--
testCyoj2--1fi8L .index-module--mainContent--1VUgb{width:100%}@media screen and (min-
width:992px){.index-module--page--2ZXnp .index-module--testCyoj2--1fi8L .index-module--mainContent--
1VUgb{width:70%}}@media screen and (min-width:992px){.index-module--page--2ZXnp .index-module--
testCyoj2--1fi8L .index-module--rightContent--16YCW{-ms-flex:0 1 440px;flex:0 1 440px}}@media screen and
(max-width:991px){.index-module--page--2ZXnp .index-module--testCyoj2--1fi8L .index-module--rightContent--
16YCW{margin-top:50px}}.index-module--introSection--2wiS_{padding-bottom:15px}@media screen and (min-
width:768px){.index-module--introSection--2wiS_{padding-top:0;margin-top:-75px}}.index-module--introSection-
2wiS_ .index-module--content--2y6NX .index-module--videoContainer--3de4T img{cursor:pointer;max-
width:580px;width:100%;margin-bottom:20px}.index-module--introSection--2wiS_ .index-module--content--
2y6NX .index-module--videoContainer--3de4T p{color:#173361;font-size:16px;line-height:26px}.index-module--
introSection--2wiS_ .index-module--content--2y6NX .index-module--videoContainer--3de4T p small{font-
size:12px;font-weight:300}.index-module--quoteSection--2EqiD{border:7px solid hsla(0,0%,96.1%,.85);border-
radius:8px;padding:100px;margin-top:0;margin-bottom:15px}@media screen and (max-width:767px){.index-
module--quoteSection--2EqiD{padding:50px 25px}}.index-module--quoteSection--2EqiD h4{color:#173361;font-
size:12px;font-weight:500;letter-spacing:1.2px;text-transform:uppercase}.index-module--quoteSection--2EqiD
div{color:#173361;font-size:12px;font-weight:300;text-transform:uppercase}.index-module--quoteSection--2EqiD
blockquote{color:#38cccd;font-size:24px;font-weight:700;font-style:italic;padding:0;border:0;margin:30px 0 0;line-
height:1.3}.index-module--releaseCalendarSection--1VSYn .index-module--content--2y6NX .index-module--
summary--cZ8qe{max-width:600px;width:90%;margin:0 auto}.index-module--releaseCalendarSection--1VSYn

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.index-module--content--2y6NX .index-module--grid--Ab3-o { margin-top: 100px } .index-module--
releaseCalendarSection--1VSYn .index-module--content--2y6NX .index-module--grid--Ab3-o .index-module--card-
-Oaxik { padding: 25px } .index-module--releaseCalendarSection--1VSYn .index-module--content--2y6NX .index-
module--grid--Ab3-o .index-module--card--Oaxik > * { text-align: center } .index-module--releaseCalendarSection--
1VSYn .index-module--content--2y6NX .index-module--grid--Ab3-o .index-module--card--Oaxik h3 { max-
width: 230px; margin: 0 auto; width: 100% } .index-module--releaseCalendarSection--1VSYn .index-module--content--
2y6NX .index-module--grid--Ab3-o .index-module--card--Oaxik .index-module--ctaContainer--P0vas { margin: auto
0 10px } .index-module--stayUpdatedSection--3bMUB .index-module--list--3jzNm li { border: 2px solid
hsla(0,0%,96.1%,.85); border-radius: 4px; padding: 25px } .index-module--stayUpdatedSection--3bMUB .index-
module--list--3jzNm li h4 { color: #173361 } .services-module--sectionContent--3IPMq { margin-top: 25px; margin-
bottom: 25px } .services-module--sectionContent--3IPMq .services-module--featureItem--1emNP { background-
color: #fff; padding: 35px } .services-module--sectionContent--3IPMq .services-module--featureItem--1emNP
h4 { color: #000 } .services-module--professionalServices--2mnoh .services-module--levelsSection--1NwNA
h3 { width: 680px; max-width: 90%; margin: auto; color: #173361 } @media screen and (min-width: 768px) { .services-
module--levelsContainer--1UGhY { display: -ms-flexbox; display: flex; -ms-flex-wrap: wrap; flex-wrap: wrap } } .services-
module--levelsContainer--1UGhY .services-module--levelWrapper--3etJ_ { margin: 0 10px; -ms-flex: 1 1; flex: 1
1 } .services-module--levelsContainer--1UGhY .services-module--levelNumber--01Fe { color: #b78142; font-
size: 24px } .services-module--levelsContainer--1UGhY .services-module--levelTitle--2GkBA { font-
size: 12px; color: #829494; text-transform: uppercase; padding: 15px 0; border-bottom: 2px solid
hsla(0,0%,96.1%,.85) } .services-module--levelsContainer--1UGhY .services-module--levelsCompletedBox--
J_g_h { height: 90px; background: hsla(0,0%,96.1%,.85); display: -ms-flexbox; display: flex; -ms-flex-direction: column-
reverse; flex-direction: column-reverse } .services-module--levelsContainer--1UGhY .services-module--
levelsCompletedBox--J_g_h .services-module--fadeLevelElement--
37r88 { width: 100%; height: 20%; position: relative; display: block } .services-module--levelsContainer--1UGhY
.services-module--levelSubTitle--2Y3Jr { font-size: 14px; padding: 15px 0; color: #173361; border-bottom: 2px solid
hsla(0,0%,96.1%,.85); text-align: left; min-height: 70px } .services-module--levelsContainer--1UGhY .services-
module--levelsUnorderedList--2BRg { list-style-type: disc; padding-left: 5px; font-size: 12px } .services-module--
levelsContainer--1UGhY .services-module--levelsListItem--2Ks7L { text-align: left; margin: 15px 0 } .services-module-
levelsContainer--1UGhY .services-module--level1--1XMHR { background-color: #e6f5fb } .services-module--
levelsContainer--1UGhY .services-module--level2--1mRB6 { background-color: #b4e1e4 } .services-module--
levelsContainer--1UGhY .services-module--level3--1b23n { background-color: #81cfe2 } .services-module--
levelsContainer--1UGhY .services-module--level4--28Iy { background-color: #0074a2 } .services-module--
levelsContainer--1UGhY .services-module--level5--1oRnw { background-color: #173361 } .services-module--
howWeWorkWrapper--2HWk2 { text-align: left; padding: 25px; background-color: #fff; margin-top: 100px } @media
screen and (max-width: 767px) { .services-module--howWeWorkWrapper--2HWk2 { background-
color: hsla(0,0%,96.1%,.85); text-align: center } } .services-module--howWeWorkSectionTitle--3Xxgl { font-
size: 28px; font-weight: 500 } .services-module--engageBulletPointList--34lhS { margin-bottom: 40px; padding-
left: 15px } .services-module--engageBulletPointItem--3LyLB { margin: 15px 0; font-size: 14px } .services-module--
titleTableWrapper--2nAyT { display: -ms-flexbox; display: flex; background-color: hsla(0,0%,96.1%,.85); margin: 15px
0; padding: 25px } @media screen and (max-width: 767px) { .services-module--titleTableWrapper--
2nAyT { display: none } } .services-module--titleTableWrapper--2nAyT .services-module--table--1s4Ut { -ms-flex: 1
1; flex: 1 1 } .services-module--titleTableWrapper--2nAyT .services-module--tableHead--2cWUO { border-bottom: 7px
solid #fff; padding-bottom: 25px; width: 33% } .services-module--titleTableWrapper--2nAyT .services-module--
tableRow--1fegK: not(:last-of-type) { border-bottom: 2px solid #fff } .services-module--titleTableWrapper--2nAyT
.services-module--tableData--2Q4Vf { padding: 15px 0; font-size: 14px } .services-module--titleTableWrapper--2nAyT
.services-module--tableData--2Q4Vf a { color: #0074a2 } .services-module--consultingTitle--3UtoE, .services-module--
tableTitle--2qtFX { margin: 0 60px 0 0; width: 15ch; line-height: 1.2; letter-spacing: 1.2px } .services-module--
consultingWrapper--2FSj7 { padding: 75px 25px; display: -ms-flexbox; display: flex; background-

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color:hsla(0,0%,96.1%,.85)}@media screen and (max-width:767px){.services-module--consultingWrapper--2FSj7{display:none}}.services-module--mobileSectionWrapper--3Y5aQ{text-align:center}@media screen and (min-width:768px){.services-module--mobileSectionWrapper--3Y5aQ{display:none}}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileTitle--1kNDb{padding-bottom:30px;border-bottom:7px solid #fff}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileList--1nV-2{list-style-type:none;padding-left:0}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileList--1nV-2,.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileListItem--2SOtR{padding:12px 0}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileListItem--2SOtR{border-bottom:2px solid #fff}.services-module--mobileSectionWrapper--3Y5aQ .services-module--mobileListItem--2SOtR a{color:#173361}.services-module--ctaButton--3iqVy{margin-top:100px}.training-module--training--3zAl6 .training-module--item--i\_dAy{padding:30px 20px;background-color:#fff}.training-module--training--3zAl6 .training-module--item--i\_dAy h4{color:#173361}.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc{margin-top:50px}@media screen and (min-width:768px){.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc{display:-ms-flexbox;display:flex}}.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column;-ms-flex-preferred-size:calc(50% - 100px);flex-basis:calc(50% - 100px);margin:50px}@media screen and (min-width:768px){.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz{margin:50px 90px}}.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz .training-module--icon--J6e5z{width:64px;height:64px;margin:auto}.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz h4{margin-top:20px;font-size:28px;font-weight:500;color:#173361}.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz p{margin:20px 0;-ms-flex:1 1;flex:1 1}.training-module--training--3zAl6 .training-module--jumpWrapper--3wumc .training-module--jumpItemWrapper--1CcRz a{-ms-flex-item-align:center;align-self:center}.training-module--training--3zAl6 .training-module--learningPathsWrapper--392uo .training-module--summary--jGfIP{width:800px;max-width:90%;margin:auto}.training-module--training--3zAl6 .training-module--mainTile--2qI8h{margin-top:50px;background-color:#173361;padding:40px;color:#fff;border-radius:8px}.training-module--training--3zAl6 .training-module--mainTile--2qI8h h4{margin-bottom:20px}.training-module--training--3zAl6 .training-module--mainTile--2qI8h p{font-weight:lighter;color:hsla(0,0%,96.1%,.85)}@media screen and (min-width:768px){.training-module--training--3zAl6 .training-module--columnWrapper--vqs\_A{display:-ms-flexbox;display:flex}}.training-module--training--3zAl6 .training-module--trackColumn--3JQ0P{-ms-flex-preferred-size:100%;flex-basis:100%}@media screen and (min-width:768px){.training-module--training--3zAl6 .training-module--trackColumn--3JQ0P{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px);margin:0 5px}}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie{margin:40px 0}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie h3,.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie h4{font-weight:700;color:#173361}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie h4{font-size:21px;padding-bottom:40px;margin:0;position:relative}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie h4:before{display:none}@media screen and (min-width:768px){.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie h4:before{display:block}}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie h3{font-size:18px;margin-bottom:20px}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie p{font-size:16px}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie .training-module--contentWrapper--7vfjv{background-color:#d7eff6;padding:40px;border-radius:8px;position:relative;min-height:240px}.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie .training-module--contentWrapper--7vfjv p{color:#000}.training-module--training--3zAl6 .training-module--contentWrapper--7vfjv .training-module--dottedLine--3LVdy:before,.training-module--training--3zAl6 .training-module--trackWrapper--2n2Ie h4:before{content:"";width:2px;height:25px;border:1px dashed

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#829494;position:absolute;left:50%;top:-30px }.training-module--training--3zA16 .training-module--competitiveList-1v2ZW h4{font-weight:500;font-size:14px;line-height:15px;color:#173361;letter-spacing:.1em;text-transform:uppercase }.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L{margin-top:50px } @media screen and (min-width:768px){.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L{display:-ms-flexbox;display:flex }}.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L a{-ms-flex:1 1;flex:1 1 }.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L .training-module--competitiveListItem--9CGyo{background-color:#b4e1e4;-ms-flex-preferred-size:100%;flex-basis:100%;margin:30px 0;padding:35px 40px;border-radius:8px;position:relative } @media screen and (min-width:768px){.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L .training-module--competitiveListItem--9CGyo{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px);margin:0 5px }}.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L .training-module--competitiveListItem--9CGyo svg{position:absolute;top:-17px;left:calc(50% - 17px)} @media screen and (min-width:768px){.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L .training-module--competitiveListItem--9CGyo svg{left:calc(50% - 8px)}}.training-module--training--3zA16 .training-module--competitiveList--1v2ZW .training-module--competitiveListItemWrapper--xvg6L .training-module--competitiveListItem--9CGyo h5{font-weight:700;font-size:18px;line-height:23px;text-align:center;color:#173361 }.training-module--training--3zA16 .training-module--resourceItem--jSSBu{-ms-flex-preferred-size:100%!important;flex-basis:100%!important;background-color:#fff;padding:25px;margin:5px 0;border-radius:8px }.training-module--training--3zA16 .training-module--resourceItem--jSSBu h4{color:#173361 }.training-module--training--3zA16 .training-module--contactSection--2NDa0 h3{color:#173361;width:700px;max-width:95%;margin:0 auto 20px }.training-module--training--3zA16 .training-module--formWrapper--5h42K{max-width:600px;margin:40px auto 0 } @media screen and (min-width:768px){.training-module--training--3zA16 .training-module--formWrapper--5h42K{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;-ms-flex-wrap:wrap;flex-wrap:wrap }}.training-module--training--3zA16 .training-module--formWrapper--5h42K .training-module--formInputDiv--3SCsU,.training-module--training--3zA16 .training-module--formWrapper--5h42K input{-ms-flex-preferred-size:calc(50% - 10px);flex-basis:calc(50% - 10px);margin:5px }.training-module--training--3zA16 .training-module--formWrapper--5h42K .training-module--state--1dtzQ{opacity:0;pointer-events:none;transition:all .2s ease }.training-module--training--3zA16 .training-module--formWrapper--5h42K .training-module--show--1A9cH{opacity:1;pointer-events:auto }.training-module--training--3zA16 .training-module--formWrapper--5h42K button{margin:50px auto 0 } @media screen and (max-width:767px){.training-module--training--3zA16 .training-module--formWrapper--5h42K button{margin-top:25px;margin-left:0 }}.training-module--training--3zA16 .training-module--formWrapper--5h42K textarea{width:100%;height:100%;padding:10px;border:none;resize:none;font-size:14px;border:2px solid rgba(130,148,148,.25);border-radius:4px }.training-module--training--3zA16 .training-module--formWrapper--5h42K textarea::-webkit-input-placeholder{color:#829494;font-size:14px }.training-module--training--3zA16 .training-module--formWrapper--5h42K textarea::-moz-placeholder{color:#829494;font-size:14px }.training-module--training--3zA16 .training-module--formWrapper--5h42K textarea:-ms-input-placeholder{color:#829494;font-size:14px }.training-module--training--3zA16 .training-module--formWrapper--5h42K textarea::placeholder{color:#829494;font-size:14px }.training-module--training--3zA16 .training-module--formWrapper--5h42K .training-module--textareaContainer--3x7vs{-ms-flex-preferred-size:100%;flex-basis:100% }.training-module--training--3zA16 .training-module--disclaimer--3ahJU{font-weight:300;font-size:16px;color:#829494;margin-top:25px }.training-module--training--3zA16 .training-module--thankYou--1Yrzn{margin-top:50px;font-size:20px }.style-module--imageContainer--bXGzM img{width:250px } @media screen and (max-width:767px){.style-module--logosContentContainer--28fgQ{padding:50px }} @media screen and (min-

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width:768px){.style-module--logosContent--3FV2R{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-
content:space-between}}.style-module--logos--3A4oE{height:80px;width:auto;max-width:180px;-o-object-
fit:contain;object-fit:contain}@media screen and (max-width:767px){.style-module--logos--
3A4oE{display:block;margin:50px auto}}.style-module--whyWrapper--1wuBn{background-
color:#fff;padding:65px 15px 0}@media screen and (min-width:992px){.style-module--whyWrapper--
1wuBn{padding:100px 150px 65px !important}}.style-module--whyWrapper--1wuBn .style-module--whySummary-
-3z6Nx{margin-bottom:50px}.style-module--whyWrapper--1wuBn .style-module--item--1__t0{-ms-flex:0 1
300px !important;flex:0 1 300px !important;margin-bottom:50px}.style-module--whyWrapper--1wuBn .style-
module--item--1__t0 h5{color:#173361}@media screen and (min-width:992px){.style-module--whyWrapper--
1wuBn .style-module--item--1__t0{-ms-flex-preferred-size:calc(50% - 20px)!important;flex-basis:calc(50% -
20px)!important}}.style-module--whyWrapper--1wuBn .style-module--item--1__t0>div:first-child{margin-
right:15px}.style-module--whyWrapper--1wuBn .style-module--copy--22gHW{font-weight:300;line-
height:1.86;color:#000;font-size:14px;text-align:center;margin-top:37px;margin-bottom:85px}.style-module--
featuresSummary--1SUmP{width:800px;max-width:90%;margin:0 auto 50px}@media screen and (min-
width:768px){.style-module--ctaContentWrapper--1LgW6{display:-ms-flexbox;display:flex}}.style-module--
ctaItem--2ZJ67{-ms-flex:1 1;flex:1 1;position:relative}@media screen and (min-width:768px){.style-module--
ctaItem--2ZJ67:first-of-type:after{content:"";width:2px;height:100%;top:0;background-
color:rgba(130,148,148,.25);position:absolute:right:0}}@media screen and (max-width:991px){.style-module--
ctaItem--2ZJ67{margin:50px auto}}.style-module--ctaItem--2ZJ67 h3{width:80%;margin:0 auto 30px;font-
size:18px;font-weight:700;color:#173361}.style-module--tryConfluent--msw3g{max-width:990px;margin:0
auto}@media screen and (min-width:768px){.style-module--tryConfluent--msw3g .style-module--
productContainer--2hTfN{display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-
between}}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product-
1QvjF{text-align:center;background-color:#fff;position:relative;border-radius:4.2px;width:100%}@media screen
and (min-width:768px){.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-
module--product--1QvjF{position:relative;min-height:328px;margin:0;max-width:480px}}@media screen and
(min-width:768px){.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--
product--1QvjF:first-child{margin-right:30px}}.style-module--tryConfluent--msw3g .style-module--
productContainer--2hTfN .style-module--product--1QvjF:last-child .style-module--content--Yu3YZ{margin-
bottom:0}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--
1QvjF h5{color:rgba(0,0,0,.85);font-size:28px;font-weight:500}@media screen and (max-width:767px){.style-
module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF h5{font-
size:21px}}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--
1QvjF p{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;margin-
top:30px;min-height:80px}@media screen and (max-width:767px){.style-module--tryConfluent--msw3g .style-
module--productContainer--2hTfN .style-module--product--1QvjF p{min-height:auto;margin-bottom:35px}}.style-
module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--1QvjF .style-
module--smallTitle--257dk{color:#173361;font-size:12px;font-weight:500;line-height:2.67;letter-spacing:2px;text-
transform:uppercase}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--
product--1QvjF .style-module--icon--20nvY{position:absolute;left:50%;-ms-transform:translateX(-
50%);transform:translateX(-50%);top:-30px}.style-module--tryConfluent--msw3g .style-module--productContainer-
-2hTfN .style-module--product--1QvjF .style-module--content--Yu3YZ{padding:53px 40px 30px;margin-
bottom:60px;border-radius:4.2px}@media screen and (min-width:768px){.style-module--tryConfluent--msw3g
.style-module--productContainer--2hTfN .style-module--product--1QvjF .style-module--content--Yu3YZ{margin-
bottom:0}}.style-module--tryConfluent--msw3g .style-module--productContainer--2hTfN .style-module--product--
1QvjF .style-module--ctaContainer--1q6Xl{margin-bottom:40px}.style-module--tryConfluent--msw3g .style-
module--disclaimer--2Z9-a{margin:15px;font-size:14px;font-weight:700;line-height:1.79;text-align:left}.style-
module--tooltip--2A6h4{display:inline-block;position:relative;vertical-align:top;margin-left:3px}.style-module--

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tooltip--2A6h4.underline.style-module--bottomRight--Gz-Xz{position:absolute;left:0;width:100%;border-
bottom:1px solid #babad0;margin-left:0}.style-module--tooltip--2A6h4.underline .style-module--hidden--
k4GRS{width:250px;left:-70px}.style-module--tooltip--2A6h4.underline .style-module--hidden--
k4GRS:before{display:none}.style-module--tooltip--2A6h4.underline .style-module--default--
1Q4QX{opacity:0;pointer-events:none}.style-module--tooltip--2A6h4 p{color:#4a4a4a;font-size:12px;font-
weight:300;letter-spacing:.4px;line-height:1.5;margin:0}.style-module--tooltip--2A6h4 .style-module--default--
1Q4QX{border-radius:20px;border:1px solid #8e9093;color:#8e9093;font-size:8px;padding:1px 5px}.style-module-
-tooltip--2A6h4 .style-module--content--3mxKy{transition:opacity .25s ease-in-out}.style-module--tooltip--2A6h4
.style-module--content--3mxKy.style-module--hidden--k4GRS{background:#fff;border:1px solid
#eee;opacity:0;position:absolute;pointer-events:none;margin:20px 5px;padding:10px;z-index:20}.style-module--
tooltip--2A6h4 .style-module--content--3mxKy.style-module--arrow--1YkB5{margin:30px 5px}.style-module--
tooltip--2A6h4 .style-module--content--3mxKy.style-module--arrow--
1YkB5:before{content:"";display:block;position:absolute;width:0;height:0;border-left:10px solid
transparent;border-right:10px solid transparent;border-bottom:10px solid #fff}.style-module--tooltip--2A6h4.style-
module--bottomRight--Gz-Xz .style-module--default--1Q4QX+div{top:0;left:-20px}.style-module--tooltip--
2A6h4.style-module--bottomRight--Gz-Xz>div:before{top:-8px;left:14px}.style-module--tooltip--2A6h4.style-
module--bottomLeft--viYel .style-module--default--1Q4QX+div{top:0;left:-224px}.style-module--tooltip--
2A6h4.style-module--bottomLeft--viYel>div:before{top:-8px;left:214px}.style-module--tooltip--2A6h4: hover
.style-module--hidden--k4GRS{opacity:1;pointer-events:auto}@media (max-width:576px){.style-module--tooltip--
2A6h4{display:none}}.confluent-platform-module--page--108H6 .confluent-platform-module--heroSection--3-7Yr
.confluent-platform-module--content--1j_Al{max-width:820px;width:100%}.confluent-platform-module--page--
108H6 .confluent-platform-module--recognition--1oskr{background:rgba(180,225,228,.3);padding:31px 0
40px}@media screen and (min-width:768px){.confluent-platform-module--page--108H6 .confluent-platform-
module--recognition--1oskr{padding:186px 0 40px}}.confluent-platform-module--page--108H6 .confluent-
platform-module--recognition--1oskr .confluent-platform-module--pager--sIXL4{-ms-flex-pack:distribute;justify-
content:space-around}.confluent-platform-module--page--108H6 .confluent-platform-module--recognition--1oskr
.confluent-platform-module--pager--sIXL4 li{margin-left:10px;margin-right:10px}.confluent-platform-module--
page--108H6 .confluent-platform-module--recognition--1oskr .confluent-platform-module--pager--sIXL4 li:first-
child{margin-left:0}.confluent-platform-module--page--108H6 .confluent-platform-module--recognition--1oskr
.confluent-platform-module--pager--sIXL4 li:last-child{margin-right:0}.confluent-platform-module--page--108H6
.confluent-platform-module--boxShadowContainer--1f1Pk{background-color:#fff;padding:100px 0}@media screen
and (min-width:992px){.confluent-platform-module--page--108H6 .confluent-platform-module--
boxShadowContainer--1f1Pk{padding:100px 45px 60px}}@media screen and (min-width:992px){.confluent-
platform-module--page--108H6 .confluent-platform-module--boxShadowContainer--1f1Pk .confluent-platform-
module--benefitsWrapper--1XJqz{-ms-flex-pack:space-evenly;justify-content:space-evenly}}@media screen and
(min-width:992px){.confluent-platform-module--page--108H6 .confluent-platform-module--boxShadowContainer--
1f1Pk .confluent-platform-module--benefitsItem--1Y0HU{-ms-flex-negative:0;flex-shrink:0;-ms-flex-
positive:1;flex-grow:1;-ms-flex-preferred-size:calc(33% - 20px)!important;flex-basis:calc(33% -
20px)!important;margin-bottom:40px}}.confluent-platform-module--page--108H6 .confluent-platform-module--
benefitSection--2IVM6,.confluent-platform-module--page--108H6 .confluent-platform-module--storySection--
3XSuj{background:rgba(180,225,228,.3)}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
featuresFor--c_v5R{margin-top:80px}@media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R{display:-ms-flexbox;display:flex;-
ms-flex-pack:center;justify-content:center}}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-
module--featuresFor--c_v5R ul{list-style-type:none;padding-left:0}.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R ul li{color:rgba(0,0,0,.85);font-
size:16px;font-weight:300;line-height:25px;letter-spacing:0;text-align:center;background-
color:rgba(180,225,228,.3);margin:8px 0;border-radius:2px;padding:5px 0;text-decoration:underline}.style-module-

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-confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R h5{ font-size:14px;font-
weight:700;text-align:center;color:#0074a2;margin:21px auto 35px;width:60%;text-transform:uppercase } @media
screen and (min-width:768px){.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
featuresFor--c_v5R h5{ width:70% }}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
featuresFor--c_v5R>div{border:6px solid #f3f4f7;-ms-flex:0 1 33%;flex:0 1 33%;padding:30px 30px
50px;position:relative}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--
c_v5R>div:first-of-type{border-bottom:0}@media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R>div:first-of-type{ border-bottom:6px
solid #f3f4f7;border-left:6px solid #f3f4f7 }}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-
module--featuresFor--c_v5R>div:last-of-type{ border-top:0}@media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R>div:last-of-type{border-top:6px solid
#f3f4f7;border-right:6px solid #f3f4f7 }} @media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R>div{border-width:6px 3px;padding-
bottom:30px }}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--featuresFor--c_v5R .style-
module--title--2n Pun{padding:9px 35px;border-radius:6px;background-color:hsla(0,0%,96.1%,.85);font-
size:12px;font-weight:500;letter-spacing:2.67px;color:#173361;position:absolute;-ms-transform:translate(-50%,-
54px);transform:translate(-50%,-54px);text-transform:uppercase}.style-module--confluentPlatformBenefitPersonas-
-3PCk0 .style-module--featureApacheKafka--NzqQR{padding:30px;background-
color:hsla(0,0%,96.1%,.85)} @media screen and (min-width:768px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--featureApacheKafka--NzqQR{margin:0 5px }}.style-
module--confluentPlatformBenefitPersonas--3PCk0 .style-module--featureApacheKafka--NzqQR span{font-
size:18px;font-weight:700;color:#0074a2}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
platformAdjectives--25Kx4{border:6px solid #f3f4f7;margin-top:20px}@media screen and (min-
width:768px){.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--
25Kx4{margin:5px }}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives-
-25Kx4 ul{list-style-type:none;display:-ms-flexbox;display:flex;-ms-flex-pack:distribute;justify-content:space-
around;padding:20px 0}@media screen and (max-width:991px){.style-module--confluentPlatformBenefitPersonas--
3PCk0 .style-module--platformAdjectives--25Kx4 ul{-ms-flex-direction:column;flex-direction:column }}.style-
module--confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--25Kx4 ul:first-of-
type{border-bottom:1px dashed #d4d0d0}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--
platformAdjectives--25Kx4 ul:first-of-type li{-ms-flex:0 1 33%;flex:0 1 33% }.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--25Kx4 ul
li{color:rgba(0,0,0,.85);font-size:16px;font-weight:300;line-height:25px;letter-spacing:0;-ms-flex:0 1 25%;flex:0 1
25%;margin:10px 0}.style-module--confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--
25Kx4 ul li.style-module--highlight--hT6ki{color:#173361;font-size:18px;font-weight:700;text-
transform:uppercase;-ms-flex:1 1 40%;flex:1 1 40% } @media screen and (max-width:991px){.style-module--
confluentPlatformBenefitPersonas--3PCk0 .style-module--platformAdjectives--25Kx4 ul li.style-module--highlight-
hT6ki{-ms-flex-order:-1;order:-1 }}.style-module--content--2ruvk{text-align:center}.style-module--formContainer-
-1XMLD{height:auto;top:50%;margin-top:0;width:100%;max-width:700px;min-
height:420px;position:relative;border-radius:5px}.style-module--formContainer--1XMLD form .style-module--
buttonContainer--3C_YP{width:100%;margin:20px 0}.style-module--formContainer--1XMLD form .style-module-
-select--1OhVX{-webkit-appearance:none;letter-spacing:1px;border:1.1px solid #e2e2e2;font-
size:12px;background:#fff;width:100%;text-transform:uppercase;text-
align:left;color:rgba(0,0,0,.7);position:relative;padding:0}.style-module--formContainer--1XMLD form .style-
module--select--1OhVX>div{padding:0 10px}.style-module--formContainer--1XMLD form .style-module--select-
1OhVX>div:first-child{padding:10px 0 10px 25px;cursor:pointer;text-align:left}.style-module--formContainer-
1XMLD form .style-module--select--1OhVX.style-module--error--2nMVD{border:1px solid #df2d58}.style-
module--formContainer--1XMLD form .style-module--select--1OhVX.style-module--error--2nMVD .style-module-

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- options--3_n0T { border-right-color:#df2d58;border-left-color:#df2d58;border-bottom-color:#df2d58 }.style-module-
- formContainer--1XMLD form .style-module--select--1OhVX .style-module--options--
3_n0T { position:absolute;left:-1px;right:-1px;z-index:9;background:#fff;border-right:1.1px solid #e99999;border-
left:1.1px solid #e99999;border-bottom:1.1px solid #e99999;top:43px;transition:max-height .5s ease-in-
out;overflow:hidden;max-height:0;border-bottom-left-radius:4px;border-bottom-right-radius:4px;border-top-left-
radius:0;border-top-right-radius:0;text-align:left }.style-module--formContainer--1XMLD form .style-module--
select--1OhVX .style-module--options--3_n0T>div { margin-bottom:10px;padding:10px 10px
20px;background:#edf0f5;position:relative }.style-module--formContainer--1XMLD form .style-module--select--
1OhVX .style-module--options--3_n0T h6 { display:inline-block;font-size:12px;margin:10px 0;color:#000;font-
weight:500 }.style-module--formContainer--1XMLD form .style-module--select--1OhVX .style-module--options--
3_n0T ul { display:-ms-flexbox;display:flex;-ms-flex-wrap:wrap;flex-wrap:wrap;-ms-flex-pack:justify;justify-
content:space-between;text-align:left;margin:0;list-style:none;padding:0 }.style-module--formContainer--1XMLD
form .style-module--select--1OhVX .style-module--options--3_n0T ul li { background:#fff;-ms-flex:1 1;flex:1 1;text-
align:center;border:1px solid #e3e4e5;border-radius:4px;font-size:12px;text-transform:uppercase;font-
weight:300;letter-spacing:1px;color:#000;margin:0 10px 0 0;padding:10px 0;cursor:pointer;line-
height:1.2;width:calc((100% - 30px)/2)}.style-module--formContainer--1XMLD form .style-module--select--
1OhVX .style-module--options--3_n0T ul li:hover { background-color:rgba(37,123,215,.5);color:#fff;font-
weight:500 }.style-module--formContainer--1XMLD form .style-module--select--1OhVX .style-module--options--
3_n0T ul li.style-module--selected--3IV6f { background-color:#257bd7;color:#fff;font-weight:500 }.style-module--
formContainer--1XMLD form .style-module--select--1OhVX .style-module--options--3_n0T .style-module--
divider--1qB1j { position:absolute;top:-20px;left:50%;-ms-transform:translateX(-50%);transform:translateX(-
50%);border:3px solid #fff;width:30px;height:30px;text-align:center;border-radius:50%;background:#f7f9fc;font-
weight:700;text-transform:uppercase }.style-module--formContainer--1XMLD form .style-module--select--1OhVX
.style-module--arrow--CsSfj { width:20px;height:20px;display:inline-
block;top:24px;right:20px;left:auto;position:absolute }.style-module--formContainer--1XMLD form .style-module--
select--1OhVX .style-module--arrow--CsSfj:after,.style-module--formContainer--1XMLD form .style-module--
select--1OhVX .style-module--arrow--CsSfj:before { content:"";position:absolute;background-
color:#8e9093;width:15px;height:1px;transition:all .4s cubic-bezier(1,.07,.28,1.04)}.style-module--formContainer--
1XMLD form .style-module--select--1OhVX .style-module--arrow--CsSfj:before { -ms-
transform:rotate(45deg);transform:rotate(45deg)}.style-module--formContainer--1XMLD form .style-module--
select--1OhVX .style-module--arrow--CsSfj:after { -ms-transform:rotate(-45deg);transform:rotate(-
45deg);left:11px }.style-module--formContainer--1XMLD form .style-module--select--1OhVX.style-module--
expanded--1Lbrq { border-bottom:0;border-bottom-left-radius:0;border-bottom-right-radius:0 }.style-module--
formContainer--1XMLD form .style-module--select--1OhVX.style-module--expanded--1Lbrq .style-module--
options--3_n0T { max-height:220px }.style-module--formContainer--1XMLD form .style-module--select--
1OhVX.style-module--expanded--1Lbrq .style-module--arrow--CsSfj:before { -ms-
transform:rotate(135deg);transform:rotate(135deg)}.style-module--formContainer--1XMLD form .style-module--
select--1OhVX.style-module--expanded--1Lbrq .style-module--arrow--CsSfj:after { -ms-transform:rotate(-
135deg);transform:rotate(-135deg);left:11px }.style-module--formContainer--1XMLD .style-module--titleContainer-
-WVppj h6 { display:inline-block;font-size:16px;font-weight:500;color:#2a2a2d;margin-bottom:24px }.style-module-
-formContainer--1XMLD .style-module--titleContainer--WVppj .tooltip-hidden { left:-200px!important }.style-
module--checkboxWrapper--2IEzb { position:relative;width:100%;margin-top:20px;color:rgba(0,0,0,.7);text-
align:left }.style-module--checkboxWrapper--2IEzb
input { position:absolute;opacity:0;cursor:pointer;height:0;width:0 }.style-module--checkboxWrapper--2IEzb
label { cursor:pointer;padding-left:30px }.style-module--checkboxWrapper--2IEzb .style-module--
checkboxContainer--2b_qe { display:block;position:relative;padding-left:35px;margin-top:12px;-webkit-user-
select:none;-moz-user-select:none;-ms-user-select:none;user-select:none }.style-module--tos--3pYRd { font-
size:12px }.style-module--tos--3pYRd p { font-size:12px;width:80%;line-height:1.4;color:rgba(0,0,0,.7);text-

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align:justify;margin:auto auto 15px }.style-module--tosUS--3c4R4,.style-module--us--2ibcg .style-module--tos--3pYRd{display:none }.style-module--us--2ibcg .style-module--tosUS--3c4R4{display:block }.modal-is-visible{overflow:hidden }.modal-is-visible .style-module--formPlatformDownloadModal--1rKbi.style-module--show--2NTMt{top:50%;left:50%;-ms-transform:translate(-50%,-50%);transform:translate(-50%,-50%)}.style-module--accordionItemWrapper--2qcVC{margin-bottom:2px;transition:all .5s ease }.style-module--accordionItemWrapper--2qcVC.style-module--collapsible--rOU3f{max-height:64px;overflow:hidden }.style-module--accordionItemWrapper--2qcVC.style-module--collapsible--rOU3f .style-module--accordionPanel--19rjo{opacity:0;transition:all .4s ease .1s }.style-module--accordionItemWrapper--2qcVC.style-module--collapsible--rOU3f .style-module--accordionTitle--1k8jN{cursor:pointer }.style-module--accordionItemWrapper--2qcVC.style-module--collapsible--rOU3f .style-module--indicator--2cYbX{display:block }.style-module--accordionItemWrapper--2qcVC.style-module--open--2SWVx{overflow:visible }.style-module--accordionItemWrapper--2qcVC.style-module--open--2SWVx .style-module--accordionItem--204fj .style-module--accordionPanel--19rjo{opacity:1 }.style-module--accordionTitle--1k8jN{color:#173361;font-size:18px;font-weight:700;letter-spacing:normal;text-align:left;padding:20px 50px 20px 20px;color:#000;background-color:#e6f5fb;position:relative}@media screen and (max-width:767px){.style-module--accordionTitle--1k8jN{font-size:16px }}.style-module--accordionAltIndicator--F2VHE{display:inline-block;position:absolute;right:2rem }.style-module--indicator--2cYbX{right:50px;position:absolute;top:35px;display:none }.style-module--purple--3ncYI .style-module--accordionTitle--1k8jN{background:rgba(85,29,157,.1);color:#551d9d }.style-module--purple--3ncYI .style-module--accordionItem--204fj{background:rgba(85,29,157,.03) }.style-module--green--3oE7a .style-module--accordionTitle--1k8jN{background:rgba(21,158,134,.1);color:#159e86 }.style-module--green--3oE7a .style-module--accordionItem--204fj{background:rgba(21,158,134,.03) }.style-module--blue--1F6u1 .style-module--accordionTitle--1k8jN{background:rgba(13,172,204,.1);color:#0dacc3 }.style-module--blue--1F6u1 .style-module--accordionItem--204fj{background:rgba(13,172,204,.03) }.style-module--orange--1yfx\_ .style-module--accordionTitle--1k8jN{background:rgba(227,125,98,.1);color:#e37d62 }.style-module--orange--1yfx\_ .style-module--accordionItem--204fj{background:rgba(227,125,98,.03) }.style-module--grey--1DKMw .style-module--accordionTitle--1k8jN{background:rgba(88,120,140,.1);color:#58788c }.style-module--grey--1DKMw .style-module--accordionItem--204fj{background:rgba(88,120,140,.03) }.style-module--tiersSection--1QkAs{display:-ms-flexbox;display:flex;-ms-flex-pack:distribute;justify-content:space-around;margin-top:100px;margin-bottom:50px }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK{-ms-flex-preferred-size:25%;flex-basis:25%;text-align:left }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK>p{font-size:13px;width:60%;margin:20px auto 20px 0 }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tooltip--1tWod{-webkit-text-decoration-color:#b78142;text-decoration-color:#b78142;cursor:help }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tooltip--1tWod div{border:2px solid #b4e1e4;width:75%!important;padding:20px 40px;border-radius:8px }.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tooltip--1tWod div p{text-align:center}@media screen and (max-width:991px){.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tooltip--1tWod div{display:none }}@media screen and (max-width:991px){.style-module--tiersSection--1QkAs .style-module--tierContainer--1g6eK .style-module--tierctaButtons--1CAwD{padding:10px 12px }}@media screen and (max-width:991px){.style-module--featuresSection--1BRNK,.style-module--tiersSection--1QkAs{display:none }}.style-module--tierTitle--ud9Z0{color:#b78142;font-size:18px;font-weight:700;letter-spacing:normal;margin-bottom:35px;display:block;text-align:left}@media screen and (max-width:991px){.style-module--tierTitle--ud9Z0{text-align:center }}.style-module--tooltip--1tWod{text-decoration:underline;display:block }.style-module--rowTitle--2FP-M{background:hsla(0,0%,96.1%,.85);padding:13px 20px;letter-spacing:1.2px;font-size:18px;font-weight:700;text-align:left}@media screen and (max-width:767px){.style-module--rowTitle--2FP-M{font-size:14px }}.style-module--row--3dCMI{display:-ms-flexbox;display:flex;border:2px solid hsla(0,0%,96.1%,.85) }.style-module--row--3dCMI.style-module--title--3Tzw4{background:hsla(0,0%,96.1%,.85) }.style-module--row--3dCMI .style-module--rowItem--

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3ZC1B {width:25%;text-align:left;padding:13px 0;font-size:13px }.style-module--row--3dCMI .style-module--
rowItem--3ZC1B:first-of-type {font-weight:500}.style-module--row--3dCMI .style-module--rowItem--3ZC1B:first-
of-type div:nth-child(2){font-weight:300;color:rgba(0,0,0,.85);font-size:11px }.style-module--row--3dCMI .style-
module--rowItem--3ZC1B:nth-of-type(3n) div:nth-child(2){margin-bottom:20px } @media screen and (max-
width:991px){.style-module--row--3dCMI .style-module--rowItem--3ZC1B {font-size:12px } }.style-module--row--
3dCMI .style-module--rowItem--3ZC1B .style-module--rowItemTooltip--1Cd48 {cursor:help;margin-
right:0} @media screen and (max-width:991px){.style-module--row--3dCMI .style-module--rowItem--3ZC1B
.style-module--rowItemTooltip--1Cd48 {display:block;font-size:12px } }.style-module--row--3dCMI .style-module--
rowItem--3ZC1B .style-module--rowItemTooltip--1Cd48>span {display:block}.style-module--row--3dCMI .style-
module--rowItem--3ZC1B .style-module--rowItemTooltip--1Cd48>span div:first-child {text-decoration:underline;-
webkit-text-decoration-color:#000;text-decoration-color:#000;max-width:210px }.style-module--row--3dCMI .style-
module--rowItem--3ZC1B .style-module--rowItemTooltip--1Cd48>div {border:1px solid #b4e1e4;text-
transform:none} @media screen and (max-width:991px){.style-module--row--3dCMI .style-module--rowItem--
3ZC1B .style-module--rowItemTooltip--1Cd48>div {display:none } }.style-module--row--3dCMI .style-module--
rowItem--3ZC1B h4 {font-size:12px } @media screen and (max-width:991px){.style-module--row--3dCMI .style-
module--rowItem--3ZC1B h4 {font-size:11px } }.style-module--row--3dCMI .style-module--rowItem--3ZC1B:first-
of-type {padding-left:20px;letter-spacing:1.2px;font-size:12px;text-transform:uppercase }.style-module--disclaimer--
2tlQN {font-size:12px;font-weight:700;line-height:1.79;text-align:right;padding:12px 0 } @media screen and (max-
width:991px){.style-module--disclaimer--2tlQN {display:none } }.style-module--mobileViewWrapper--
2oK4O {display:none } @media screen and (max-width:991px){.style-module--mobileViewWrapper--
2oK4O {display:block } }.style-module--mobileView--3YxAf .style-module--tier--2LItI {margin:50px }.style-module-
mobileView--3YxAf .style-module--tier--2LItI h3 {text-align:center }.style-module--mobileView--3YxAf .style-
module--tier--2LItI p {font-size:12px;margin-bottom:35px }.style-module--mobileView--3YxAf .style-module--
mobileRow--1MKZU {display:-ms-flexbox;display:flex;border:2px solid hsla(0,0%,96.1%,.85);padding:15px 60px
15px 20px;-ms-flex-pack:justify;justify-content:space-between;font-size:14px }.style-module--mobileView--3YxAf
.style-module--mobileRow--1MKZU>div:first-child {text-align:left }.style-module--mobileView--3YxAf .style-
module--mobileRow--1MKZU>div:last-child {text-align:right }.style-module--container--
Fuoc8 {position:relative }.style-module--tabContainer--2EeGI {margin-top:65px;position:relative;display:-ms-
flexbox;display:flex;-ms-flex-pack:center;justify-content:center }.style-module--tabContainer--2EeGI:after,.style-
module--tabContainer--2EeGI:before {content:"";position:absolute;width:35%;top:50%;border:3px solid
hsla(0,0%,96.1%,.85);-ms-transform:translateY(-50%);transform:translateY(-50%)} @media screen and (max-
width:991px){.style-module--tabContainer--2EeGI:after,.style-module--tabContainer--
2EeGI:before {display:none } }.style-module--tabContainer--2EeGI:after {left:0 }.style-module--tabContainer--
2EeGI:before {right:0 }.style-module--tabWrapper--1MIKN {display:-ms-flexbox;display:flex;border:1px solid
#d1d1d1;padding:15px 30px;border-radius:4px;-ms-flex-wrap:wrap;flex-wrap:wrap;text-align:center;z-
index:1;background-color:#fff;cursor:pointer } @media screen and (min-width:992px){.style-module--tabWrapper--
1MIKN:first-of-type {border-radius:4px 0 0 4px;border-right:none } } @media screen and (min-width:992px){.style-
module--tabWrapper--1MIKN:last-of-type {border-left:none;border-radius:0 4px 4px 0 } }.style-module--
tabWrapper--1MIKN.style-module--active--3mpSI {color:#fff;background-color:#173361 }.style-module--
tabSubTitle--3FtQx,.style-module--tabTitle--2Nc3h {width:100%;font-weight:500 }.style-module--tabTitle--
2Nc3h {text-transform:uppercase;font-size:12px;font-stretch:normal;letter-spacing:.76px }.style-module--
tabSubTitle--3FtQx {margin:0;font-size:14px }.style-module--container--30Ip7 {border-radius:8px;margin:50px
0;padding:50px 20px;background:#173361;color:#fff }.style-module--container--30Ip7 a: hover { -webkit-text-
decoration-color:#fff;text-decoration-color:#fff }.style-module--container--30Ip7 a h4 {color:#fff;font-size:21px;font-
weight:700;margin:0;display:inline }.style-module--container--30Ip7 a div {margin-left:7px;display:inline-
block;vertical-align:middle;top:-10px }.rc-slider {position:relative;height:14px;padding:5px 0;width:100%;border-
radius:6px;-ms-touch-action:none;touch-action:none }.rc-slider,* {box-sizing:border-box;-webkit-tap-
highlight-color:rgba(0,0,0,0) }.rc-slider-rail {width:100%;background-color:#e9e9e9 }.rc-slider-rail,.rc-slider-

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track{position:absolute;height:4px;border-radius:6px}.rc-slider-track{left:0;background-color:#abe2fb}.rc-slider-
handle{position:absolute;width:14px;height:14px;cursor:pointer;cursor:-webkit-grab;margin-top:-
5px;cursor:grab;border-radius:50%;border:2px solid #96dbfa;background-color:#fff;-ms-touch-action:pan-x;touch-
action:pan-x}.rc-slider-handle-dragging.rc-slider-handle-dragging.rc-slider-handle-dragging{border-
color:#57c5f7;box-shadow:0 0 0 5px #96dbfa}.rc-slider-handle:focus{outline:none}.rc-slider-handle-click-
focused:focus{border-color:#96dbfa;box-shadow:unset}.rc-slider-handle:hover{border-color:#57c5f7}.rc-slider-
handle:active{border-color:#57c5f7;box-shadow:0 0 5px #57c5f7;cursor:-webkit-grabbing;cursor:grabbing}.rc-
slider-mark{position:absolute;top:18px;left:0;width:100%;font-size:12px}.rc-slider-mark-
text{position:absolute;display:inline-block;vertical-align:middle;text-align:center;cursor:pointer;color:#999}.rc-
slider-mark-text-active{color:#666}.rc-slider-
step{position:absolute;width:100%;height:4px;background:transparent}.rc-slider-dot{position:absolute;bottom:-
2px;margin-left:-4px;width:8px;height:8px;border:2px solid #e9e9e9;background-color:#fff;cursor:pointer;border-
radius:50%;vertical-align:middle}.rc-slider-dot-active{border-color:#96dbfa}.rc-slider-dot-reverse{margin-right:-
4px}.rc-slider-disabled{background-color:#e9e9e9}.rc-slider-disabled .rc-slider-track{background-color:#ccc}.rc-
slider-disabled .rc-slider-dot,.rc-slider-disabled .rc-slider-handle{border-color:#ccc;box-shadow:none;background-
color:#fff;cursor:not-allowed}.rc-slider-disabled .rc-slider-dot,.rc-slider-disabled .rc-slider-mark-text{cursor:not-
allowed!important}.rc-slider-vertical{width:14px;height:100%;padding:0 5px}.rc-slider-vertical .rc-slider-
rail{height:100%;width:4px}.rc-slider-vertical .rc-slider-track{left:5px;bottom:0;width:4px}.rc-slider-vertical .rc-
slider-handle{margin-left:-5px;-ms-touch-action:pan-y;touch-action:pan-y}.rc-slider-vertical .rc-slider-
mark{top:0;left:18px;height:100%}.rc-slider-vertical .rc-slider-step{height:100%;width:4px}.rc-slider-vertical .rc-
slider-dot{left:2px;margin-bottom:-4px}.rc-slider-vertical .rc-slider-dot:first-child,.rc-slider-vertical .rc-slider-
dot:last-child{margin-bottom:-4px}.rc-slider-tooltip-zoom-down-appear,.rc-slider-tooltip-zoom-down-enter,.rc-
slider-tooltip-zoom-down-leave{-webkit-animation-duration:.3s;animation-duration:.3s;-webkit-animation-fill-
mode:both;animation-fill-mode:both;display:block!important;-webkit-animation-play-state:paused;animation-play-
state:paused}.rc-slider-tooltip-zoom-down-appear.rc-slider-tooltip-zoom-down-appear-active,.rc-slider-tooltip-
zoom-down-enter.rc-slider-tooltip-zoom-down-enter-active{-webkit-animation-
name:rcSliderTooltipZoomDownIn;animation-name:rcSliderTooltipZoomDownIn;-webkit-animation-play-
state:running;animation-play-state:running}.rc-slider-tooltip-zoom-down-leave.rc-slider-tooltip-zoom-down-leave-
active{-webkit-animation-name:rcSliderTooltipZoomDownOut;animation-name:rcSliderTooltipZoomDownOut;-
webkit-animation-play-state:running;animation-play-state:running}.rc-slider-tooltip-zoom-down-appear,.rc-slider-
tooltip-zoom-down-enter{-ms-transform:scale(0);transform:scale(0);-webkit-animation-timing-function:cubic-
bezier(.23,1,.32,1);animation-timing-function:cubic-bezier(.23,1,.32,1)}.rc-slider-tooltip-zoom-down-leave{-
webkit-animation-timing-function:cubic-bezier(.755,.05,.855,.06);animation-timing-function:cubic-
bezier(.755,.05,.855,.06)}@-webkit-keyframes rcSliderTooltipZoomDownIn{0%{opacity:0;transform-origin:50%
100%;transform:scale(0)}to{transform-origin:50% 100%;transform:scale(1)}}@keyframes
rcSliderTooltipZoomDownIn{0%{opacity:0;transform-origin:50% 100%;transform:scale(0)}to{transform-
origin:50% 100%;transform:scale(1)}}@-webkit-keyframes rcSliderTooltipZoomDownOut{0%{transform-
origin:50% 100%;transform:scale(1)}to{opacity:0;transform-origin:50% 100%;transform:scale(0)}}@keyframes
rcSliderTooltipZoomDownOut{0%{transform-origin:50% 100%;transform:scale(1)}to{opacity:0;transform-
origin:50% 100%;transform:scale(0)}}.rc-slider-tooltip{position:absolute;left:-9999px;top:-
9999px;visibility:visible}.rc-slider-tooltip,.rc-slider-tooltip *{box-sizing:border-box;-webkit-tap-highlight-
color:rgba(0,0,0,0)}.rc-slider-tooltip-hidden{display:none}.rc-slider-tooltip-placement-top{padding:4px 0 8px}.rc-
slider-tooltip-inner{padding:6px 2px;min-width:24px;height:24px;font-size:12px;line-height:1;color:#fff;text-
align:center;text-decoration:none;background-color:#6c6c6c;border-radius:6px;box-shadow:0 0 4px #d9d9d9}.rc-
slider-tooltip-arrow{position:absolute;width:0;height:0;border-color:transparent;border-style:solid}.rc-slider-tooltip-
placement-top .rc-slider-tooltip-arrow{bottom:4px;left:50%;margin-left:-4px;border-width:4px 4px 0;border-top-
color:#6c6c6c}.style-module--pricingCalculator--D5Y17{position:relative;z-index:1}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17{-ms-flex-direction:column;flex-direction:column}}.style-

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module--pricingCalculator--D5Y17 .style-module--container--2yYu5{display:-ms-flexbox;display:flex}@media
screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--container--2yYu5{-ms-
flex-direction:column;flex-direction:column}}.style-module--pricingCalculator--D5Y17 .style-module--
mainCalculator--YXJeD{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-
direction:column;width:77.8rem}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17
.style-module--mainCalculator--YXJeD{width:100%;-ms-flex-direction:column;flex-direction:column}}.style-
module--pricingCalculator--D5Y17 .style-module--accordion--1Xd_0{height:-webkit-max-content;height:-moz-
max-content;height:max-content}.style-module--pricingCalculator--D5Y17 .style-module--accordionItem--
3qJxX{border:7px solid hsla(0,0%,96.1%,.85);border-radius:8px;min-height:12.5rem;background:#fff;margin-
bottom:1rem}.style-module--pricingCalculator--D5Y17 .style-module--accordionItem--3qJxX:last-of-type{margin-
bottom:0}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--
accordionItem--3qJxX{border:none;max-height:none}}.style-module--pricingCalculator--D5Y17 .style-module--
accordionItemActive--1Z_Bc{box-sizing:border-box;background:#fff}.style-module--pricingCalculator--D5Y17
.style-module--accordionItemActive--1Z_Bc .style-module--accordionItemTitle--2H98i{background:#fff;font-
size:2.1rem;font-weight:500}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17
.style-module--accordionItemActive--1Z_Bc .style-module--accordionItemTitle--2H98i{font-size:2.1rem;font-
weight:500}}.style-module--pricingCalculator--D5Y17 .style-module--accordionItemTitle--
2H98i{background:hsla(0,0%,96.1%,.85);font-size:1.8rem;font-weight:400;padding:4.5rem 2rem;transition:all
.35s;position:relative}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-
module--accordionItemTitle--2H98i{font-size:2.1rem;font-weight:500;padding:2rem 3.75rem 0;line-height:1.6;min-
height:0;text-align:center;background:none}}.style-module--pricingCalculator--D5Y17 .style-module--
accordionItemTitleRight--3qb7l{color:#173361;font-weight:300;font-size:1.6rem;display:inline-
block;position:absolute;right:2rem}@media screen and (max-width:767px){.style-module--pricingCalculator--
D5Y17 .style-module--accordionItemTitleRight--3qb7l{display:none}}.style-module--pricingCalculator--D5Y17
.style-module--accordionItemTitleValue--131ck{display:inline-block;width:auto;padding-left:1.5rem}.style-
module--pricingCalculator--D5Y17 .style-module--accordionItemIndicator--
1YIUh{display:none!important}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17
.style-module--accordionItemPanel--2tczN{opacity:1!important;padding-left:1.2rem;padding-right:1.2rem;border-
bottom:.7rem solid hsla(0,0%,96.1%,.85)}.style-module--pricingCalculator--D5Y17 .style-module--
accordionItemPanel--2tczN:last-of-type{border-bottom:none}}.style-module--pricingCalculator--D5Y17 .style-
module--section1--1-8KW{padding:3.2rem 3.6rem 2.5rem}@media screen and (max-width:767px){.style-module--
pricingCalculator--D5Y17 .style-module--section1--1-8KW{padding:3.2rem 0 2.5rem}}.style-module--
pricingCalculator--D5Y17 .style-module--fieldLabel--3DLKg{font-size:12px;line-height:1.5rem;letter-
spacing:.1rem;padding:.5rem 0;text-transform:uppercase;font-weight:500}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--fieldLabel--3DLKg{font-size:12px;line-
height:1.5rem}}.style-module--pricingCalculator--D5Y17 .style-module--providerContainer--1uY8E{display:-ms-
flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--providerContainer--1uY8E{-ms-flex-
direction:column;flex-direction:column;-ms-flex-align:center;align-items:center}}.style-module--pricingCalculator-
D5Y17 .style-module--ctaContainer--uZcE3{margin-top:6.5rem;text-align:center}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--ctaContainer--uZcE3{display:none}}.style-
module--pricingCalculator--D5Y17 .style-module--sectionButton--3V1mf:hover{color:#0074a2}.style-module--
pricingCalculator--D5Y17 .style-module--providerLabel--1OdUe{width:32%;text-align:center;border-
radius:.4rem;border:1px solid rgba(130,148,148,.25);padding:4rem 0;cursor:pointer}@media screen and (max-
width:767px){.style-module--pricingCalculator--D5Y17 .style-module--providerLabel--
1OdUe{width:90%;padding:2rem 0}}.style-module--pricingCalculator--D5Y17 .style-module--providerRadio--
2TVAt:checked+.style-module--providerLabel--1OdUe{padding:3.9rem 0;border:2px solid #0074a2}@media
screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--providerRadio--

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2TVAt:checked+.style-module--providerLabel--1OdUe{padding:1.9rem 0}.style-module--pricingCalculator--D5Y17 .style-module--providerRadio--2TVAt{-webkit-appearance:none;-moz-appearance:none;appearance:none;border:none;display:inline;width:0;height:0}.style-module--pricingCalculator--D5Y17 .style-module--section2--dCKMt{padding:3.2rem 3.6rem 2.5rem}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--section2--dCKMt{padding:3.2rem 0 2.5rem}}.style-module--pricingCalculator--D5Y17 .style-module--regionContainer--3x-x5{display:-ms-flexbox;display:flex;-ms-flex-direction:column;flex-direction:column}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--regionContainer--3x-x5{-ms-flex-direction:column-reverse;flex-direction:column-reverse}}.style-module--pricingCalculator--D5Y17 .style-module--tip--2PiIS .style-module--tooltip--385jI{border:.2rem solid #d7eff6;border-radius:.8rem;padding:3rem}.style-module--pricingCalculator--D5Y17 .style-module--tip--2PiIS .style-module--tooltip--385jI p{line-height:2.5rem;font-size:1.4rem;text-transform:none}.style-module--pricingCalculator--D5Y17 .style-module--sectionSplit--LnwRO{margin-top:1.5rem;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--sectionSplit--LnwRO{-ms-flex-direction:column;flex-direction:column}}.style-module--pricingCalculator--D5Y17 .style-module--sectionSplitPart--2IPi\_{width:48%;text-align:left}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--sectionSplitPart--2IPi\_{text-align:center;width:auto;margin:.5rem}}.style-module--pricingCalculator--D5Y17 .style-module--sectionSplitPartRight--1L7Kv{width:48%;text-align:right}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--sectionSplitPartRight--1L7Kv{text-align:center;width:auto;margin:.5rem}}.style-module--pricingCalculator--D5Y17 .style-module--radioToggle--FwXVV{display:block}.style-module--pricingCalculator--D5Y17 .style-module--radioToggleContainer--2AgyV{display:block;padding:0;margin:0;border-radius:2.5rem;background:hsla(0,0%,96.1%,.85)}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--radioToggleContainer--2AgyV{background:rgba(130,148,148,25)}}.style-module--pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ{-webkit-appearance:none;-moz-appearance:none;appearance:none;border:none;display:inline}.style-module--pricingCalculator--D5Y17 .style-module--radioToggleLabel--2WfMo{padding:.5rem 0;width:50%;text-align:center;border-radius:2.5rem;background:transparent;border:2px solid transparent;font-size:12px;color:#829494;text-transform:uppercase;margin:0;opacity:1}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--radioToggleLabel--2WfMo{padding:.5rem 0}}.style-module--pricingCalculator--D5Y17 .style-module--radioToggleInvalid--2i\_eO{opacity:.5;text-decoration:line-through;cursor:not-allowed}.style-module--pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ:checked+.style-module--radioToggleLabel--2WfMo{background:#0074a2;color:#fff}.style-module--pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ:active+.style-module--radioToggleLabel--2WfMo,.style-module--pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ:focus+.style-module--radioToggleLabel--2WfMo{border-color:rgba(130,148,148,25)}.style-module--pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ:checked:active+.style-module--radioToggleLabel--2WfMo,.style-module--pricingCalculator--D5Y17 .style-module--radioToggleRadio--2iXdJ:checked:focus+.style-module--radioToggleLabel--2WfMo{border-color:#173361}.style-module--pricingCalculator--D5Y17 .style-module--section3--2NVYM{padding:0 3.6rem 5rem}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--section3--2NVYM{padding:0 0 5rem}}.style-module--pricingCalculator--D5Y17 .style-module--sliderContainer--1W4g0{margin:.5rem 0 2.5rem}.style-module--pricingCalculator--D5Y17 .style-module--slider--3yHlc{margin:0}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--slider--3yHlc{margin-left:1.5rem;width:calc(100vw - 6rem)}}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ{display:block;width:38.5rem;margin-left:1.8rem;background:#fff;box-shadow:0 4px 20px rgba(0,0,0,25);border-radius:8px;padding:1.7rem 2.5rem 2.5rem}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ .style-module--sectionSplit--

LnwRO{margin:.8rem 0}@media screen and (max-width:767px){.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ{width:100%;margin:1rem 0;height:auto;padding:1.6rem}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ .style-module--sectionSplit--LnwRO{-ms-flex-direction:row;flex-direction:row}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ .style-module--sectionSplitPart--2IPi\_{width:49%;text-align:left}.style-module--pricingCalculator--D5Y17 .style-module--display--20DIQ .style-module--sectionSplitPartRight--1L7Kv{width:49%;text-align:right}}.style-module--pricingCalculator--D5Y17 .style-module--displayHeading--2YFNw{font-size:1.6rem;font-weight:700;color:#173361;margin:0 0 1rem;text-align:left}.style-module--pricingCalculator--D5Y17 .style-module--displayHeadingRight--2YZUJ{font-size:1.6rem;font-weight:700;color:#173361;margin:0 0 1rem;text-align:right}.style-module--pricingCalculator--D5Y17 .style-module--displayLabel--3Czd1{text-transform:uppercase;color:#829494;font-size:1.2rem;letter-spacing:.1em;text-align:left}.style-module--pricingCalculator--D5Y17 .style-module--displayRate--6lzLc{font-size:1.6rem;font-weight:300;white-space:nowrap;text-align:left}.style-module--pricingCalculator--D5Y17 .style-module--displayNumber--19Obs{font-size:2.4rem;font-weight:500;color:#173361;line-height:2}.style-module--pricingCalculator--D5Y17 .style-module--displayButton--2W6-3{width:100%;margin:2rem 0 1rem}.style-module--pricingCalculator--D5Y17 .style-module--displayTotal--3qT-N{font-size:3.5rem;font-weight:700;color:#173361;line-height:1;margin-bottom:1.5rem}.style-module--pricingCalculator--D5Y17 .style-module--marketingText--2XB0U{text-align:center;color:#173361;font-size:1.4rem}.style-module--pricingCalculator--D5Y17 .style-module--displayDiscount--lkCPC{display:-ms-flexbox;display:flex;-ms-flex-align:center;align-items:center;padding:1rem 0}.style-module--pricingCalculator--D5Y17 .style-module--discountStripe--1UpvG{-ms-flex-positive:1;flex-grow:1;border-radius:.7rem;height:.7rem;background-color:#c5832e}.style-module--pricingCalculator--D5Y17 .style-module--discountNumber--1cCud{display:inline-block;width:auto;margin-left:1.5rem;color:#c5832e;font-size:1.8rem;font-weight:700}.style-module--pricingCalculator--D5Y17 .style-module--disclaimerText--OKPyn{text-align:center;padding:1.5rem 0 0;font-size:1.2rem}.style-module--calculatorHead--1gP1e{position:relative}.style-module--calculatorHeadTitle--1S4o-{text-align:center}.style-module--calculatorHeadSummary--2M6\_A{text-align:center;width:700px;max-width:100%;margin:40px auto;font-weight:lighter}.style-module--cardsContainer--1b4zg{padding:5rem 0;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between}@media screen and (max-width:767px){.style-module--cardsContainer--1b4zg{-ms-flex-direction:column;flex-direction:column}}.style-module--calculatorCard--Q2frv{border:7px solid hsla(0,0%,96.1%,.85);width:49%;padding:6rem}@media screen and (max-width:767px){.style-module--calculatorCard--Q2frv:first-of-type{margin-bottom:1.5rem}}.style-module--calculatorCard--Q2frv .style-module--calculatorCardContent--GnTWx{text-align:center;font-weight:700;font-size:1.8rem;line-height:2.3rem;color:#173361;height:12rem}.style-module--calculatorCard--Q2frv>div>div{text-align:center}@media screen and (max-width:767px){.style-module--calculatorCard--Q2frv{width:auto;padding:3rem}.style-module--calculatorCard--Q2frv .style-module--calculatorCardContent--GnTWx{font-size:1.6rem}}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cloudProviders--1IMBN{margin:30px auto;padding:0;list-style:none;display:-ms-flexbox;display:flex;-ms-flex-pack:justify;justify-content:space-between;max-width:340px}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cloudProviders--1IMBN li{-ms-flex:1 1;flex:1 1}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cloudProviders--1IMBN li:last-of-type img{height:38px}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cloudProviders--1IMBN img{width:auto}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--content--18XtX{margin:0 auto;max-width:620px}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--content--18XtX p{margin-top:30px}.index-module--page--1UpMf .index-module--hero--PIh19 .index-module--cta--2wZ\_J: hover{background:#38cccd;border-color:#38cccd}.index-module--page--1UpMf .index-module--container--3d16M{padding:65px 15px 0;background-color:#fff}@media screen and (min-width:992px){.index-module--page--1UpMf .index-module--container--3d16M{padding:100px 150px 65px !important}}.index-module--page--1UpMf .index-module--calculatorContainer--2AKga{padding:0 15px;background-color:#fff}@media screen and (min-



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width:992px){.index-module--page--1UpMf .index-module--calculatorContainer--2AKga{padding:0
150px!important}}.index-module--page--1UpMf .index-module--item--22UIM{-ms-flex:0 1 300px!important;flex:0
1 300px!important;margin-bottom:50px}@media screen and (min-width:992px){.index-module--page--1UpMf
.index-module--item--22UIM{-ms-flex-preferred-size:calc(50% - 20px)!important;flex-basis:calc(50% -
20px)!important}}.index-module--page--1UpMf .index-module--item--22UIM>div:first-child{margin-
right:15px}.index-module--page--1UpMf .index-module--copy--1ftLS{font-weight:300;line-
height:1.86;color:#000;font-size:14px;text-align:center;margin-top:37px;margin-bottom:85px}.index-module--page-
-1UpMf .index-module--testimonial--28VhI{box-shadow:none}@media screen and (min-width:768px){.index-
module--page--1UpMf .index-module--testimonial--28VhI ul{overflow-x:hidden}}.index-module--page--1UpMf
.index-module--testimonialWhyConfluentWrapper--3LmbR{padding-top:30px}@media screen and (min-
width:768px){.index-module--page--1UpMf .index-module--testimonialWhyConfluentWrapper--
3LmbR{padding:183px 0 40px}}.index-module--page--1UpMf .index-module--featureSection--QSZ7m .index-
module--featureContainer--VEZYr>div>div{min-width:260px}.index-module--page--1UpMf .index-module--
pricingTierClassName--1woLd{-ms-flex-preferred-size:33.33%;flex-basis:33.33%}@media screen and (max-
width:991px){.index-module--page--1UpMf .index-module--pricingTierClassName--1woLd p,.index-module--
page--1UpMf .index-module--pricingTierClassName--1woLd strong{font-size:14px}}.index-module--page--1UpMf
.index-module--rowClassName--2VMt8>div{width:33.33%}.index-module--page--1UpMf .index-module--
rowClassName--2VMt8>div:last-of-type{display:none}.index-module--page--1UpMf .index-module--
confluentCloudCardSection--2hk5a{padding-top:0}@media screen and (min-width:768px){.index-module--page--
1UpMf .index-module--confluentCloudCardSection--2hk5a .index-module--confluentCloudCardContent--
1Y6kG{display:-ms-flexbox;display:flex}}.index-module--page--1UpMf .index-module--
confluentCloudCardSection--2hk5a .index-module--confluentCloudCard--1w00b{background-
color:#e6f5fb;padding:70px 35px;margin:10px}@media screen and (min-width:768px){.index-module--page--
1UpMf .index-module--confluentCloudCardSection--2hk5a .index-module--confluentCloudCard--1w00b{-ms-
flex:1 1;flex:1 1;padding:100px 45px}}.index-module--page--1UpMf .index-module--confluentCloudCardSection--
2hk5a .index-module--confluentCloudCard--1w00b div{text-align:center}.index-module--page--1UpMf .index-
module--confluentCloudCardSection--2hk5a .index-module--confluentCloudCard--1w00b a{margin-
top:30px}.index-module--page--1UpMf .index-module--confluentCloudCardSection--2hk5a .index-module--
confluentCloudCard--1w00b h3{color:#173361;width:80%;margin:auto}.tryfree-module--page--12u8F{overflow-
x:hidden}.tryfree-module--page--12u8F .tryfree-module--heroContent--EfkFT{-ms-flex-align:start;align-items:flex-
start}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS>div{position:relative}@media screen and (min-
width:992px){.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--heroContent--
EfkFT{position:relative;max-width:580px;width:60%}}@media screen and (min-width:1200px){.tryfree-module--
page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--heroImage--DARRe{right:90px;bottom:-
30px;position:absolute}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--heroImage--
DARRe img{max-width:900px}}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--
content--2WOfs{margin:30px 0}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--
cloudProviders--1YTxr{margin:15px 0}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS>div{-ms-flex-
align:start;align-items:flex-start}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--
primaryCtaContainer--3Qrsn{margin-top:15px}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS
.tryfree-module--cloudProviders--1YTxr{padding:0;list-style:none;display:-ms-flexbox;display:flex;-ms-flex-
align:center;align-items:center;max-width:340px}@media screen and (max-width:991px){.tryfree-module--page--
12u8F .tryfree-module--hero--3X3tS .tryfree-module--cloudProviders--1YTxr{max-width:none;-ms-flex-
pack:center;justify-content:center}}.tryfree-module--page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--
cloudProviders--1YTxr li:not(:last-of-type){margin-right:40px}.tryfree-module--page--12u8F .tryfree-module--
hero--3X3tS .tryfree-module--cloudProviders--1YTxr li:last-of-type img{height:38px}.tryfree-module--page--
12u8F .tryfree-module--hero--3X3tS .tryfree-module--cloudProviders--1YTxr img{width:auto}.tryfree-module--
page--12u8F .tryfree-module--hero--3X3tS .tryfree-module--cta--yHvzZ: hover{background:#38cccd;border-

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color:#38cccd}.tryfree-module--page--12u8F .tryfree-module--doMoreContent--h0A1I div { width:90% }.tryfree-module--page--12u8F #logos { margin-bottom:15px }.tryfree-module--page--12u8F #key-points { padding-top:0 } @media screen and (min-width:768px) { .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC { display:-ms-flexbox;display:flex } .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs { padding:70px 35px;margin:10px;border-radius:8px;border:7px solid hsla(0,0%,96.1%,.85) } @media screen and (min-width:768px) { .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs { -ms-flex:1 1;flex:1 1;padding:100px 45px } .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs div { text-align:center;-ms-flex-align:center;align-items:center } .tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs a { margin-top:30px }.tryfree-module--page--12u8F .tryfree-module--confluentCloudCardContent--2jeKC .tryfree-module--confluentCloudCard--2sNFs h3 { color:#173361;width:80%;margin:auto }.tryfree-module--page--12u8F .tryfree-module--pricingTierClassName--fg28d { -ms-flex-preferred-size:33.33%;flex-basis:33.33% } @media screen and (max-width:991px) { .tryfree-module--page--12u8F .tryfree-module--pricingTierClassName--fg28d p,.tryfree-module--page--12u8F .tryfree-module--pricingTierClassName--fg28d strong { font-size:14px } .tryfree-module--page--12u8F .tryfree-module--rowClassName--33R8i>div { width:33.33% }.tryfree-module--page--12u8F .tryfree-module--rowClassName--33R8i>div:last-of-type { display:none } .tryfree-module--page--12u8F .tryfree-module--estimateTitle--1dPZB { margin-bottom:0 }.tryfree-module--page--12u8F .tryfree-module--copy--2oYm3 { font-weight:300;line-height:1.86;color:#000;font-size:16px;text-align:center;width:800px;max-width:100%;margin:50px auto 100px } @media screen and (max-width:991px) { .tryfree-module--page--12u8F .tryfree-module--copy--2oYm3 { margin:50px auto } } .tryfree-module--page--12u8F .tryfree-module--contactBlurb--blmwN { text-align:center;margin-top:30px;margin-bottom:50px }.style-module--page--16hJw .style-module--heroSection--12Xfi>div { -ms-flex-pack:justify;justify-content:space-between } @media screen and (max-width:991px) { .style-module--page--16hJw .style-module--heroSection--12Xfi>div { -ms-flex-direction:column;flex-direction:column;padding-top:50px;padding-bottom:50px } } .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 { width:40%;margin-left:50px;max-width:510px } @media screen and (max-width:991px) { .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 { width:90%;margin-left:0;margin-top:50px } } .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 img.style-module--clickable--15TDK { cursor:pointer }.style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 p { color:#fff;font-size:12px;font-weight:300;line-height:1.3;margin-top:5px } @media screen and (max-width:991px) { .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--rightColumn--3cEw5 p { text-align:center } } @media screen and (min-width:992px) { .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--leftColumn--2kQa6 { width:65% } } .style-module--page--16hJw .style-module--heroSection--12Xfi .style-module--leftColumn--2kQa6 ul { margin:50px 0 0;padding:0;list-style-position:inside }.style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv { background:hsla(0,0%,100%,.5) }.style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv>\* { text-align:center }.style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv p { margin:0 auto 30px }.style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv a { margin-bottom:10px }.style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv .style-module--ctaContainer--dYlaW { margin:auto 0 }.style-module--page--16hJw .style-module--resourcesSection--2OYkn .style-module--grid--MYGSI .style-module--card--1eZOv .style-module--ctaContainer--dYlaW a+a { margin-left:10px }.style-module--page--16hJw .style-module--whySection--2bt8R .style-module--title--1OmKY { display:block }.style-module--page--16hJw .style-module--

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whySection--2bt8R .style-module--accordion--12W8x .style-module--content--VbhfO{line-
height:1.63;padding:50px 90px;text-align:left}@media screen and (max-width:767px){.style-module--page--16hJw
.style-module--whySection--2bt8R .style-module--accordion--12W8x .style-module--content--VbhfO{padding:50px
25px}}.style-module--page--16hJw .style-module--whySection--2bt8R .style-module--accordion--12W8x .style-
module--content--VbhfO ul{margin:20px 0;padding:0;list-style:none}.style-module--page--16hJw .style-module--
whySection--2bt8R .style-module--accordion--12W8x .style-module--content--VbhfO ul
li{background:#fff;margin-bottom:10px;padding:20px;font-size:14px;font-weight:500;line-height:1.79}.style-
module--page--16hJw .style-module--whySection--2bt8R .style-module--accordion--12W8x .style-module--content-
-VbhfO ul li:last-child{margin-bottom:0}.style-module--page--16hJw .style-module--whySection--2bt8R .style-
module--accordion--12W8x .style-module--content--VbhfO ul ul{list-style-type:disc;list-style-
position:inside}.style-module--page--16hJw .style-module--whySection--2bt8R .style-module--accordion--12W8x
.style-module--content--VbhfO ul ul li{padding:0;font-weight:400}.style-module--page--16hJw .style-module--
benefitSection--nY1h0 ul{-ms-flex-direction:column;flex-direction:column;width:90%;margin:0 auto;max-
width:800px}.style-module--page--16hJw .style-module--benefitSection--nY1h0 ul h4{color:#173361}.style-
module--page--16hJw .style-module--benefitSection--nY1h0 ul li{margin:0 0 50px}.style-module--page--16hJw
.style-module--benefitSection--nY1h0 ul li:last-child{margin-bottom:0}.style-module--page--16hJw .style-module--
benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW{margin:10px 0;display:-ms-
flexbox;display:flex;text-align:left}@media screen and (max-width:767px){.style-module--page--16hJw .style-
module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW{-ms-flex-
direction:column;flex-direction:column}}.style-module--page--16hJw .style-module--benefitSection--nY1h0 .style-
module--table--32JBF .style-module--row--FZfaW div{padding:20px 20px 30px;-ms-flex:1 1;flex:1 1}@media
screen and (max-width:767px){.style-module--page--16hJw .style-module--benefitSection--nY1h0 .style-module--
table--32JBF .style-module--row--FZfaW div{padding:20px}}.style-module--page--16hJw .style-module--
benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3_VN{text-align:center}@media
screen and (max-width:767px){.style-module--page--16hJw .style-module--benefitSection--nY1h0 .style-module--
table--32JBF .style-module--header--3_VN{display:none}}.style-module--page--16hJw .style-module--
benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3_VN div{background:none}.style-
module--page--16hJw .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3-
_VN div:not(.style-module--emptyCell---gCTw){border-radius:4px;margin:0
5px;padding:10px;color:#173361;font-size:18px;font-weight:700;line-height:23px}.style-module--page--16hJw
.style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3_VN div:not(.style-
module--emptyCell---gCTw):last-child{margin-right:0}.style-module--page--16hJw .style-module--featureSection--
VVqNM .style-module--items--2m8yP{display:-ms-flexbox;display:flex;-ms-flex-pack:start;justify-content:flex-
start}.style-module--page--16hJw .style-module--featureSection--VVqNM .style-module--items--
2m8yP>li{border:2px solid rgba(130,148,148,.25);border-radius:8px;margin:5px 0;width:100%;-ms-
flex:none!important;flex:none!important;padding:20px 15px}@media screen and (max-width:767px){.style-
module--page--16hJw .style-module--featureSection--VVqNM .style-module--items--
2m8yP>li{width:100%!important}}.style-module--page--16hJw .style-module--featureSection--VVqNM .style-
module--items--2m8yP>li h4{color:#000}.style-module--page--16hJw .style-module--featureSection--
VVqNM.style-module--col4--1kPzz .style-module--items--2m8yP>li{margin-right:10px;width:calc((100% -
30px)/4)}.style-module--page--16hJw .style-module--featureSection--VVqNM.style-module--col4--1kPzz .style-
module--items--2m8yP>li:nth-child(4n){margin-right:0}@media screen and (max-width:991px){.style-module--
page--16hJw .style-module--featureSection--VVqNM.style-module--col4--1kPzz .style-module--items--
2m8yP>li{width:calc((100% - 20px)/2)}}.style-module--page--16hJw .style-module--featureSection--
VVqNM.style-module--col3--yF8zI .style-module--items--2m8yP>li{margin-right:10px;width:calc((100% -
20px)/3)}.style-module--page--16hJw .style-module--featureSection--VVqNM.style-module--col3--yF8zI .style-
module--items--2m8yP>li:nth-child(3n){margin-right:0}.style-module--page--16hJw .style-module--
moreReleaseSection--eFAVF .style-module--content--VbhfO{color:#000;font-size:16px;font-weight:300;line-

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height:25px;letter-spacing:0;text-align:center}.style-module--page--16hJw .style-module--moreReleaseSection--
eFAVf .style-module--content--VbhfO h3{color:#173361;font-size:12px;font-weight:500;line-height:2.67;letter-
spacing:2px;text-transform:uppercase}.style-module--page--16hJw .style-module--moreReleaseSection--eFAVf
.style-module--content--VbhfO p{margin-bottom:50px;max-width:720px}.style-module--purple--2FtjE .style-
module--benefitSection--nY1h0,.style-module--purple--2FtjE .style-module--trySection--
1GXCx{background:rgba(85,29,157,.03)}.style-module--purple--2FtjE .style-module--moreReleaseSection--
eFAVf,.style-module--purple--2FtjE .style-module--resourcesSection--
2OYkn{background:rgba(85,29,157,.1)}.style-module--purple--2FtjE .style-module--benefitSection--nY1h0 .style-
module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3-_VN)
div{background:rgba(85,29,157,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--purple--2FtjE .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-
module--row--FZfaW:not(.style-module--header--3-_VN) .style-module--bold--1-JIS{color:#551d9d;font-
size:21px;font-weight:500;line-height:27px}.style-module--purple--2FtjE .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--header--3-_VN div:not(.style-module--emptyCell---
gCTw){background:#551d9d;color:#fff}.style-module--green--2GuAI .style-module--benefitSection--nY1h0,.style-
module--green--2GuAI .style-module--trySection--1GXCx{background:rgba(21,158,134,.03)}.style-module--green--
2GuAI .style-module--moreReleaseSection--eFAVf,.style-module--green--2GuAI .style-module--
resourcesSection--2OYkn{background:rgba(21,158,134,.1)}.style-module--green--2GuAI .style-module--
benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3-_VN)
div{background:rgba(21,158,134,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--green--2GuAI .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-
module--row--FZfaW:not(.style-module--header--3-_VN) .style-module--bold--1-JIS{color:#159e86;font-
size:21px;font-weight:500;line-height:27px}.style-module--green--2GuAI .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--header--3-_VN div:not(.style-module--emptyCell---
gCTw){background:#159e86;color:#fff}.style-module--blue--3yMuA .style-module--benefitSection--nY1h0,.style-
module--blue--3yMuA .style-module--trySection--1GXCx{background:rgba(13,172,204,.03)}.style-module--blue--
3yMuA .style-module--moreReleaseSection--eFAVf,.style-module--blue--3yMuA .style-module--resourcesSection--
2OYkn{background:rgba(13,172,204,.1)}.style-module--blue--3yMuA .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3-_VN)
div{background:rgba(13,172,204,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--blue--3yMuA .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-
module--row--FZfaW:not(.style-module--header--3-_VN) .style-module--bold--1-JIS{color:#0dacc; font-
size:21px;font-weight:500;line-height:27px}.style-module--blue--3yMuA .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--header--3-_VN div:not(.style-module--emptyCell---
gCTw){background:#0dacc;color:#fff}.style-module--orange--mKAYd .style-module--benefitSection--
nY1h0,.style-module--orange--mKAYd .style-module--trySection--
1GXCx{background:rgba(227,125,98,.03)}.style-module--orange--mKAYd .style-module--moreReleaseSection--
eFAVf,.style-module--orange--mKAYd .style-module--resourcesSection--
2OYkn{background:rgba(227,125,98,.1)}.style-module--orange--mKAYd .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3-_VN)
div{background:rgba(227,125,98,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-
spacing:0}.style-module--orange--mKAYd .style-module--benefitSection--nY1h0 .style-module--table--32JBF
.style-module--row--FZfaW:not(.style-module--header--3-_VN) .style-module--bold--1-JIS{color:#e37d62;font-
size:21px;font-weight:500;line-height:27px}.style-module--orange--mKAYd .style-module--benefitSection--nY1h0
.style-module--table--32JBF .style-module--header--3-_VN div:not(.style-module--emptyCell---
gCTw){background:#e37d62;color:#fff}.style-module--grey--1eGst .style-module--benefitSection--nY1h0,.style-
module--grey--1eGst .style-module--trySection--1GXCx{background:rgba(88,120,140,.03)}.style-module--grey--
1eGst .style-module--moreReleaseSection--eFAVf,.style-module--grey--1eGst .style-module--resourcesSection--

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2OYkn{background:rgba(88,120,140,.1)}.style-module--grey--1eGst .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3\_VN) div{background:rgba(88,120,140,.03);color:#000;font-size:16px;font-weight:300;line-height:25px;letter-spacing:0}.style-module--grey--1eGst .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW:not(.style-module--header--3\_VN) .style-module--bold--1-JIS{color:#58788c;font-size:21px;font-weight:500;line-height:27px}.style-module--grey--1eGst .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--header--3\_VN div:not(.style-module--emptyCell--gCTw){background:#58788c;color:#fff}.style-module--project\_metamorphosis\_cost\_effective--3HwjK .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW div:first-child{max-width:142px}@media screen and (max-width:767px){.style-module--project\_metamorphosis\_cost\_effective--3HwjK .style-module--benefitSection--nY1h0 .style-module--table--32JBF .style-module--row--FZfaW div:first-child{max-width:none;text-align:center}}</style><meta name="generator" content="Gatsby 2.21.30"/><link rel="sitemap" type="application/xml" href="/sitemap.xml"/><link rel="alternate" type="application/rss+xml" title="Confluent&#x27;s Blog Feed" href="/rss.xml"/><title data-react-helmet="true">Confluent Community License | Confluent</title><link data-react-helmet="true" href="/css/wp.css" rel="stylesheet"/><meta data-react-helmet="true" name="description" content="Confluent, founded by the creators of Apache Kafka, delivers a complete execution of Kafka for the Enterprise, to help you run your business in real time."/><meta data-react-helmet="true" name="image" content="https://cdn.confluent.io/wp-content/uploads/seo-logo-meadow.png"/><meta data-react-helmet="true" property="og:url" content="https://www.confluent.io"/><meta data-react-helmet="true" property="og:locale" content="en\_US"/><meta data-react-helmet="true" property="og:type" content="website"/><meta data-react-helmet="true" property="og:title" content="Confluent Community License | Confluent"/><meta data-react-helmet="true" property="og:description" content="Confluent, founded by the creators of Apache Kafka, delivers a complete execution of Kafka for the Enterprise, to help you run your business in real time."/><meta data-react-helmet="true" property="og:site\_name" content="Confluent"/><meta data-react-helmet="true" property="og:image" content="https://cdn.confluent.io/wp-content/uploads/seo-logo-meadow.png"/><meta data-react-helmet="true" name="twitter:card" content="summary"/><meta data-react-helmet="true" name="twitter:description" content="Confluent, founded by the creators of Apache Kafka, delivers a complete execution of Kafka for the Enterprise, to help you run your business in real time."/><meta data-react-helmet="true" name="twitter:title" content="Confluent Community License | Confluent"/><meta data-react-helmet="true" name="twitter:image" content="https://cdn.confluent.io/wp-content/uploads/seo-logo-meadow.png"/><meta data-react-helmet="true" name="twitter:site" content="@ConfluentInc"/><meta data-react-helmet="true" name="twitter:creator" content="@ConfluentInc"/><meta data-react-helmet="true" property="fb:app\_id" content="1800296596896644"/><script>(function(w,d,s,l,i){w[l]=w[l]||[];w[l].push({'gtm.start': new Date().getTime(),event:'gtm.js'});var f=d.getElementsByTagName(s)[0],j=d.createElement(s),dl=l!='dataLayer'?'&l='+l:'';j.async=true;j.src='https://www.googletagmanager.com/gtm.js?id='+i+dl+';f.parentNode.insertBefore(j,f);})(window,document,'script','dataLayer','GTM-M58HDC6');</script><link rel="preload" as="font" href="/fonts/MarkOT/MarkOT.woff2"/><link rel="preload" as="font" href="/fonts/MarkOT/MarkOT-Italic.woff2"/><link rel="preload" as="font" href="/fonts/MarkOT/MarkOT-Medium.woff2"/><link rel="preload" as="font" href="/fonts/MarkOT/MarkOT-MediumItalic.woff2"/><link rel="preload" as="font" href="/fonts/MarkOT/MarkOT-Bold.woff2"/><link rel="preload" as="font" href="/fonts/MarkOT/MarkOT-BoldItalic.woff2"/><link rel="preload" as="font" href="/fonts/MarkOT/MarkOT-NarrowLight.woff2"/><link rel="preload" as="font" href="/fonts/MarkOT/MarkOT-NarrowLightItalic.woff2"/><link rel="stylesheet" href="/fonts/fonts.css"/><link href="https://cdn.confluent.io/css/bootstrap.min.css" rel="stylesheet"/><link href="/css/main.css" rel="stylesheet"/><link href="/css/print.css" rel="stylesheet" media="print"/><script src="https://code.jquery.com/jquery-1.12.4.min.js" integrity="sha256-ZosEbRLbNqzLpnKIkEdrPv7IOy9C27hHQ+Xp8a4MxAQ=" crossorigin="anonymous"></script><script

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3srjX" href="/cookies">More Information</a></div></div></div></div><div id="gatsby-announcer" style="position:absolute;top:0;width:1px;height:1px;padding:0;overflow:hidden;clip:rect(0, 0, 0, 0);white-space:nowrap;border:0" aria-live="assertive" aria-atomic="true"></div></div><script id="\_\_LOADABLE\_REQUIRED\_CHUNKS\_\_" type="application/json">[]</script><script id="\_\_LOADABLE\_REQUIRED\_CHUNKS\_\_ext" type="application/json">{"namedChunks":[]}</script><script>!function(){var t=window.driftt=window.drift=window.driftt||[];if(!t.init){if(t.invoked)return void(window.console&&console.error&&console.error("Drift snippet included twice."));t.invoked=!0,t.methods=["identify","config","track","reset","debug","show","ping","page","hide","off","on"],t.factory=function(e){return function(){var n=Array.prototype.slice.call(arguments);return n.unshift(e),t.push(n),t}},t.methods.forEach(function(e){t[e]=t.factory(e)}),t.load=function(t){var e=3e5\*Math.ceil(new Date/3e5),n=document.createElement("script");n.type="text/javascript",n.async=!0,n.crossorigin="anonymous",n.src="https://js.driftt.com/include/"+e+"/"+t+".js";var o=document.getElementsByTagName("script")[0];o.parentNode.insertBefore(n,o)}}();</script><script id="gatsby-script-loader">/\*! [CDATA[\* /window.pagePath="/confluent-community-license/";\*/]>\*/</script><script id="gatsby-chunk-mapping">/\*! [CDATA[\* /window.\_\_chunkMapping={"app":["/app-21ff557440d63499cf51.js"],"CfLandingPageSectionCard":["CfLandingPageSectionCarousel":["CfLandingPageSectionImage":["CfLandingPageSectionText":["component---src-pages-404-js":["/component---src-pages-404-js-a62280e90a18b6f6e2b5.js"],"component---src-pages-about-js":["/component---src-pages-about-js-c8d17b6a92066a3cf011.js"],"component---src-pages-advisory-terms-and-conditions-april-2016-js":["/component---src-pages-advisory-terms-and-conditions-april-2016-js-9f2649e0a6965353c694.js"],"component---src-pages-advisory-terms-and-conditions-js":["/component---src-pages-advisory-terms-and-conditions-js-d90256f69401ecab1336.js"],"component---src-pages-apache-engineering-guidelines-js":["/component---src-pages-apache-engineering-guidelines-js-2971c703e56f1919b90f.js"],"component---src-pages-apache-guidelines-js":["/component---src-pages-apache-guidelines-js-fbf9142d3642b9f40357.js"],"component---src-pages-archives-cloud-customer-dpa-pre-nov-2019-js":["/component---src-pages-archives-cloud-customer-dpa-pre-nov-2019-js-962398ef607e7cddee1a.js"],"component---src-pages-archives-cloud-enterprise-security-addendum-jan-2019-js":["/component---src-pages-archives-cloud-enterprise-security-addendum-jan-2019-js-7f71feaf64c5ac2cf6a.js"],"component---src-pages-archives-confluent-cloud-tos-sept-2019-js":["/component---src-pages-archives-confluent-cloud-tos-sept-2019-js-d503f0495afed1e843dc.js"],"component---src-pages-archives-confluent-privacy-statement-april-2018-js":["/component---src-pages-archives-confluent-privacy-statement-april-2018-js-6df4b452875a55984d26.js"],"component---src-pages-archives-confluent-privacy-statement-january-2020-js":["/component---src-pages-archives-confluent-privacy-statement-january-2020-js-7251ce04885fed56c2f2.js"],"component---src-pages-archives-confluent-privacy-statement-may-2018-js":["/component---src-pages-archives-confluent-privacy-statement-may-2018-js-1d2755944822c34b9f9c.js"],"component---src-pages-archives-confluent-privacy-statement-may-2019-js":["/component---src-pages-archives-confluent-privacy-statement-may-2019-js-a62a981977a64ffe77aa.js"],"component---src-pages-archives-confluent-privacy-statement-september-2018-js":["/component---src-pages-archives-confluent-privacy-statement-september-2018-js-013662f55d66480ee814.js"],"component---src-pages-archives-supplemental-services-terms-april-2019-js":["/component---src-pages-archives-supplemental-services-terms-april-2019-js-64bc41c8ee67cd7ece93.js"],"component---src-pages-candidate-privacy-js":["/component---src-pages-candidate-privacy-js-bdd6f6ca28de6ef3bb1a.js"],"component---src-pages-careers-js":["/component---src-pages-careers-js-f87bdfa28f4e58617c8e.js"],"component---src-pages-certification-js":["/component---src-pages-certification-js-1e112f6a5cc22a06083f.js"],"component---src-pages-cloud-customer-dpa-js":["/component---src-pages-cloud-customer-dpa-js-b647dd4b2f61826adfc5.js"],"component---src-pages-cloud-enterprise-security-addendum-archive-js":["/component---src-pages-cloud-enterprise-security-addendum-archive-js-

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# 1.459 urllib3 1.22

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# Contributions to the urllib3 project

## Creator & Maintainer

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## Contributors

In chronological order:

- \* victor.vde <<http://code.google.com/u/victor.vde/>>
- \* HTTPS patch (which inspired HTTPSConnectionPool)
  
- \* erikcederstrand <<http://code.google.com/u/erikcederstrand/>>
- \* NTLM-authenticated HTTPSConnectionPool
- \* Basic-authenticated HTTPSConnectionPool (merged into make\_headers)
  
- \* niphlod <niphlod@gmail.com>
- \* Client-verified SSL certificates for HTTPSConnectionPool
- \* Response gzip and deflate encoding support
- \* Better unicode support for filepost using StringIO buffers
  
- \* btoconnor <brian@btoconnor.net>
- \* Non-multipart encoding for POST requests
  
- \* p.dobrogost <<http://code.google.com/u/@WBRSRIBZDhBFXQB6/>>
- \* Code review, PEP8 compliance, benchmark fix
  
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- \* Bugfixes, suggestions, Requests integration
  
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- \* Bugfixes, Improvements and Test coverage
  
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- \* Python 3 support
  
- \* brandon-rhodes <<http://rhodesmill.org/brandon>>
- \* Design review, bugfixes, test coverage.
  
- \* studer <theo.studer@gmail.com>
- \* IPv6 url support and test coverage

- \* Shivaram Lingamneni <slingamn@cs.stanford.edu>
- \* Support for explicitly closing pooled connections
  
- \* hartator <hartator@gmail.com>
- \* Corrected multipart behavior for params
  
- \* Thomas Weischuh <thomas@t-8ch.de>
- \* Support for TLS SNI
- \* API unification of ssl\_version/cert\_reqs
- \* SSL fingerprint and alternative hostname verification
- \* Bugfixes in testsuite
  
- \* Sune Kirkeby <mig@ibofobi.dk>
- \* Optional SNI-support for Python 2 via PyOpenSSL.
  
- \* Marc Schlaich <marc.schlaich@gmail.com>
- \* Various bugfixes and test improvements.
  
- \* Bryce Boe <bbzbryce@gmail.com>
- \* Correct six.moves conflict
- \* Fixed pickle support of some exceptions
  
- \* Boris Figovsky <boris.figovsky@ravellosystems.com>
- \* Allowed to skip SSL hostname verification
  
- \* Cory Benfield <<http://lukasa.co.uk/about/>>
- \* Stream method for Response objects.
- \* Return native strings in header values.
- \* Generate 'Host' header when using proxies.
  
- \* Jason Robinson <jaywink@basshero.org>
- \* Add missing WrappedSocket.fileno method in PyOpenSSL
  
- \* Audrius Butkevicius <audrius.butkevicius@elastichosts.com>
- \* Fixed a race condition
  
- \* Stanislav Vitkovskiy <stas.vitkovsky@gmail.com>
- \* Added HTTPS (CONNECT) proxy support
  
- \* Stephen Holsapple <sholsapp@gmail.com>
- \* Added abstraction for granular control of request fields
  
- \* Martin von Gagern <Martin.vGagern@gmx.net>
- \* Support for non-ASCII header parameters
  
- \* Kevin Burke <kev@inburke.com> and Pavel Kirichenko <juanych@yandex-team.ru>
- \* Support for separate connect and request timeouts

- \* Peter Waller <p@pwaller.net>
- \* HTTPResponse.tell() for determining amount received over the wire
  
- \* Nipunn Koorapati <nipunn1313@gmail.com>
- \* Ignore default ports when comparing hosts for equality
  
- \* Danilo @dbrgn <http://dbrgn.ch/>
- \* Disabled TLS compression by default on Python 3.2+
- \* Disabled TLS compression in pyopenssl contrib module
- \* Configurable cipher suites in pyopenssl contrib module
  
- \* Roman Bogorodskiy <roman.bogorodskiy@ericsson.com>
- \* Account retries on proxy errors
  
- \* Nicolas Delaby <nicolas.delaby@ezeep.com>
- \* Use the platform-specific CA certificate locations
  
- \* Josh Schneier <https://github.com/jschneier>
- \* HTTPHeaderDict and associated tests and docs
- \* Bugfixes, docs, test coverage
  
- \* Tahia Khan <http://tahia.tk/>
- \* Added Timeout examples in docs
  
- \* Arthur Grunseid <http://grunseid.com>
- \* source\_address support and tests (with https://github.com/bui)
  
- \* Ian Cordasco <graffatcolmingov@gmail.com>
- \* PEP8 Compliance and Linting
- \* Add ability to pass socket options to an HTTP Connection
  
- \* Erik Tollerud <erik.tollerud@gmail.com>
- \* Support for standard library io module.
  
- \* Krishna Prasad <kprasad.iitd@gmail.com>
- \* Google App Engine documentation
  
- \* Aaron Meurer <asmeurer@gmail.com>
- \* Added Url.url, which unparses a Url
  
- \* Evgeny Kapun <abacabadabacaba@gmail.com>
- \* Bugfixes
  
- \* Benjamin Meyer <bm\_witness@yahoo.com>
- \* Security Warning Documentation update for proper capture
  
- \* Shivan Sornarajah <github@sornars.com>



\* Support for using ConnectionPool and PoolManager as context managers.

\* Alex Gaynor <alex.gaynor@gmail.com>

\* Updates to the default SSL configuration

\* Tomas Tomecek <ttomecek@redhat.com>

\* Implemented generator for getting chunks from chunked responses.

\* tlynn <https://github.com/tlynn>

\* Respect the warning preferences at import.

\* David D. Riddle <ddriddle@illinois.edu>

\* IPv6 bugfixes in testsuite

\* Jon Wayne Parrott <jonwayne@google.com>

\* App Engine environment tests.

\* John Krauss <https://github.com/talos>

\* Clues to debugging problems with `cryptography` dependency in docs

\* Disassem <https://github.com/Disassem>

\* Fix pool-default headers not applying for url-encoded requests like GET.

\* James Atherfold <jlatherfold@hotmail.com>

\* Bugfixes relating to cleanup of connections during errors.

\* Christian Pedersen <https://github.com/chripede>

\* IPv6 HTTPS proxy bugfix

\* Jordan Moldow <https://github.com/jmoldow>

\* Fix low-level exceptions leaking from ``HTTPResponse.stream()``.

\* Bugfix for ``ConnectionPool.urlopen(release\_conn=False)``.

\* Creation of ``HTTPConnectionPool.ResponseCls``.

\* Predrag Gruevski <https://github.com/obi1kenobi>

\* Made cert digest comparison use a constant-time algorithm.

\* Adam Talsma <https://github.com/a-tal>

\* Bugfix to ca\_cert file paths.

\* Evan Meagher <https://evanmeagher.net>

\* Bugfix related to `memoryview` usage in PyOpenSSL adapter

\* John Vandenberg <jayvdb@gmail.com>

\* Python 2.6 fixes; pyflakes and pep8 compliance

\* Andy Caldwell <andy.m.caldwell@googlemail.com>

\* Bugfix related to reusing connections in indeterminate states.

- \* Ville Skytt <ville.skytta@iki.fi>
- \* Logging efficiency improvements, spelling fixes, Travis config.
  
- \* Shige Takeda <smtakeda@gmail.com>
- \* Started Recipes documentation and added a recipe about handling concatenated gzip data in HTTP response
  
- \* Jesse Shapiro <jesse@jesseshapiro.net>
- \* Various character-encoding fixes/tweaks
- \* Disabling IPv6 DNS when IPv6 connections not supported
  
- \* David Foster <http://dafoster.net/>
- \* Ensure order of request and response headers are preserved.
  
- \* Jeremy Cline <jeremy@jcline.org>
- \* Added connection pool keys by scheme
  
- \* Aviv Palivoda <palaviv@gmail.com>
- \* History list to Retry object.
- \* HTTPResponse contains the last Retry object.
  
- \* Nate Prewitt <nate.prewitt@gmail.com>
- \* Ensure timeouts are not booleans and greater than zero.
- \* Fixed infinite loop in ``stream`` when amt=None.
- \* Added length\_remaining to determine remaining data to be read.
- \* Added enforce\_content\_length to raise exception when incorrect content-length received.
  
- \* Seth Michael Larson <sethmichaellarson@protonmail.com>
- \* Created selectors backport that supports PEP 475.
  
- \* Alexandre Dias <alex.dias@smarkets.com>
- \* Don't retry on timeout if method not in whitelist
  
- \* Moinuddin Quadri <moin18@gmail.com>
- \* Lazily load idna package
  
- \* Tom White <s6yg1ez3@mail2tor.com>
- \* Made SOCKS handler differentiate socks5h from socks5 and socks4a from socks4.
  
- \* Tim Burke <tim.burke@gmail.com>
- \* Stop buffering entire deflate-encoded responses.
  
- \* Tuukka Mustonen <tuukka.mustonen@gmail.com>
- \* Add counter for status\_forcelist retries.
  
- \* Erik Rose <erik@mozilla.com>
- \* Bugfix to pyopenssl vendoring

\* [Your name or handle] <[email or website]>

\* [Brief summary of your changes]

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# 1.460 openssl-pkcs11 0.4.10 2.el8

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b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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# 1.461 flask-openid 1.3.0

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## 1.462 werkzeug 2.2.2

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## 1.464 shim 14

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## 1.465 Ivm2 1.02.181-3.e18

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Found in path(s):



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\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/convert/TransformAccessArrayField.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/CompileError.java  
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jar/javassist/CannotCompileException.java

\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/SyntheticAttribute.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/JvstCodeGen.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/ast/AssignExpr.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/CtNewMethod.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/tools/reflect/Compiler.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/ClassClassPath.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/ByteStream.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/ast/ASTList.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/util/proxy/MethodHandler.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/FieldInfo.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/ast/NewExpr.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/convert/Transformer.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/stackmap/TypeTag.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/InstructionPrinter.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/scopedpool/ScopedClassPoolRepository.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/CtBehavior.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/expr/Cast.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/analysis/Subroutine.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/ConstPool.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/stackmap/TypedBlock.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/ProceedHandler.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/Descriptor.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/ast/InstanceOfExpr.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/expr/Handler.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/convert/TransformCall.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/tools/rmi/ObjectImporter.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-

jar/javassist/compiler/NoFieldException.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/compiler/ast/CallExpr.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/CtMember.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/compiler/ast/Visitor.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/bytecode/analysis/MultiType.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/runtime/Desc.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/compiler/ast/MethodDecl.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/bytecode/ConstantAttribute.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/util/proxy/ProxyFactory.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/util/proxy/ProxyObjectInputStream.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/CtNewWrappedMethod.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/expr/NewExpr.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/ClassPath.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/util/proxy/ProxyObjectOutputStream.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/NotFoundException.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/convert/TransformReadField.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/Javac.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/tools/reflect/Metaobject.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/bytecode/analysis/IntQueue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/bytecode/Mnemonic.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/util/proxy/SecurityActions.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/tools/rmi/Sample.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/bytecode/ByteArray.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/bytecode/analysis/Type.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/compiler/ast/Pair.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/compiler/KeywordTable.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/bytecode/stackmap/MapMaker.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-  
jar/javassist/bytecode/ClassFileWriter.java

\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/expr/ExprEditor.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/tools/rmi/RemoteException.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/convert/TransformBefore.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/CtClassType.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/expr/Expr.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/tools/reflect/ClassMetaobject.java  
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Found in path(s):

\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/ClassMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/DoubleMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/FloatMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/ByteMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/AnnotationMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/MemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/LongMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/EnumMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/IntegerMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/BooleanMemberValue.java



\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/Annotation.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/StringMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/MemberValueVisitor.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/ArrayMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/CharMemberValue.java  
\* /opt/cola/permits/1135902035\_1613627706.92/0/javassist-3-21-0-ga-sources-5-jar/javassist/bytecode/annotation/ShortMemberValue.java

## 1.469 hk2-locator 2.2.0-b21

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## 1.470 libcap-ng 0.7.11-1.el8

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Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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# 1.472 perl-digest 1.17-395.el8

## 1.472.1 Available under license :

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=head1 NAME

Digest - Modules that calculate message digests

=head1 SYNOPSIS

```
$md5 = Digest->new("MD5");  
$sha1 = Digest->new("SHA-1");  
$sha256 = Digest->new("SHA-256");  
$sha384 = Digest->new("SHA-384");  
$sha512 = Digest->new("SHA-512");
```

```
$hmac = Digest->HMAC_MD5($key);
```

=head1 DESCRIPTION

The C<Digest::> modules calculate digests, also called "fingerprints" or "hashes", of some data, called a message. The digest is (usually) some small/fixed size string. The actual size of the digest depend of the algorithm used. The message is simply a sequence of arbitrary bytes or bits.

An important property of the digest algorithms is that the digest is I<likely> to change if the message change in some way. Another property is that digest functions are one-way functions, that is it should be I<hard> to find a message that correspond to some given digest. Algorithms differ in how "likely" and how "hard", as well as how efficient they are to compute.

Note that the properties of the algorithms change over time, as the algorithms are analyzed and machines grow faster. If your application for instance depends on it being "impossible" to generate the same digest for a different message it is wise to make it easy to plug in stronger algorithms as the one used grow weaker. Using the interface



documented here should make it easy to change algorithms later.

All C<Digest::> modules provide the same programming interface. A functional interface for simple use, as well as an object oriented interface that can handle messages of arbitrary length and which can read files directly.

The digest can be delivered in three formats:

=over 8

=item I<binary>

This is the most compact form, but it is not well suited for printing or embedding in places that can't handle arbitrary data.

=item I<hex>

A twice as long string of lowercase hexadecimal digits.

=item I<base64>

A string of portable printable characters. This is the base64 encoded representation of the digest with any trailing padding removed. The string will be about 30% longer than the binary version.

L<MIME::Base64> tells you more about this encoding.

=back

The functional interface is simply importable functions with the same name as the algorithm. The functions take the message as argument and return the digest. Example:

```
use Digest::MD5 qw(md5);
$digest = md5($message);
```

There are also versions of the functions with "\_hex" or "\_base64" appended to the name, which returns the digest in the indicated form.

=head1 OO INTERFACE

The following methods are available for all C<Digest::> modules:

=over 4

=item \$ctx = Digest->XXX(\$arg,...)

```
=item $ctx = Digest->new(XXX => $arg,...)
```

```
=item $ctx = Digest::XXX->new($arg,...)
```

The constructor returns some object that encapsulate the state of the message-digest algorithm. You can add data to the object and finally ask for the digest. The "XXX" should of course be replaced by the proper name of the digest algorithm you want to use.

The two first forms are simply syntactic sugar which automatically load the right module on first use. The second form allow you to use algorithm names which contains letters which are not legal perl identifiers, e.g. "SHA-1". If no implementation for the given algorithm can be found, then an exception is raised.

If new() is called as an instance method (i.e. \$ctx->new) it will just reset the state the object to the state of a newly created object. No new object is created in this case, and the return value is the reference to the object (i.e. \$ctx).

```
=item $other_ctx = $ctx->clone
```

The clone method creates a copy of the digest state object and returns a reference to the copy.

```
=item $ctx->reset
```

This is just an alias for \$ctx->new.

```
=item $ctx->add( $data )
```

```
=item $ctx->add( $chunk1, $chunk2, ... )
```

The string value of the \$data provided as argument is appended to the message we calculate the digest for. The return value is the \$ctx object itself.

If more arguments are provided then they are all appended to the message, thus all these lines will have the same effect on the state of the \$ctx object:

```
$ctx->add("a"); $ctx->add("b"); $ctx->add("c");  
$ctx->add("a")->add("b")->add("c");  
$ctx->add("a", "b", "c");  
$ctx->add("abc");
```

Most algorithms are only defined for strings of bytes and this method might therefore croak if the provided arguments contain chars with

ordinal number above 255.

```
=item $ctx->addfile( $io_handle )
```

The `$io_handle` is read until EOF and the content is appended to the message we calculate the digest for. The return value is the `$ctx` object itself.

The `addfile()` method will croak() if it fails reading data for some reason. If it croaks it is unpredictable what the state of the `$ctx` object will be in. The `addfile()` method might have been able to read the file partially before it failed. It is probably wise to discard or reset the `$ctx` object if this occurs.

In most cases you want to make sure that the `$io_handle` is in "binmode" before you pass it as argument to the `addfile()` method.

```
=item $ctx->add_bits( $data, $nbits )
```

```
=item $ctx->add_bits( $bitstring )
```

The `add_bits()` method is an alternative to `add()` that allow partial bytes to be appended to the message. Most users should just ignore this method as partial bytes is very unlikely to be of any practical use.

The two argument form of `add_bits()` will add the first `$nbits` bits from `$data`. For the last potentially partial byte only the high order `C<< $nbits % 8 >>` bits are used. If `$nbits` is greater than `C<< length($data) * 8 >>`, then this method would do the same as `C<< $ctx->add($data) >>`.

The one argument form of `add_bits()` takes a `$bitstring` of "1" and "0" chars as argument. It's a shorthand for `C<< $ctx->add_bits(pack("B*", $bitstring), length($bitstring)) >>`.

The return value is the `$ctx` object itself.

This example shows two calls that should have the same effect:

```
$ctx->add_bits("111100001010");  
$ctx->add_bits("\xF0xA0", 12);
```

Most digest algorithms are byte based and for these it is not possible to add bits that are not a multiple of 8, and the `add_bits()` method will croak if you try.

```
=item $ctx->digest
```

Return the binary digest for the message.

Note that the `C<digest>` operation is effectively a destructive, read-once operation. Once it has been performed, the `$ctx` object is automatically `C<reset>` and can be used to calculate another digest value. Call `$ctx->clone->digest` if you want to calculate the digest without resetting the digest state.

=item `$ctx->hexdigest`

Same as `$ctx->digest`, but will return the digest in hexadecimal form.

=item `$ctx->b64digest`

Same as `$ctx->digest`, but will return the digest as a base64 encoded string.

=back

=head1 Digest speed

This table should give some indication on the relative speed of different algorithms. It is sorted by throughput based on a benchmark done with of some implementations of this API:

Algorithm	Size	Implementation	MB/s
MD4	128	Digest::MD4 v1.3	165.0
MD5	128	Digest::MD5 v2.33	98.8
SHA-256	256	Digest::SHA2 v1.1.0	66.7
SHA-1	160	Digest::SHA v4.3.1	58.9
SHA-1	160	Digest::SHA1 v2.10	48.8
SHA-256	256	Digest::SHA v4.3.1	41.3
Haval-256	256	Digest::Haval256 v1.0.4	39.8
SHA-384	384	Digest::SHA2 v1.1.0	19.6
SHA-512	512	Digest::SHA2 v1.1.0	19.3
SHA-384	384	Digest::SHA v4.3.1	19.2
SHA-512	512	Digest::SHA v4.3.1	19.2
Whirlpool	512	Digest::Whirlpool v1.0.2	13.0
MD2	128	Digest::MD2 v2.03	9.5
Adler-32	32	Digest::Adler32 v0.03	1.3
CRC-16	16	Digest::CRC v0.05	1.1
CRC-32	32	Digest::CRC v0.05	1.1
MD5	128	Digest::Perl::MD5 v1.5	1.0
CRC-CCITT	16	Digest::CRC v0.05	0.8

These numbers was achieved Apr 2004 with ActivePerl-5.8.3 running under Linux on a P4 2.8 GHz CPU. The last 5 entries differ by being pure perl implementations of the algorithms, which explains why they are so slow.

=head1 SEE ALSO

L<Digest::Adler32>, L<Digest::CRC>, L<Digest::Haval256>,  
L<Digest::HMAC>, L<Digest::MD2>, L<Digest::MD4>, L<Digest::MD5>,  
L<Digest::SHA>, L<Digest::SHA1>, L<Digest::SHA2>, L<Digest::Whirlpool>

New digest implementations should consider subclassing from L<Digest::base>.

L<MIME::Base64>

[http://en.wikipedia.org/wiki/Cryptographic\\_hash\\_function](http://en.wikipedia.org/wiki/Cryptographic_hash_function)

=head1 AUTHOR

Gisle Aas <gisle@aas.no>

The C<Digest::> interface is based on the interface originally developed by Neil Winton for his C<MD5> module.

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This is just a simple frontend module for autoloading of various Digest:: modules. It also provide documentation of the interface that all Digest:: modules should provide.

You will need perl version 5.004 or better to install this module.

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Found in path(s):

\* /opt/ws\_local/PERMITS\_SQL/1009548135\_1591903344.6/0/perl-Digest-1.17-395.el8.src.rpm-cosi-expand-archive-NmswH4Un/Digest-1.17.tar.gz-cosi-expand-archive-vPzrVmz9/Digest-1.17/META.yml

## 1.473 netty 4.1.35.Final

### 1.473.1 Available under license :

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# 1.474 ncurses 6.1-9.20180224.el8

## 1.474.1 Available under license :

Upstream source <https://invisible-island.net/ncurses/ncurses-examples.html>

Current ncurses maintainer: Thomas Dickey <[dickey@invisible-island.net](mailto:dickey@invisible-island.net)>

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Files: \*

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-- vile: txtmode file-encoding=utf-8

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-- vile:txtmode fc=72

-- \$Id: COPYING,v 1.6 2018/01/01 12:00:00 tom Exp \$

Upstream source <https://invisible-island.net/ncurses/ncurses.html>

This package is used for testing builds of ncurses.

Current ncurses maintainer: Thomas Dickey <[dickey@invisible-island.net](mailto:dickey@invisible-island.net)>

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Files: doc/html/NCURSES-Programming-HOWTO.html

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Files: progs/tset.c ncurses/tinfo/read\_termcap.c

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-- vile: txtmode file-encoding=utf-8

# 1.475 cracklib 2.9.6 15.el8

## 1.475.1 Available under license :

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- b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

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## END OF TERMS AND CONDITIONS

^L

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To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the library's name and a brief idea of what it does.>

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You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library `Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990



Ty Coon, President of Vice

That's all there is to it!

This package was debianized by Jean Pierre LeJacq  
<jplejacq@quoininc.com> on Wed, 25 Feb 1998. Martin Pitt  
<martin@piware.de> was the package's maintainer up to version  
2.7.19-1. The current maintainer is Jan Dittberner  
<jandd@debian.org>.

It was downloaded from <http://sourceforge.net/projects/cracklib>

Copyright (c) 1993 Alec Muffett <alecm@crypto.dircon.co.uk>,  
Copyright (c) 2005-2009 Nathan Neulinger <nneul@umr.edu>,  
Copyright (c) 2008-2009 Jan Dittberner <jan@dittberner.info>

Modifications: Added cronjob, configuration file, and man pages.

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<http://www.gnu.org/licenses/old-licenses/lgpl-2.1.html>. You can also  
obtain it by writing to the Free Software Foundation, Inc., 51  
Franklin St, Fifth Floor, Boston, MA 02110-1301, USA.

Copyright information:

CrackLib was originally licensed with a variant of the Artistic  
license. In the interests of wider acceptance and more modern  
licensing, it was switched with the original author's blessing to GPL  
v2.

This approval was carried out in email discussions in 2005, and has  
been reconfirmed as of 2007-10-01 with the following email from Alec  
Muffett. Cracklib's license was changed from the GPL to the LGPL after  
consensus of all previous developers in October 2008, effective with  
release 2.8.15 released on 2009-11-19. See the email discussion below  
for both license changes.

-----  
-----  
EFFECTIVE OCT 2008, LICENSE IS BEING CHANGED TO LGPL-2.1 (though not reflected  
in released code until Nov 2009 - slow release cycle...)  
-----

Discussion thread from mailing list archive, with approval from everyone actively  
involved or holding original licensing rights included.

[Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2007-10-02 01:16

Attachments: Message as HTML

looks like 2.8.11 is out and marked as "GPL-2" ... releasing libraries unde=  
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GPL-2 is not desirable at all ... this is why the LGPL-2.1 exists  
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Re: [Cracklib-devel] cracklib license

From: Neulinger, Nathan <nneul@um...> - 2007-10-02 01:18

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-- Nathan

=20

-----  
Nathan Neulinger EMail: nneul@um...

University of Missouri - Rolla Phone: (573) 341-6679

UMR Information Technology Fax: (573) 341-4216

> -----Original Message-----

> From: cracklib-devel-bounces@li...

> [mailto:cracklib-devel-bounces@li...] On Behalf Of

> Mike Frysinger

> Sent: Monday, October 01, 2007 8:15 PM

> To: cracklib-devel@li...

> Subject: [Cracklib-devel] cracklib license

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> libraries under  
> GPL-2 is not desirable at all ... this is why the LGPL-2.1 exists  
> -mike

Re: [Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2007-10-02 01:33

Attachments: Message as HTML

On Monday 01 October 2007, Neulinger, Nathan wrote:

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library to dictact to application writes what license they should be using.=  
=20  
thus LGPL-2.1 enters to fill this void.  
=20  
=20mike

Re: [Cracklib-devel] cracklib license

From: Neulinger, Nathan <nneul@um...> - 2007-10-02 01:46

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=20

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Nathan Neulinger EMail: nneul@um...  
University of Missouri - Rolla Phone: (573) 341-6679  
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> -----Original Message-----  
> From: cracklib-devel-bounces@li...

> [mailto:cracklib-devel-bounces@li...] On Behalf Of  
> Mike Frysinger  
> Sent: Monday, October 01, 2007 8:33 PM  
> To: Neulinger, Nathan  
> Cc: cracklib-devel@li...; Alec Muffett  
> Subject: Re: [Cracklib-devel] cracklib license  
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> -mike

Re: [Cracklib-devel] cracklib license

From: Alec Muffett <alecm@cr...> - 2007-10-02 08:57

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> maintainers to get together with Alec in a conversation and come to a  
> decision as to what licensing scheme y'all want. I haven't really done  
> much other than cleaning up the packaging and patches and a small  
> bit of  
> additional code, so whatever licensing y'all come up with is fine  
> by me.

I am sympathetic. Guys, what do you reckon?

What I am hearing so far is that LGPL makes sense, since it can be  
linked with any code, not just GPL...

-a

Re: [Cracklib-devel] cracklib license

From: Devin Reade <gdr@gn...> - 2007-10-02 15:04

I would like to see it under LGPL as well. I think it is in everyone's best interests to have as secure systems as possible, and I think tainting it via GPL will just make it less likely that the library gets used, and will not usually cause companies/developers to GPL the dependent code (where it is not already GPL).

I like GPL, I use it when I can, but I don't think that it's the correct license in this situation.

Devin

--

If it's sinful, it's more fun.

Re: [Cracklib-devel] cracklib license

From: Nalin Dahyabhai <nalin@re...> - 2008-01-28 16:32

On Tue, Oct 02, 2007 at 09:57:31AM +0100, Alec Muffett wrote:

>> Seems like the ideal thing here would be for you and the other distro  
>> maintainers to get together with Alec in a conversation and come to a  
>> decision as to what licensing scheme y'all want. I haven't really done  
>> much other than cleaning up the packaging and patches and a small  
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>> additional code, so whatever licensing y'all come up with is fine  
>> by me.  
>  
> I am sympathetic. Guys, what do you reckon?  
>  
> What I am hearing so far is that LGPL makes sense, since it can be  
> linked with any code, not just GPL...

My apologies for not chiming in in anything resembling a reasonable timeframe.

I'd also suggest the LGPL, for the reason you noted above. Alternately, GPLv2 with the option of using the library under a later version of the GPL would permit applications which were released under version 3 of the GPL to use the library, too, which would be sufficient for the packages which are included in Fedora. FWIW, I'd personally lean toward LGPL.

In any case, I thank you both for working on sorting this out.

Cheers,

Nalin

Re: [Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2008-10-05 21:27

Attachments: Message as HTML

On Monday 28 January 2008, Nalin Dahyabhai wrote:

> On Tue, Oct 02, 2007 at 09:57:31AM +0100, Alec Muffett wrote:

>>> Seems like the ideal thing here would be for you and the other distro  
>>> maintainers to get together with Alec in a conversation and come to a  
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>>> by me.

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>> I am sympathetic. Guys, what do you reckon?

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> In any case, I thank you both for working on sorting this out.

looks like everyone is OK with LGPL-2.1 (GNU Lesser license), so can we make  
the change now ?

-mike

Re: [Cracklib-devel] cracklib license

From: Alec Muffett <alecm@cr...> - 2008-10-05 23:18

>> In any case, I thank you both for working on sorting this out.

>

> looks like everyone is OK with LGPL-2.1 (GNU Lesser license), so can we make  
> the change now ?

yes. go for it. thanks++

-a

Re: [Cracklib-devel] cracklib license  
From: Mike Frysinger <vapier@ge...> - 2008-10-25 22:34

Attachments: Message as HTML

On Sunday 05 October 2008, Alec Muffett wrote:

>>> In any case, I thank you both for working on sorting this out.  
>>  
>> looks like everyone is OK with LGPL-2.1 (GNU Lesser license), so can we  
>> make the change now ?  
>  
> yes. go for it. thanks++

Nathan Neulinger is the only one who can actually make said change ...

-mike

-----  
BELOW IS ORIGINAL LICENSING DISCUSSION RE CHANGING TO GPL from Artistic.  
-----

CrackLib was originally licensed with a variant of the Artistic license. In the interests of wider acceptance and more modern licensing, it was switched with the original author's blessing to GPL v2.

This approval was carried out in email discussions in 2005, and has been reconfirmed as of 2007-10-01 with the following email from Alec Muffett.

The below email references nneul@umr.edu address, as that is the address that was used at the time. For any future emails regarding this, please use nneul@neulinger.org.

-----  
From alecm@crypticide.com Mon Oct 1 12:26:03 2007  
Received: from umr-exproto2.cc.umr.edu ([131.151.0.192]) by UMR-CMAIL1.umr.edu with Microsoft SMTPSVC(6.0.3790.3959);  
Mon, 1 Oct 2007 12:26:03 -0500  
Received: from scansrv2.srv.mst.edu ([131.151.1.114]) by umr-exproto2.cc.umr.edu with Microsoft SMTPSVC(6.0.3790.3959);  
Mon, 1 Oct 2007 12:26:02 -0500  
Received: (qmail 8022 invoked from network); 1 Oct 2007 16:59:55 -0000  
Received: from smtp1.srv.mst.edu (131.151.1.43)  
by scanin-ipvs.cc.umr.edu with SMTP; 1 Oct 2007 16:59:55 -0000

Received: from spunkymail-mx8.g.dreamhost.com (mx1.spunky.mail.dreamhost.com [208.97.132.47])  
by smtp1.srv.mst.edu (8.13.1/8.13.1) with ESMTP id 191Gxtpr020623  
for <nneul@umr.edu>; Mon, 1 Oct 2007 11:59:55 -0500  
Received: from rutherford.zen.co.uk (rutherford.zen.co.uk [212.23.3.142])  
by spunkymail-mx8.g.dreamhost.com (Postfix) with ESMTP id 2C7734D311  
for <nneul@neulinger.org>; Mon, 1 Oct 2007 09:59:50 -0700 (PDT)  
Received: from [82.68.43.14] (helo=[192.168.1.3])  
by rutherford.zen.co.uk with esmtp (Exim 4.50)  
id 1IcOcX-0004Qt-6L  
for nneul@neulinger.org; Mon, 01 Oct 2007 16:59:49 +0000  
Mime-Version: 1.0 (Apple Message framework v752.2)  
In-Reply-To: <1b1b3fd80710010908k11dac0afp1f2dd471059ff9a4@mail.gmail.com>  
References: <1190922867.3457.147.camel@localhost.localdomain>  
<EC90713277D2BE41B7110CCD74E235CEF44F38@UMR-CMAIL1.umr.edu>  
<1b1b3fd80710010908k11dac0afp1f2dd471059ff9a4@mail.gmail.com>  
Content-Type: text/plain; charset=US-ASCII; delsp=yes; format=flowed  
Message-Id: <117A1264-F6DC-4E25-B0DD-56FBFE6E9F@crypticide.com>  
Content-Transfer-Encoding: 7bit  
From: Alec Muffett <alecm@crypticide.com>  
Subject: Re: cracklib license  
Date: Mon, 1 Oct 2007 17:59:46 +0100  
To: Nathan Neulinger <nneul@neulinger.org>  
X-Mailer: Apple Mail (2.752.2)  
X-Originating-Rutherford-IP: [82.68.43.14]  
Return-Path: alecm@crypticide.com  
X-OriginalArrivalTime: 01 Oct 2007 17:26:03.0008 (UTC) FILETIME=[2420C000:01C80450]  
Status: RO  
Content-Length: 585  
Lines: 21

>  
> ----- Forwarded message -----  
> From: Neulinger, Nathan <nneul@umr.edu>  
> Date: Sep 27, 2007 2:58 PM  
> Subject: RE: cracklib license  
> To: alecm@crypto.dircon.co.uk  
>  
> Any chance you could write me a self-contained email stating clearly  
> that the license is being changed to GPL, so I could include that  
> email  
> in the repository and clean up the repository/tarballs? I have all the  
> original discussion, but something succinct and self contained  
> would be  
> ideal.

The license for my code in the Cracklib distribution is henceforth GPL.

Happy now? :-)



-a

-----  
EFFECTIVE OCT 2008, LICENSE IS BEING CHANGED TO LGPL-2.1 (though not reflected  
in released code until Nov 2009 - slow release cycle...)  
-----

Discussion thread from mailing list archive, with approval from everyone actively  
involved or holding original licensing rights included.

[Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2007-10-02 01:16

Attachments: Message as HTML

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Nathan Neulinger EMail: nneul@um...

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> library to dictact to application writes what license they should  
> be using.  
> thus LGPL-2.1 enters to fill this void.  
> -mike

Re: [Cracklib-devel] cracklib license

From: Alec Muffett <alecm@cr...> - 2007-10-02 08:57

> Seems like the ideal thing here would be for you and the other distro  
> maintainers to get together with Alec in a conversation and come to a  
> decision as to what licensing scheme y'all want. I haven't really done  
> much other than cleaning up the packaging and patches and a small  
> bit of  
> additional code, so whatever licensing y'all come up with is fine  
> by me.

I am sympathetic. Guys, what do you reckon?

What I am hearing so far is that LGPL makes sense, since it can be  
linked with any code, not just GPL...

-a

Re: [Cracklib-devel] cracklib license

From: Devin Reade <gdr@gn...> - 2007-10-02 15:04

I would like to see it under LGPL as well. I think it is in everyone's best interests to have as secure systems as possible, and I think tainting it via GPL will just make it less likely that the library gets used, and will not usually cause companies/developers to GPL the dependent code (where it is not already GPL).

I like GPL, I use it when I can, but I don't think that it's the correct license in this situation.

Devin

--

If it's sinful, it's more fun.

Re: [Cracklib-devel] cracklib license

From: Nalin Dahyabhai <nalin@re...> - 2008-01-28 16:32

On Tue, Oct 02, 2007 at 09:57:31AM +0100, Alec Muffett wrote:

>> Seems like the ideal thing here would be for you and the other distro  
>> maintainers to get together with Alec in a conversation and come to a  
>> decision as to what licensing scheme y'all want. I haven't really done  
>> much other than cleaning up the packaging and patches and a small  
>> bit of  
>> additional code, so whatever licensing y'all come up with is fine  
>> by me.  
>  
> I am sympathetic. Guys, what do you reckon?  
>  
> What I am hearing so far is that LGPL makes sense, since it can be  
> linked with any code, not just GPL...

My apologies for not chiming in in anything resembling a reasonable timeframe.

I'd also suggest the LGPL, for the reason you noted above. Alternately, GPLv2 with the option of using the library under a later version of the GPL would permit applications which were released under version 3 of the GPL to use the library, too, which would be sufficient for the packages which are included in Fedora. FWIW, I'd personally lean toward LGPL.

In any case, I thank you both for working on sorting this out.

Cheers,

Nalin

Re: [Cracklib-devel] cracklib license

From: Mike Frysinger <vapier@ge...> - 2008-10-05 21:27

Attachments: Message as HTML

On Monday 28 January 2008, Nalin Dahyabhai wrote:

> On Tue, Oct 02, 2007 at 09:57:31AM +0100, Alec Muffett wrote:

>>> Seems like the ideal thing here would be for you and the other distro  
>>> maintainers to get together with Alec in a conversation and come to a  
>>> decision as to what licensing scheme y'all want. I haven't really done  
>>> much other than cleaning up the packaging and patches and a small  
>>> bit of  
>>> additional code, so whatever licensing y'all come up with is fine  
>>> by me.

>>

>> I am sympathetic. Guys, what do you reckon?

>>

>> What I am hearing so far is that LGPL makes sense, since it can be  
>> linked with any code, not just GPL...

>

> My apologies for not chiming in in anything resembling a reasonable  
> timeframe.

>

> I'd also suggest the LGPL, for the reason you noted above. Alternately,  
> GPLv2 with the option of using the library under a later version of the  
> GPL would permit applications which were released under version 3 of the  
> GPL to use the library, too, which would be sufficient for the packages  
> which are included in Fedora. FWIW, I'd personally lean toward LGPL.

>

> In any case, I thank you both for working on sorting this out.

looks like everyone is OK with LGPL-2.1 (GNU Lesser license), so can we make  
the change now ?

-mike

Re: [Cracklib-devel] cracklib license

From: Alec Muffett <alecm@cr...> - 2008-10-05 23:18

>> In any case, I thank you both for working on sorting this out.

>

> looks like everyone is OK with LGPL-2.1 (GNU Lesser license), so can we make  
> the change now ?

yes. go for it. thanks++

-a

Re: [Cracklib-devel] cracklib license  
From: Mike Frysinger <vapier@ge...> - 2008-10-25 22:34

Attachments: Message as HTML

On Sunday 05 October 2008, Alec Muffett wrote:

>>> In any case, I thank you both for working on sorting this out.  
>>  
>> looks like everyone is OK with LGPL-2.1 (GNU Lesser license), so can we  
>> make the change now ?  
>  
> yes. go for it. thanks++

Nathan Neulinger is the only one who can actually make said change ...  
-mike

-----  
BELOW IS ORIGINAL LICENSING DISCUSSION RE CHANGING TO GPL from Artistic.  
-----

CrackLib was originally licensed with a variant of the Artistic license. In the interests of wider acceptance and more modern licensing, it was switched with the original author's blessing to GPL v2.

This approval was carried out in email discussions in 2005, and has been reconfirmed as of 2007-10-01 with the following email from Alec Muffett.

The below email references nneul@umr.edu address, as that is the address that was used at the time. For any future emails regarding this, please use nneul@neulinger.org.

-----  
From alecm@crypticide.com Mon Oct 1 12:26:03 2007  
Received: from umr-exproto2.cc.umn.edu ([131.151.0.192]) by UMR-CMAIL1.umn.edu with Microsoft SMTPSVC(6.0.3790.3959);  
Mon, 1 Oct 2007 12:26:03 -0500  
Received: from scansrv2.srv.mst.edu ([131.151.1.114]) by umr-exproto2.cc.umn.edu with Microsoft SMTPSVC(6.0.3790.3959);  
Mon, 1 Oct 2007 12:26:02 -0500  
Received: (qmail 8022 invoked from network); 1 Oct 2007 16:59:55 -0000  
Received: from smtp1.srv.mst.edu (131.151.1.43)  
by scanin-ipvs.cc.umn.edu with SMTP; 1 Oct 2007 16:59:55 -0000  
Received: from spunkymail-mx8.g.dreamhost.com (mx1.spunky.mail.dreamhost.com [208.97.132.47])  
by smtp1.srv.mst.edu (8.13.1/8.13.1) with ESMTP id I91Gxtpr020623

for <nneul@umr.edu>; Mon, 1 Oct 2007 11:59:55 -0500  
Received: from rutherford.zen.co.uk (rutherford.zen.co.uk [212.23.3.142])  
by spunkymail-mx8.g.dreamhost.com (Postfix) with ESMTP id 2C7734D311  
for <nneul@neulinger.org>; Mon, 1 Oct 2007 09:59:50 -0700 (PDT)  
Received: from [82.68.43.14] (helo=[192.168.1.3])  
by rutherford.zen.co.uk with esmtp (Exim 4.50)  
id 1IcOcX-0004Qt-6L  
for nneul@neulinger.org; Mon, 01 Oct 2007 16:59:49 +0000  
Mime-Version: 1.0 (Apple Message framework v752.2)  
In-Reply-To: <1b1b3fd80710010908k11dac0afp1f2dd471059ff9a4@mail.gmail.com>  
References: <1190922867.3457.147.camel@localhost.localdomain>  
<EC90713277D2BE41B7110CCD74E235CEF44F38@UMR-CMAIL1.umr.edu>  
<1b1b3fd80710010908k11dac0afp1f2dd471059ff9a4@mail.gmail.com>  
Content-Type: text/plain; charset=US-ASCII; delp=yes; format=flowed  
Message-Id: <117A1264-F6DC-4E25-B0DD-56FBFE6E9F@crypticide.com>  
Content-Transfer-Encoding: 7bit  
From: Alec Muffett <alecm@crypticide.com>  
Subject: Re: cracklib license  
Date: Mon, 1 Oct 2007 17:59:46 +0100  
To: Nathan Neulinger <nneul@neulinger.org>  
X-Mailer: Apple Mail (2.752.2)  
X-Originating-Rutherford-IP: [82.68.43.14]  
Return-Path: alecm@crypticide.com  
X-OriginalArrivalTime: 01 Oct 2007 17:26:03.0008 (UTC) FILETIME=[2420C000:01C80450]  
Status: RO  
Content-Length: 585  
Lines: 21

>  
> ----- Forwarded message -----  
> From: Neulinger, Nathan <nneul@umr.edu>  
> Date: Sep 27, 2007 2:58 PM  
> Subject: RE: cracklib license  
> To: alecm@crypto.dircon.co.uk  
>  
> Any chance you could write me a self-contained email stating clearly  
> that the license is being changed to GPL, so I could include that  
> email  
> in the repository and clean up the repository/tarballs? I have all the  
> original discussion, but something succinct and self contained  
> would be  
> ideal.

The license for my code in the Cracklib distribution is henceforth GPL.

Happy now? :-)

-a

# 1.476 tiger-types 1.4

## 1.476.1 Available under license :

```
<!DOCTYPE html>
<html lang="en" dir="ltr">
<head profile="http://www.w3.org/1999/xhtml/vocab">
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
  <meta name="viewport" content="width=device-width, initial-scale=1" />
  <link rel="shortcut icon" href="https://opensource.org/files/osi_favicon.png" type="image/png" />
  <meta name="HandheldFriendly" content="true" />
  <link rel="shortlink" href="/node/47" />
  <meta name="Generator" content="Drupal 7 (http://drupal.org)" />
  <link rel="canonical" href="/licenses/CDDL-1.0" />
  <meta name="MobileOptimized" content="width" />
  <title>Common Development and Distribution License (CDDL-1.0) | Open Source Initiative</title>
  <link type="text/css" rel="stylesheet" href="https://opensource.org/files/css/css_xE-rWrJf-
fncB6ztZfd2huxqgxu4WO-qwma6Xer30m4.css" media="all" />
  <link type="text/css" rel="stylesheet"
href="https://opensource.org/files/css/css_4p37TiWeuzRfdymI_IPgCuu6wEwSDhUquxUkHLI7QnU.css"
media="all" />
  <link type="text/css" rel="stylesheet"
href="https://opensource.org/files/css/css_MnXiytJtb186Ydycnpwpw34cuUsHaKc80ey5LiQXhSY.css"
media="all" />
  <link type="text/css" rel="stylesheet" href="//maxcdn.bootstrapcdn.com/bootstrap/3.2.0/css/bootstrap.min.css"
media="all" />
  <link type="text/css" rel="stylesheet" href="https://opensource.org/files/css/css_KGZcOm3i1wmtbgZsjo-
3V9FM4wZ-5UDcpJ7Vfzmt45E.css" media="all" />
  <link type="text/css" rel="stylesheet"
href="https://opensource.org/files/css/css_G9cu63kkDQ56GYuF3QrqJxma5HT-bUVZckUWKUzFCF4.css"
media="all" />

  <!--[if lt IE 9]>
  <link type="text/css" rel="stylesheet" href="https://opensource.org/sites/all/themes/bootstrap-
business/css/ie8.css?ol0qr1" media="all" />
  <![endif]-->

  <!-- HTML5 element support for IE6-8 -->
  <!--[if lt IE 9]>
  <script src="//html5shiv.googlecode.com/svn/trunk/html5.js"></script>
  <![endif]-->
  <script type="text/javascript" src="//code.jquery.com/jquery-1.10.2.min.js"></script>
  <script type="text/javascript">
  <!--/--><![CDATA[//><!--
window.jQuery || document.write("<script
src='/sites/all/modules/jquery_update/replace/jquery/1.10/jquery.min.js'\>\x3C/script>")
```



```

//--><![ ]>
</script>
<script type="text/javascript"
src="https://opensource.org/files/js/js_aczm2rRgH_slWBPnvD3KMrK7rwa1i99HOq8IUAb99Co.js"></script>
<script type="text/javascript" src="//maxcdn.bootstrapcdn.com/bootstrap/3.2.0/js/bootstrap.min.js"></script>
<script type="text/javascript">
<!--><![CDATA[//><!--
jQuery(document).ready(function($) {
  $(window).scroll(function() {
    if($(this).scrollTop() != 0) {
      $("#toTop").fadeIn();
    } else {
      $("#toTop").fadeOut();
    }
  });

  $("#toTop").click(function() {
    $("body,html").animate({scrollTop:0},800);
  });

});
//--><![ ]>
</script>
<script type="text/javascript"
src="https://opensource.org/files/js/js_ruOYJN6FkJU2O5L1dAKVnDloSn5R6LjnLW88zFxs1Uw.js"></script>
<script type="text/javascript" src="https://opensource.org/files/js/js_JQHTvV_SkyFIN3f2BnQwnusF-
eI6tkX8wrKAK2siiZU.js"></script>
<script type="text/javascript">
<!--><![CDATA[//><!--
jQuery.extend(Drupal.settings,
{ "basePath":"\/","pathPrefix":"","ajaxPageState":{"theme":"bootstrap_business","theme_token":"Qt73Xdx7obPk_s
4eeCH7buQWxzLFf5Um2HpId-Siv9s"},"js":{"\/code.jquery.com\/jquery-
1.10.2.min.js":1,"0":1,"misc\/jquery.once.js":1,"misc\/drupal.js":1,"\/maxcdn.bootstrapcdn.com\/bootstrap\/3.2.0\/js
\/bootstrap.min.js":1,"1":1,"sites\/all\/libraries\/superfish\/jquery.hoverIntent.minified.js":1,"sites\/all\/libraries\/supe
rfish\/sftouchscreen.js":1,"sites\/all\/libraries\/superfish\/sfsmscreen.js":1,"sites\/all\/libraries\/superfish\/suppositi
on.js":1,"sites\/all\/libraries\/superfish\/superfish.js":1,"sites\/all\/libraries\/superfish\/supersubs.js":1,"sites\/all\/mod
ules\/superfish\/superfish.js":1,"sites\/all\/themes\/bootstrap-
business\/js\/jquery.browser.min.js":1},"css":{"modules\/system\/system.base.css":1,"modules\/system\/system.men
us.css":1,"modules\/system\/system.messages.css":1,"modules\/system\/system.theme.css":1,"modules\/aggregator\/
aggregator.css":1,"modules\/comment\/comment.css":1,"modules\/field\/theme\/field.css":1,"sites\/all\/modules\/mol
lom\/mollom.css":1,"modules\/node\/node.css":1,"modules\/search\/search.css":1,"modules\/user\/user.css":1,"sites\/
all\/modules\/views\/css\/views.css":1,"sites\/all\/modules\/ctools\/css\/ctools.css":1,"\/maxcdn.bootstrapcdn.com\/
bootstrap\/3.2.0\/css\/bootstrap.min.css":1,"sites\/all\/libraries\/superfish\/css\/superfish.css":1,"sites\/all\/themes\/bo
otstrap-business\/css\/style.css":1,"sites\/all\/themes\/bootstrap-
business\/color\/colors.css":1,"sites\/all\/themes\/bootstrap-business\/css\/local.css":1,"sites\/all\/themes\/bootstrap-
business\/css\/ie8.css":1}}, "urlIsAjaxTrusted":{"\/licenses\/cddl1.php":true},"superfish":{"1":{"id":"1","sf":{"anima
tion":{"opacity":"show","height":"show"},"speed":"\u0027fast\u0027","autoArrows":false,"dropShadows":true,"dis
ableHI":false},"plugins":{"touchscreen":{"mode":"window_width"},"smallscreen":{"mode":"window_width"},"add

```

```

Selected":false,"menuClasses":false,"hyperlinkClasses":false,"title":"Navigation"},"supposition":true,"bgiframe":fal
se,"supersubs":{"minWidth":"12","maxWidth":"27","extraWidth":1}}}}));
//--><![ ]>
</script>
</head>
<body class="html not-front not-logged-in no-sidebars page-node page-node- page-node-47 node-type-page" >
<div id="skip-link">
  <a href="#main-content" class="element-invisible element-focusable">Skip to main content</a>
</div>
<div id="toTop"><span class="glyphicon glyphicon-chevron-up"></span></div>

<!-- #header-top -->
<div id="header-top" class="clearfix">
  <div class="container">

    <!-- #header-top-inside -->
    <div id="header-top-inside" class="clearfix">
      <div class="row">

        <div class="col-md-8">
          <!-- #header-top-left -->
          <div id="header-top-left" class="clearfix">
            <div class="region region-header-top-left">
              <div id="block-menu-secondary-menu" class="block block-menu clearfix">

<div class="content">
  <ul class="menu"><li class="first leaf"><a href="/" title="">Home</a></li>
<li class="leaf"><a href="/blog" title="">From the Board</a></li>
<li class="leaf"><a href="/contact" title="">Contact</a></li>
<li class="last leaf"><a href="/civicrm/contribute/transact?reset=1&id=2" title="">Donate</a></li>
</ul> </div>
</div>
</div>
</div>
<!-- EOF:#header-top-left -->
</div>

        <div class="col-md-4">
          <!-- #header-top-right -->
          <div id="header-top-right" class="clearfix">
            <div class="region region-header-top-right">
              <div id="block-search-form" class="block block-search clearfix">

<div class="content">

```

```

    <form action="/licenses/cddl1.php" method="post" id="search-block-form" accept-charset="UTF-8"><div><div
class="container-inline">
    <h2 class="element-invisible">Search form</h2>
    <div class="form-item form-type-textfield form-item-search-block-form">
<input onblur="if (this.value == &#039;&#039;) {this.value = &#039;Search this website...&#039;;}" onfocus="if
(this.value == &#039;Search this website...&#039;) {this.value = &#039;&#039;;}" type="text" id="edit-search-
block-form--2" name="search_block_form" value="Search this website..." size="15" maxlength="128"
class="form-text" />
</div>
<div class="form-actions form-wrapper" id="edit-actions"><input value="" type="submit" id="edit-submit"
name="op" class="form-submit" /></div><input type="hidden" name="form_build_id" value="form-
bHQObyvdpYpP9q-Fw-RUMqMbj_-M2JMQxkrV017VnrI" />
<input type="hidden" name="form_id" value="search_block_form" />
</div>
</div></form> </div>
</div>
</div>
    </div>
    <!-- EOF:#header-top-right -->
</div>

    </div>
</div>
<!-- EOF: #header-top-inside -->

</div>
</div>
<!-- EOF: #header-top -->

</div>
</div>
<!-- header -->
<header id="header" role="banner" class="clearfix">
<div class="container">

    <!-- #header-inside -->
<div id="header-inside" class="clearfix">
    <div class="row">
        <div class="col-md-8">

                <div id="logo">
                    <a href="/" title="Home" rel="home">  </a>
                </div>

                <div id="site-name">
                    <a href="/" title="Home">Open Source Initiative</a>
                </div>

```

```

        </div>

        <div class="col-md-4">

                </div>
        </div>
</div>
<!-- EOF: #header-inside -->

</div>
</header>
<!-- EOF: #header -->

<!-- #main-navigation -->
<div id="main-navigation" class="clearfix">
    <div class="container">

        <!-- #main-navigation-inside -->
        <div id="main-navigation-inside" class="clearfix">
            <div class="row">
                <div class="col-md-12">
                    <nav role="navigation">
                        <div class="region region-navigation">
                            <div id="block-superfish-1" class="block block-superfish clearfix">

                                <div class="content">
                                    <ul id="superfish-1" class="menu sf-menu sf-navigation sf-horizontal sf-style-none sf-total-items-6 sf-parent-items-6 sf-single-items-0"><li id="menu-37-1" class="first odd sf-item-1 sf-depth-1 sf-total-children-4 sf-parent-children-2 sf-single-children-2 menuparent"><a href="/about" title="About the Open Source Initiative" class="sf-depth-1 menuparent">About</a><ul><li id="menu-75-1" class="first odd sf-item-1 sf-depth-2 sf-no-children"><a href="/history" title="History of the OSI" class="sf-depth-2">History</a></li><li id="menu-82-1" class="middle even sf-item-2 sf-depth-2 sf-total-children-7 sf-parent-children-0 sf-single-children-7 menuparent"><a href="/board" title="Board of Directors" class="sf-depth-2 menuparent">Board</a><ul><li id="menu-83-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/docs/board-annotated" title="OSI Board -- With Annotations" class="sf-depth-3">Board - Annotated</a></li><li id="menu-96-1" class="middle even sf-item-2 sf-depth-3 sf-no-children"><a href="/minutes" title="Public Minutes of Board Meetings" class="sf-depth-3">Minutes</a></li><li id="menu-185-1" class="middle odd sf-item-3 sf-depth-3 sf-no-children"><a href="/organization" title="These portfolios represent the activities of the current OSI board." class="sf-depth-3">Organization & Operations</a></li><li id="menu-95-1" class="middle even sf-item-4 sf-depth-3 sf-no-children"><a href="/articles-of-incorporation" title="OSI incorporation record" class="sf-depth-3">Articles of Incorporation</a></li><li id="menu-1475-1" class="middle odd sf-item-5 sf-depth-3 sf-no-children"><a href="/elections" class="sf-depth-3">Board Elections</a></li><li id="menu-84-1" class="middle even sf-item-6 sf-depth-3 sf-no-children"><a href="/bylaws" title="Bylaws of the Open Source Initiative" class="sf-depth-3">Bylaws</a></li><li id="menu-1317-1" class="last odd sf-item-7 sf-depth-3 sf-no-children"><a href="/conflict_of_interest_policy" title="" class="sf-depth-3">Conflict of Interest</a></li></ul></li><li id="menu-1843-1" class="middle odd sf-item-3 sf-depth-2 sf-total-children-2 sf-parent-children-0 sf-single-children-2

```

menuparent"><a href="/trademark" title="" class="sf-depth-2 menuparent">Trademark & Logo</a><ul><li id="menu-184-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/trademark-guidelines" title="OSI's Trademark Policy" class="sf-depth-3">Trademark Guidelines</a></li><li id="menu-183-1" class="last even sf-item-2 sf-depth-3 sf-no-children"><a href="/logo-usage-guidelines" title="Guidelines for appearance and usage of OSI Logo" class="sf-depth-3">Logo Guidelines</a></li></ul></li><li id="menu-126-1" class="last even sf-item-4 sf-depth-2 sf-no-children"><a href="/ToS" title="Rules for posting content on this site" class="sf-depth-2">Terms of Service</a></li></ul></li><li id="menu-65-1" class="middle even sf-item-2 sf-depth-1 sf-total-children-5 sf-parent-children-3 sf-single-children-2 menuparent"><a href="/licenses" class="sf-depth-1 menuparent">Licenses</a><ul><li id="menu-61-1" class="first odd sf-item-1 sf-depth-2 sf-total-children-1 sf-parent-children-0 sf-single-children-1 menuparent"><a href="/osd" title="The actual OSD defining what constitutes an Open Source licence" class="sf-depth-2 menuparent">Open Source Definition</a><ul><li id="menu-62-1" class="firstandlast odd sf-item-1 sf-depth-3 sf-no-children"><a href="/osd-annotated" title="The OSD with explanations and rationale interspersed." class="sf-depth-3">OSD - Annotated</a></li></ul></li><li id="menu-77-1" class="middle even sf-item-2 sf-depth-2 sf-no-children"><a href="/licenses/category" title="Licenses by Category" class="sf-depth-2">Licenses by Category</a></li><li id="menu-72-1" class="middle odd sf-item-3 sf-depth-2 sf-no-children"><a href="/licenses/alphabetical" title="Licenses that are approved by the OSI as conforming to the OSD" class="sf-depth-2">Licenses by Name</a></li><li id="menu-66-1" class="middle even sf-item-4 sf-depth-2 sf-total-children-2 sf-parent-children-0 sf-single-children-2 menuparent"><a href="/approval" title="Certifying licences as OSD-compliant" class="sf-depth-2 menuparent">License Review Process</a><ul><li id="menu-67-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/proliferation" title="Supporting choice while maintaining sanity" class="sf-depth-3">Licence Proliferation</a></li><li id="menu-69-1" class="last even sf-item-2 sf-depth-3 sf-no-children"><a href="/proliferation-report" title="License Proliferation Committee's report to the OSI Board" class="sf-depth-3">LP report to the Board</a></li></ul></li><li id="menu-99-1" class="last odd sf-item-5 sf-depth-2 sf-total-children-4 sf-parent-children-0 sf-single-children-4 menuparent"><a href="/osr-intro" title="Open Standards Requirement for Software" class="sf-depth-2 menuparent">Open Standards</a><ul><li id="menu-101-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/osr" title="An "open standard" must not prohibit conforming implementations in open source software." class="sf-depth-3">The Open Standards Requirement</a></li><li id="menu-102-1" class="middle even sf-item-2 sf-depth-3 sf-no-children"><a href="/osr-compliance" class="sf-depth-3">Open Standards Requirement Compliance</a></li><li id="menu-100-1" class="middle odd sf-item-3 sf-depth-3 sf-no-children"><a href="/osr-rationale" class="sf-depth-3">Open Standards Requirement Rationale</a></li><li id="menu-103-1" class="last even sf-item-4 sf-depth-3 sf-no-children"><a href="/osr-faq" title="Frequently asked questions about the Open Standards Requirement" class="sf-depth-3">OSR Frequently Asked Questions</a></li></ul></li></ul></li><li id="menu-1842-1" class="middle odd sf-item-3 sf-depth-1 sf-total-children-3 sf-parent-children-2 sf-single-children-1 menuparent"><a href="/membership" title="Page for our various membership programs" class="sf-depth-1 menuparent">Membership</a><ul><li id="menu-914-1" class="first odd sf-item-1 sf-depth-2 sf-total-children-1 sf-parent-children-0 sf-single-children-1 menuparent"><a href="/members" class="sf-depth-2 menuparent">Individuals</a><ul><li id="menu-897-1" class="firstandlast odd sf-item-1 sf-depth-3 sf-no-children"><a href="/civicrm/contribute/transact?reset=1&id=1" title="" class="sf-depth-3">Join</a></li></ul></li><li id="menu-675-1" class="middle even sf-item-2 sf-depth-2 sf-total-children-3 sf-parent-children-0 sf-single-children-3 menuparent"><a href="/affiliates" title="Home page for OSI's membership scheme for non-profits and not-for-profits" class="sf-depth-2 menuparent">Affiliates</a><ul><li id="menu-676-1" class="first odd sf-item-1 sf-depth-3 sf-no-children"><a href="/affiliates/about" title="" class="sf-depth-3">Become an Affiliate</a></li><li id="menu-677-1" class="middle even sf-item-2 sf-depth-3 sf-no-children"><a href="/affiliates/list" title="Full list of non-profits and not-for-profits affiliated to OSI" class="sf-depth-3">List of Affiliates</a></li><li id="menu-2071-1" class="last odd sf-item-3 sf-depth-3 sf-no-children"><a href="/AffiliateRequirements" class="sf-depth-3">Affiliate Criteria</a></li></ul></li><li id="menu-1436-1" class="last odd sf-item-3 sf-depth-2 sf-no-children"><a href="/sponsors" class="sf-depth-2">Sponsors &

Support

- [Community](/community)
- [The virtual committees where the OSI's work gets done](/lists)
- [Guidelines for OSI Mailing Lists](/codeofconduct)
- [Licensing Code of Conduct](/codeofconduct/licensing)
- [Disclaimer for OSI Public Forums](/public_forums_disclaimer)
- [Policy on Public Communications and Archives](/public_archives_policy)
- [Volunteers](/volunteers)
- [Wiki](http://wiki.opensource.org)
- [OSI Store](/store)
- [Resources](/resources)
- [FAQ](/faq)
- [OSI Board Blog](/blog)
- [Getting Help](/help)
- [Bibliography](/links)
- [Open Source Case for Business](/advocacy/case_for_business.php)
- [Working Groups](/working_groups)
- [OSI's Open Source Education Initiative and Activities](/osi-open-source-education)
- [News & Events](/news)
- [Index of newsletters](/newsletters)
- [Events](/events)

</div>

</div>

</nav>

</div>

</div>

</div>

<!-- EOF: #main-navigation-inside -->

</div>

</div>

<!-- EOF: #main-navigation -->

```

<!-- #page -->
<div id="page" class="clearfix">

<!-- #main-content -->
<div id="main-content">
  <div class="container">

    <!-- #messages-console -->
      <!-- EOF: #messages-console -->

    <div class="row">

      <section class="col-md-12">

        <!-- #main -->
        <div id="main" class="clearfix">

          <!-- EOF:#content-wrapper -->
          <div id="content-wrapper">

            <h1 class="page-title">Common Development and Distribution
License (CDDL-1.0)</h1>

            <!-- #tabs -->
              <div class="tabs">
                </div>
              <!-- EOF: #tabs -->

            <!-- #action links -->
              <!-- EOF: #action links -->

            <div class="region region-content">
            <div id="block-system-main" class="block block-system clearfix">

            <div class="content">
            <article id="node-47" class="node node-page clearfix">

            <div class="content">

```

```
<div class="field field-name-body field-type-text-with-summary field-label-hidden"><div class="field-items"><div class="field-item even"><div align="right">
<button onclick="myFunction()">Further resources on <b>CDDL-1.0</b></button>
```

```
<p id="demo"></p>
```

```
<script>
```

```
<!--//--><![CDATA[// ><!--
```

```
function myFunction() {
```

```
  var x;
```

```
  if (confirm("Disclaimer: While the OSI acknowledges these as potentially helpful resources for the community, it does not endorse any content, contributors or license interpretations from these websites. Any links to these resources across opensource.org are solely for navigational purposes. The OSI does not promote or exclusively favor any of the mentioned resources, but instead provides them as separate third-party resource to help inform your opinion. Any content from or links to these resources are separate from the OSI, exist for purely informational purposes and creates no attorney-client relationship between you, the OSI or the resources. If you have questions about how licenses apply to you or your organization, you should seek legal advice. ") == true) {
```

```
    x = "<br><p>The following are other community resources that may be helpful:<br><br><a href=https://tldrlegal.com/license/common-development-and-distribution-license-%28cddl-1.0%29-explained style='font-weight: bold;'>Common Development and Distribution License (CDDL-1.0) on TLDRLegal<br><a href=http://www.gnu.org/licenses/license-list.en.html>GNU License List<br><a href=https://en.wikipedia.org/wiki/Comparison_of_free_and_open-source_software_licenses>Wikipedia License List<br><a href=http://oss-watch.ac.uk/apps/licdiff/>OSSWatch License Diff<br><a href=choosealicense.com>Choosealicense";
```

```
  } else {
```

```
    x = " ";
```

```
  }
```

```
  document.getElementById("demo").innerHTML = x;
```

```
}
```

```
//--><![]]>
```

```
</script></div>
```

```
<b>COMMON DEVELOPMENT AND DISTRIBUTION LICENSE
```

```
Version 1.0 (CDDL-1.0)</b>
```

```
(<a href="cddl1.txt">text</a>)
```

```
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```

```
<ul><li><p> <b>1.1. Contributor</b> means each individual or entity that creates or contributes to the creation of Modifications.</p>
```

```
</li><li><p> <b>1.2. Contributor Version</b> means the combination of the Original Software, prior Modifications used by a Contributor (if any), and the Modifications made by that particular Contributor.</p>
```



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</li></ul></div></div> </div>

</article> </div>  
</div>  
</div>

</div>  
<!-- EOF:#content-wrapper -->

</div>  
<!-- EOF:#main -->

</section>

</div>

</div>  
</div>  
<!-- EOF:#main-content -->

</div>  
<!-- EOF:#page -->

<footer id="subfooter" class="clearfix">  
<div class="container">  
  
<!-- #subfooter-inside -->  
<div id="subfooter-inside" class="clearfix">  
<div class="row">  
<div class="col-md-12">  
<!-- #subfooter-left -->  
<div class="subfooter-area">

<div class="region region-footer">  
<div id="block-block-11" class="block block-block clearfix">

```

<div class="content">
  <div class="filler" style="vertical-align: middle; display: inline-block;">
<p style="margin: 0pt auto; display: table-cell; text-align: center; vertical-align: middle;">
<a href="https://twitter.com/OpenSourceOrg" style="margin: 0pt auto; display: table-cell; text-align: center;
vertical-align: middle;"></a>

<a href="https://plus.google.com/+opensourceinitiative" style="margin: 0pt auto; display: table-cell; text-align:
center; vertical-align: middle;"></a>

<a href="https://www.linkedin.com/company/open-source-initiative-osi-" style="margin: 0pt auto; display: table-
cell; text-align: center; vertical-align: middle;"></a>

<a href="http://wiki.opensource.org" style="margin: 0pt auto; display: table-cell; text-align: center; vertical-align:
middle;"></a>

<a href="http://creativecommons.org/licenses/by/4.0/" style="margin: 0pt auto; display: table-cell; text-align:
center; vertical-align: middle;"></a>

<script id="fbwiuwz">
<!--<!--><![CDATA[<!--><!--
(function(i){var
f,s=document.getElementById(i);f=document.createElement('iframe');f.src='//api.flattr.com/button/view/?uid=osi&u
rl=http%3A%2F%2Fopensource.org';f.title='Flattr';f.height=70;f.width=70;f.style.borderWidth=0;s.parentNode.inse
rtBefore(f,s);})('fbwiuwz');
//><!--><!-->
</script></p>
</div>

<br /><div class="license" style="vertical-align: middle; display: inline-block;">
<p>
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href="http://creativecommons.org/licenses/by/4.0/">Creative Commons Attribution 4.0 International License</a>.
</p>
<p>
<a href=" ../ToS">Terms of Service</a>
</p>
</div>
</div>
</div>
<div id="block-block-7" class="block block-block clearfix">

```

```

<div class="content">
  <script src="https://www.google-analytics.com/urchin.js" type="text/javascript">
<!--/--><![CDATA[// ><!--

//--><!]]>
</script><script type="text/javascript">
<!--/--><![CDATA[// ><!--

_uacct = "UA-3916956-1";
urchinTracker();

//--><!]]>
</script> </div>
</div>
</div>

      </div>
      <!-- EOF: #subfooter-left -->
    </div>
  </div>
</div>
<!-- EOF: #subfooter-inside -->

</div>
</footer>
<!-- EOF:#subfooter -->
</body>
</html>

```

# 1.477 glibc 2.28

## 1.477.1 Available under license :

```

/* _setjmp is implemented in setjmp.S */
@c The GNU Lesser General Public License.
@center Version 2.1, February 1999

```

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@c hence no sectioning command or @node.

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[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

@end display

@subheading Preamble

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We call this license the @dfn{Lesser} General Public License because it does @emph{Less} to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

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The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a ``work based on the library" and a ``work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

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@end enumerate

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distribute the source code, even though third parties are not compelled to copy the source along with the object code.

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@item

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@subheading END OF TERMS AND CONDITIONS

@page

@subheading How to Apply These Terms to Your New Libraries

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@var{signature of Ty Coon}, 1 April 1990  
Ty Coon, President of Vice  
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/\* setjmp is implemented in setjmp.S \*/

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```
@c Local Variables:
@c ispell-local-pdict: "ispell-dict"
@c End:
```

## 1.478 toml 0.10.0

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## Commands to generate dependency files  
GEN_DEPS.c= $(CC) -E -MM $(DEFS) $(CPPFLAGS)  
GEN_DEPS.cc= $(CXX) -E -MM $(DEFS) $(CPPFLAGS)  
  
## Flags for position independent code  
SHAREDLIBCFLAGS = -fPIC  
SHAREDLIBCXXFLAGS = -fPIC  
SHAREDLIBCPPFLAGS = -DPIC  
  
## Additional flags when building libraries and with threads  
THREADSCPPFLAGS = -D_REENTRANT  
LIBCPPFLAGS =
```

```

## Compiler switch to embed a runtime search path
LD_RPATH=
LD_RPATH_PRE= -Wl,-rpath,

## Compiler switch to embed a library name
LD_SONAME = -Wl,-soname -Wl,$(notdir $(MIDDLE_SO_TARGET))

## Shared library options
LD_SOOPTIONS= -Wl,-Bsymbolic

## Shared object suffix
SO = so

## Non-shared intermediate object suffix
STATIC_O = ao

## Compilation rules
%.${STATIC_O}: $(srcdir)/%.c
$(COMPILE.c) $(STATICCPPFLAGS) $(STATICCFLAGS) -o $@ $<
%.o: $(srcdir)/%.c
$(COMPILE.c) $(DYNAMICCPPFLAGS) $(DYNAMICCFLAGS) -o $@ $<

%.${STATIC_O}: $(srcdir)/%.cpp
$(COMPILE.cc) $(STATICCPPFLAGS) $(STATICCXXFLAGS) -o $@ $<
%.o: $(srcdir)/%.cpp
$(COMPILE.cc) $(DYNAMICCPPFLAGS) $(DYNAMICCXXFLAGS) -o $@ $<

## Dependency rules
%.d: $(srcdir)/%.c
@echo "generating dependency information for $<"
@$(SHELL) -ec '$(GEN_DEPS.c) $< \
| sed "s^\($*\)\.o[ :]*/g" > $@; \
[ -s $@ ] || rm -f $@'

%.d: $(srcdir)/%.cpp
@echo "generating dependency information for $<"
@$(SHELL) -ec '$(GEN_DEPS.cc) $< \
| sed "s^\($*\)\.o[ :]*/g" > $@; \
[ -s $@ ] || rm -f $@'

## Versioned libraries rules

%.${SO}.${SO_TARGET_VERSION_MAJOR}: %.${SO}.${SO_TARGET_VERSION}
$(RM) $@ && ln -s ${<F} $@
%.${SO}: %.${SO}.${SO_TARGET_VERSION_MAJOR}
$(RM) $@ && ln -s ${*F}.${SO}.${SO_TARGET_VERSION} $@

## Bind internal references

```

```
# LDflags that pkgdata will use
BIR_LDFLAGS= -Wl,-Bsymbolic
```

```
# Dependencies [i.e. map files] for the final library
BIR_DEPS=
```

```
## Remove shared library 's'
STATIC_PREFIX_WHEN_USED =
STATIC_PREFIX =
```

```
## End BSD-specific setup
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```

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@c End:
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#### Source Files

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. The file `src/libs/snprintf/snprintf.c', written by Mark Martinec <mark.martinec@ijs.si>.

Please look into snprintf.c for the copyright message.

The complete snprintf package together with documentation is available from

<http://www.ijs.si/software/snprintf/> .

. The `grn' preprocessor, written by Barry Roitblat <barry@rentonww.com> and David Slattengren <slatteng@Xinet.COM>. These files have been part of the original Berkeley ditroff distribution, without AT&T code, and are in the public domain.

The original package can be found at <http://ftp.cs.wisc.edu/pub/misc/grn.tar.Z> .

src/preproc/grn/gprint.h  
src/preproc/grn/hdb.cpp  
src/preproc/grn/hgraph.cpp

src/preproc/grn/hpoint.cpp  
src/preproc/grn/main.cpp

. The `gxditview' output device. It is based on X11's `xditview' program and thus has the X license.

src/devices/xditview/DESC.in  
src/devices/xditview/Dvi.c  
src/devices/xditview/Dvi.h  
src/devices/xditview/DviP.h  
src/devices/xditview/FontMap  
src/devices/xditview/GXditview.ad  
src/devices/xditview/Menu.h  
src/devices/xditview/ad2c  
src/devices/xditview/device.c  
src/devices/xditview/device.h  
src/devices/xditview/draw.c  
src/devices/xditview/font.c  
src/devices/xditview/gray1.bm  
src/devices/xditview/gray2.bm  
src/devices/xditview/gray3.bm  
src/devices/xditview/gray4.bm  
src/devices/xditview/gray5.bm  
src/devices/xditview/gray6.bm  
src/devices/xditview/gray7.bm  
src/devices/xditview/gray8.bm  
src/devices/xditview/gxditview.man  
src/devices/xditview/lex.c  
src/devices/xditview/page.c  
src/devices/xditview/parse.c  
src/devices/xditview/xdit.bm  
src/devices/xditview/xdit\_mask.bm  
src/devices/xditview/xditview.c

src/include/DviChar.h  
src/include/XFontName.h

src/libs/libxutil/DviChar.c  
src/libs/libxutil/XFontName.c

## Macro Packages

-----

. The -mdoc macro set, using the BSD license.

tmac/doc.tmac  
tmac/doc-old.tmac

tmac/doc-common  
tmac/doc-ditroff  
tmac/doc-nroff  
tmac/doc-syms  
tmac/groff\_mdoc.man

. The -me macro set, using the BSD license.

tmac/e.tmac  
tmac/groff\_me.man  
doc/meintro.me  
doc/meintro\_fr.me  
doc/meref.me

## Hyphenation Patterns

-----

. The file `tmac/hyphen.us' is identical to the file `hyphen.tex', part of the TeX system written by Donald E. Knuth; the master file can be found at

<ftp://labrea.stanford.edu/pub/tex/dist/lib/hyphen.tex> .

It has been renamed for consistency, i.e., to make patterns available under the filenames `hyphen.<language>', e.g. `hyphen.de' or `hyphen.uk'.

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. The file `tmac/hyphen.fr' contains the same patterns as the file `frhyph.tex' (for TeX), which can be found at

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. The file `tmac/hyphen.sv' is identical to the file `svhyph.tex', which can be found at

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. The files `tmac/hyphen.det' and `tmac/hyphen.den' contain the same patterns as the files `dehyphn.tex' and `dehypht.tex' (for TeX), which

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. The file `tmac/hyphenex.det' is identical to the file `dehyphtex.tex', which can be found at

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. The file `tmac/hyphen.cs' contains the same patterns as the file `czhyphen.tex' (for TeX), which can be found in the archive

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### 1.486.1 Available under license :

This is the Debian GNU/Linux prepackaged version of the static EXT2 file system consistency checker (e2fsck.static). The EXT2 utilities were written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

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```
#  
# This is a Makefile stub which handles the creation of BSD shared  
# libraries.  
#  
# In order to use this stub, the following makefile variables must be defined.  
#  
# BSDLIB_VERSION = 1.0  
# BSDLIB_IMAGE = libce  
# BSDLIB_MYDIR = et  
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)  
#
```

```
all:: image
```

```
real-subdirs:: Makefile
```

```
@echo " MKDIR pic"
```

```
@mkdir -p pic
```

```
BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
```

```
BSDLIB_PIC_FLAG = -fpic
```

```
image: $(BSD_LIB)
```

```
$(BSD_LIB): $(OBJS)
```

```
(cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
```

```
$(MV) pic/$(BSD_LIB) .
```

```
$(RM) -f ../$(BSD_LIB)
```

```
(cd ..; $(LN) $(LINK_BUILD_FLAGS) \
```

```
`echo $(my_dir) | sed -e 's;lib/;;'/'$(BSD_LIB) $(BSD_LIB))
```

```
install-shlibs install:: $(BSD_LIB)
```

```
@echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
```

```
@$(INSTALL_PROGRAM) $(BSD_LIB) \
```

```
$(DESTDIR)$$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
```

```
@-$(LDCONFIG)
```

```
install-strip: install
```

```
install-shlibs-strip:: install-shlibs
```

```
uninstall-shlibs uninstall::
```

```
$(RM) -f $(DESTDIR)$$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
```

```
clean::
```

```
$(RM) -rf pic
```

```
$(RM) -f $(BSD_LIB)
```

\$(RM) -f ../\$(BSD\_LIB)

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Index: tdbsa/tdb.c

-----  
--- tdbsa.orig/tdb.c

+++ tdbsa/tdb.c

@@ -4,11 +4,11 @@ Rev: 23371

Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)

\*/

/\*

- Unix SMB/CIFS implementation.  
+ trivial database library - standalone version

- trivial database library - private includes

-

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Theodore Ts'o  
23-June-2007

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This package was added to the e2fsprogs debian source package by Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

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Upstream Author: Theodore Ts'o <tytso@mit.edu>

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This is the Debian GNU/Linux prepackaged version of the `ss` command-line interface parsing library. It is currently distributed together with the EXT2 file system utilities, which are otherwise packaged as "e2fsprogs".

This package was put together by Yann Dirson <dirson@debian.org>, from sources obtained from a mirror of:  
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Gadi Oxman, August 1995

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lost+found...

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!"#\$%&'()\*+,-  
./0123456789;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~

!"#\$%&'()\*+,-  
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## 1.488 apscheduler 3.3.1

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```
@c Local Variables:
```

```
@c ispell-local-pdict: "ispell-dict"
```

```
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<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

```
This program is free software: you can redistribute it and/or modify  
it under the terms of the GNU General Public License as published by  
the Free Software Foundation, either version 3 of the License, or  
(at your option) any later version.
```

```
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but WITHOUT ANY WARRANTY; without even the implied warranty of  
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the  
GNU General Public License for more details.
```

```
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```

Also add information on how to contact you by electronic and paper mail.

If the program does terminal interaction, make it output a short notice like this when it starts in an interactive mode:

```
<program> Copyright (C) <year> <name of author>  
This program comes with ABSOLUTELY NO WARRANTY; for details type `show w'.  
This is free software, and you are welcome to redistribute it  
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```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, your program's commands

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# 1.491 libcroco 0.6.12 4.el8\_2.1

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# 1.492 perl-term-ansicolor 4.06 396.el8

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## 1.493 zstd 1.4.4 1.el8

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```
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under certain conditions; type `show c' for details.
```

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'Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989

Ty Coon, President of Vice

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# 1.495 perl-io-socket-ssl 2.066-4.module\_el8.6.0+2811+fe6c84b0

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Found in path(s):

```
* /opt/cola/permits/1345494094_1661989483.7462482/0/perl-IO-Socket-SSL-2.066-4.module_el8.6.0+2811+fe6c84b0.src.rpm-cosi-expand-archive-0X12HeuT/IO-Socket-SSL-2.066.tar.gz-cosi-expand-archive-pGhmkBIu/IO-Socket-SSL-2.066/lib/IO/Socket/SSL/PublicSuffix.pm
```

No license file was found, but licenses were detected in source scan.

```
--- lib/IO/Socket/SSL.pm
```

```
+++ lib/IO/Socket/SSL.pm
```

```
@@ -172,11 +172,10 @@ my %DEFAULT_SSL_ARGS = (
```

```
    SSL_npn_protocols => undef, # meaning depends whether on server or client side
```

```
    SSL_alpn_protocols => undef, # list of protocols we'll accept/send, for example ['http/1.1','spdy/3.1']
```

```
- # https://wiki.mozilla.org/Security/Server_Side_TLS, 2019/03/05
```

```
- # "Old backward compatibility" for best compatibility
```

```
- # .. "Most ciphers that are not clearly broken and dangerous to use are supported"
```

```
- # slightly reordered to prefer AES since it is cheaper when hardware accelerated
```

```
- SSL_cipher_list => 'ECDHE-RSA-AES128-GCM-SHA256:ECDHE-ECDSA-AES128-GCM-SHA256:ECDHE-RSA-AES256-GCM-SHA384:ECDHE-ECDSA-AES256-GCM-SHA384:ECDHE-ECDSA-CHACHA20-POLY1305:ECDHE-RSA-CHACHA20-POLY1305:DHE-RSA-AES128-GCM-SHA256:DHE-DSS-AES128-GCM-SHA256:kEDH+AESGCM:ECDHE-RSA-AES128-SHA256:ECDHE-ECDSA-AES128-SHA256:ECDHE-RSA-AES128-SHA:ECDHE-ECDSA-AES128-SHA:ECDHE-RSA-AES256-SHA384:ECDHE-ECDSA-AES256-SHA384:ECDHE-RSA-AES256-SHA:ECDHE-ECDSA-AES256-SHA:DHE-RSA-AES128-SHA256:DHE-RSA-AES128-SHA:DHE-DSS-AES128-SHA256:DHE-RSA-AES256-SHA256:DHE-DSS-AES256-SHA:DHE-RSA-AES256-SHA:ECDHE-RSA-DES-CBC3-SHA:ECDHE-ECDSA-DES-CBC3-SHA:EDH-RSA-DES-CBC3-SHA:AES128-GCM-SHA256:AES256-GCM-SHA384:AES128-SHA256:AES256-SHA256:AES128-SHA:AES256-SHA:AES:DES-CBC3-
```

```
SHA:HIGH:SEED:!aNULL:!eNULL:!EXPORT:!DES:!RC4:!MD5:!PSK:!RSAPSK:!aDH:!aECDH:!EDH-DSS-DES-CBC3-SHA:!KRB5-DES-CBC3-SHA:!SRP',
```

```
+ # Use system-wide default cipher list to support use of system-wide
```

```
+ # crypto policy (#1076390, #1127577, CPAN RT#97816)
```

```
+ # https://fedoraproject.org/wiki/Changes/CryptoPolicy
```

```
+ SSL_cipher_list => 'PROFILE=SYSTEM',
```

```
);
```

```
my %DEFAULT_SSL_CLIENT_ARGS = (
```

```
@@ -186,63 +185,6 @@ my %DEFAULT_SSL_CLIENT_ARGS = (
```

```
    SSL_ca_file => undef,
```



```

SSL_ca_path => undef,

- # older versions of F5 BIG-IP hang when getting SSL client hello >255 bytes
- # http://support.f5.com/kb/en-us/solutions/public/13000/000/sol13037.html
- # http://guest:guest@rt.openssl.org/Ticket/Display.html?id=2771
- # Ubuntu worked around this by disabling TLSv1_2 on the client side for
- # a while. Later a padding extension was added to OpenSSL to work around
- # broken F5 but then IronPort croaked because it did not understand this
- # extension so it was disabled again :(
- # Firefox, Chrome and IE11 use TLSv1_2 but use only a few ciphers, so
- # that packet stays small enough. We try the same here.
-
- SSL_cipher_list => join(" ",
-
- # SSLabs report for Chrome 48/OSX.
- # This also includes the fewer ciphers Firefox uses.
- 'ECDHE-ECDSA-AES128-GCM-SHA256',
- 'ECDHE-RSA-AES128-GCM-SHA256',
- 'DHE-RSA-AES128-GCM-SHA256',
- 'ECDHE-ECDSA-CHACHA20-POLY1305',
- 'ECDHE-RSA-CHACHA20-POLY1305',
- 'ECDHE-ECDSA-AES256-SHA',
- 'ECDHE-RSA-AES256-SHA',
- 'DHE-RSA-AES256-SHA',
- 'ECDHE-ECDSA-AES128-SHA',
- 'ECDHE-RSA-AES128-SHA',
- 'DHE-RSA-AES128-SHA',
- 'AES128-GCM-SHA256',
- 'AES256-SHA',
- 'AES128-SHA',
- 'DES-CBC3-SHA',
-
- # IE11/Edge has some more ciphers, notably SHA384 and DSS
- # we don't offer the *-AES128-SHA256 and *-AES256-SHA384 non-GCM
- # ciphers IE/Edge offers because they look like a large mismatch
- # between a very strong HMAC and a comparably weak (but sufficient)
- # encryption. Similar all browsers which do SHA384 can do ECDHE
- # so skip the DHE*SHA384 ciphers.
- 'ECDHE-RSA-AES256-GCM-SHA384',
- 'ECDHE-ECDSA-AES256-GCM-SHA384',
- # 'ECDHE-RSA-AES256-SHA384',
- # 'ECDHE-ECDSA-AES256-SHA384',
- # 'ECDHE-RSA-AES128-SHA256',
- # 'ECDHE-ECDSA-AES128-SHA256',
- # 'DHE-RSA-AES256-GCM-SHA384',
- # 'AES256-GCM-SHA384',
- 'AES256-SHA256',
- # 'AES128-SHA256',

```

```

- 'DHE-DSS-AES256-SHA256',
- # 'DHE-DSS-AES128-SHA256',
- 'DHE-DSS-AES256-SHA',
- 'DHE-DSS-AES128-SHA',
- 'EDH-DSS-DES-CBC3-SHA',
-
- # Just to make sure, that we don't accidentally add bad ciphers above.
- # This includes dropping RC4 which is no longer supported by modern
- # browsers and also excluded in the SSL libraries of Python and Ruby.
- "!EXP !MEDIUM !LOW !eNULL !aNULL !RC4 !DES !MD5 !PSK !SRP"
- )
);

```

```

# set values inside _init to work with perlcc, RT#95452
--- lib/IO/Socket/SSL.pod
+++ lib/IO/Socket/SSL.pod
@@ -1054,12 +1054,8 @@ documentation (L<http://www.openssl.org/
for more details.

```

Unless you fail to contact your peer because of no shared ciphers it is recommended to leave this option at the default setting. The default setting prefers ciphers with forward secrecy, disables anonymous authentication and disables known insecure ciphers like MD5, DES etc. This gives a grade A result at the tests of SSL Labs.

-To use the less secure OpenSSL builtin default (whatever this is) set `-SSL_cipher_list` to "".

+recommended to leave this option at the default setting, which honors the +system-wide `PROFILE=SYSTEM` cipher list.

In case different cipher lists are needed for different SNI hosts a hash can be given with the host as key and the cipher suite as value, similar to

Found in path(s):

```

* /opt/cola/permits/1345494094_1661989483.7462482/0/perl-IO-Socket-SSL-2.066-4.module_el8.6.0+2811+fe6c84b0.src.rpm-cosi-expand-archive-0X12HeuT/IO-Socket-SSL-2.066-use-system-default-cipher-list.patch

```

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---

abstract: 'Nearly transparent SSL encapsulation for IO::Socket::INET.'

author:

- 'Steffen Ullrich <sullr@cpan.org>, Peter Behroozi, Marko Asplund'

build\_requires:

ExtUtils::MakeMaker: '0'

configure\_requires:

ExtUtils::MakeMaker: '0'

Net::SSLeay: '1.46'

dynamic\_config: 1

generated\_by: 'ExtUtils::MakeMaker version 7.24, CPAN::Meta::Converter version 2.150010'  
license: perl  
meta-spec:  
url: <http://module-build.sourceforge.net/META-spec-v1.4.html>  
version: '1.4'  
name: IO-Socket-SSL  
no\_index:  
directory:  
- t  
- inc  
requires:  
Mozilla::CA: '0'  
Net::SSLeay: '1.46'  
Scalar::Util: '0'  
resources:  
bugtracker: <https://rt.cpan.org/Dist/Display.html?Queue=IO-Socket-SSL>  
homepage: <https://github.com/noxxi/p5-io-socket-ssl>  
license: <http://dev.perl.org/licenses/>  
repository: <https://github.com/noxxi/p5-io-socket-ssl>  
version: '2.066'  
x\_serialization\_backend: 'CPAN::Meta::YAML version 0.018'

Found in path(s):

```
* /opt/cola/permits/1345494094_1661989483.7462482/0/perl-IO-Socket-SSL-2.066-4.module_el8.6.0+2811+fe6c84b0.src.rpm-cosi-expand-archive-0X12HeuT/IO-Socket-SSL-2.066.tar.gz-cosi-expand-archive-pGhmkBIu/IO-Socket-SSL-2.066/META.yml
```

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=head1 NAME

IO::Socket::SSL - SSL sockets with IO::Socket interface

=head1 SYNOPSIS

```
use strict;
use IO::Socket::SSL;

# simple client
my $cl = IO::Socket::SSL->new('www.google.com:443');
print $cl "GET / HTTP/1.0\r\n\r\n";
print <$cl>;

# simple server
my $srv = IO::Socket::SSL->new(
LocalAddr => '0.0.0.0:1234',
Listen => 10,
SSL_cert_file => 'server-cert.pem',
SSL_key_file => 'server-key.pem',
```

```
);  
$srv->accept;
```

=head1 DESCRIPTION

IO::Socket::SSL makes using SSL/TLS much easier by wrapping the necessary functionality into the familiar L<IO::Socket> interface and providing secure defaults whenever possible.

This way, existing applications can be made SSL-aware without much effort, at least if you do blocking I/O and don't use select or poll.

But, under the hood, SSL is a complex beast.

So there are lots of methods to make it do what you need if the default behavior is not adequate.

Because it is easy to inadvertently introduce critical security bugs or just hard to debug problems, I would recommend studying the following documentation carefully.

The documentation consists of the following parts:

=over 4

=item \* L<"Essential Information About SSL/TLS">

=item \* L<"Basic SSL Client">

=item \* L<"Basic SSL Server">

=item \* L<"Common Usage Errors">

=item \* L<"Common Problems with SSL">

=item \* L<"Using Non-Blocking Sockets">

=item \* L<"Advanced Usage">

=item \* L<"Integration Into Own Modules">

=item \* L<"Description Of Methods">

=back

Additional documentation can be found in

=over 4

=item \* L<IO::Socket::SSL::Intercept> - Doing Man-In-The-Middle with SSL

=item \* L<IO::Socket::SSL::Utils> - Useful functions for certificates etc

=back

=head1 Essential Information About SSL/TLS

SSL (Secure Socket Layer) or its successor TLS (Transport Layer Security) are protocols to facilitate end-to-end security. These protocols are used when accessing web sites (https), delivering or retrieving email, and in lots of other use cases.

In the following documentation we will refer to both SSL and TLS as simply 'SSL'.

SSL enables end-to-end security by providing two essential functions:

=over 4

=item Encryption

This part encrypts the data for transit between the communicating parties, so that nobody in between can read them. It also provides tamper resistance so that nobody in between can manipulate the data.

=item Identification

This part makes sure that you talk to the right peer.

If the identification is done incorrectly it is easy to mount man-in-the-middle attacks, e.g. if Alice wants to talk to Bob it would be possible for Mallory to put itself in the middle, so that Alice talks to Mallory and Mallory to Bob.

All the data would still be encrypted, but not end-to-end between Alice and Bob, but only between Alice and Mallory and then between Mallory and Bob.

Thus Mallory would be able to read and modify all traffic between Alice and Bob.

=back

Identification is the part which is the hardest to understand and the easiest to get wrong.

With SSL, the Identification is usually done with B<certificates> inside a B<PKI> (Public Key Infrastructure).

These Certificates are comparable to an identity card, which contains information about the owner of the card. The card then is somehow B<signed> by the B<issuer> of the card, the B<CA> (Certificate Agency).

To verify the identity of the peer the following must be done inside SSL:

=over 4

=item \*

Get the certificate from the peer.

If the peer does not present a certificate we cannot verify it.

=item \*

Check if we trust the certificate, e.g. make sure it's not a forgery.

We believe that a certificate is not a fake if we either know the certificate already or if we B<trust> the issuer (the CA) and can verify the issuers signature on the certificate.

In reality there is often a hierarchy of certificate agencies and we only directly trust the root of this hierarchy.

In this case the peer not only sends his own certificate, but also all B<intermediate certificates>.

Verification will be done by building a B<trust path> from the trusted root up to the peers certificate and checking in each step if the we can verify the issuer's signature.

This step often causes problems because the client does not know the necessary trusted root certificates. These are usually stored in a system dependent CA store, but often the browsers have their own CA store.

=item \*

Check if the certificate is still valid.

Each certificate has a lifetime and should not be used after that time because it might be compromised or the underlying cryptography got broken in the mean time.

=item \*

Check if the subject of the certificate matches the peer.

This is like comparing the picture on the identity card against the person representing the identity card.

When connecting to a server this is usually done by comparing the hostname used for connecting against the names represented in the certificate.

A certificate might contain multiple names or wildcards, so that it can be used for multiple hosts (e.g. \*.example.com and \*.example.org).

Although nobody sane would accept an identity card where the picture does not match the person we see, it is a common implementation error with SSL to omit this check or get it wrong.

=item \*

Check if the certificate was revoked by the issuer.

This might be the case if the certificate was compromised somehow and now somebody else might use it to claim the wrong identity.

Such revocations happened a lot after the heartbleed attack.

For SSL there are two ways to verify a revocation, CRL and OCSP.

With CRLs (Certificate Revocation List) the CA provides a list of serial numbers for revoked certificates. The client somehow has to download the list (which can be huge) and keep it up to date.

With OCSP (Online Certificate Status Protocol) the client can check a single certificate directly by asking the issuer.

Revocation is the hardest part of the verification and none of today's browsers get it fully correct. But, they are still better than most other implementations which don't implement revocation checks or leave the hard parts to the developer.

=back

When accessing a web site with SSL or delivering mail in a secure way the identity is usually only checked one way, e.g. the client wants to make sure it talks to the right server, but the server usually does not care which client it talks to.

But, sometimes the server wants to identify the client too and will request a certificate from the client which the server must verify in a similar way.

=head1 Basic SSL Client

A basic SSL client is simple:

```
my $client = IO::Socket::SSL->new('www.example.com:443')
or die "error=$!, ssl_error=$SSL_ERROR";
```

This will take the OpenSSL default CA store as the store for the trusted CA.

This usually works on UNIX systems.

If there are no certificates in the store it will try use L<Mozilla::CA> which provides the default CAs of Firefox.

In the default settings, L<IO::Socket::SSL> will use a safer cipher set and SSL version, do a proper hostname check against the certificate, and use SNI (server name indication) to send the hostname inside the SSL handshake. This is necessary to work with servers which have different certificates behind the same IP address.

It will also check the revocation of the certificate with OCSP, but currently only if the server provides OCSP stapling (for deeper checks see C<ocsp\_resolver> method).

Lots of options can be used to change ciphers, SSL version, location of CA and much more. See documentation of methods for details.

With protocols like SMTP it is necessary to upgrade an existing socket to SSL. This can be done like this:

```
my $client = IO::Socket::INET->new('mx.example.com:25') or die $!;
# .. read greeting from server
# .. send EHLO and read response
# .. send STARTTLS command and read response
# .. if response was successful we can upgrade the socket to SSL now:
IO::Socket::SSL->start_SSL($client,
# explicitly set hostname we should use for SNI
SSL_hostname => 'mx.example.com'
) or die $SSL_ERROR;
```

A more complete example for a simple HTTP client:

```
my $client = IO::Socket::SSL->new(
# where to connect
PeerHost => "www.example.com",
PeerPort => "https",

# certificate verification - VERIFY_PEER is default
SSL_verify_mode => SSL_VERIFY_PEER,

# location of CA store
# need only be given if default store should not be used
SSL_ca_path => '/etc/ssl/certs', # typical CA path on Linux
SSL_ca_file => '/etc/ssl/cert.pem', # typical CA file on BSD

# or just use default path on system:
IO::Socket::SSL::default_ca(), # either explicitly
# or implicitly by not giving SSL_ca_*

# easy hostname verification
# It will use PeerHost as default name a verification
# scheme as default, which is safe enough for most purposes.
SSL_verifycn_name => 'foo.bar',
SSL_verifycn_scheme => 'http',

# SNI support - defaults to PeerHost
SSL_hostname => 'foo.bar',

) or die "failed connect or ssl handshake: $!, $SSL_ERROR";

# send and receive over SSL connection
print $client "GET / HTTP/1.0\r\n\r\n";
```



```
print <$client>;
```

And to do revocation checks with OCSP (only available with OpenSSL 1.0.0 or higher and L<Net::SSL> 1.59 or higher):

```
# default will try OCSP stapling and check only leaf certificate
my $client = IO::Socket::SSL->new($dst);

# better yet: require checking of full chain
my $client = IO::Socket::SSL->new(
PeerAddr => $dst,
SSL_ocsp_mode => SSL_OCSP_FULL_CHAIN,
);

# even better: make OCSP errors fatal
# (this will probably fail with lots of sites because of bad OCSP setups)
# also use common OCSP response cache
my $ocsp_cache = IO::Socket::SSL::OCSP_Cache->new;
my $client = IO::Socket::SSL->new(
PeerAddr => $dst,
SSL_ocsp_mode => SSL_OCSP_FULL_CHAIN|SSL_OCSP_FAIL_HARD,
SSL_ocsp_cache => $ocsp_cache,
);

# disable OCSP stapling in case server has problems with it
my $client = IO::Socket::SSL->new(
PeerAddr => $dst,
SSL_ocsp_mode => SSL_OCSP_NO_STAPLE,
);

# check any certificates which are not yet checked by OCSP stapling or
# where we have already cached results. For your own resolving combine
# $ocsp->requests with $ocsp->add_response(uri,response).
my $ocsp = $client->ocsp_resolver();
my $errors = $ocsp->resolve_blocking();
if ($errors) {
warn "OCSP verification failed: $errors";
close($client);
}
}
```

=head1 Basic SSL Server

A basic SSL server looks similar to other L<IO::Socket> servers, only that it also contains settings for certificate and key:

```
# simple server
my $server = IO::Socket::SSL->new(
# where to listen
```

```

LocalAddr => '127.0.0.1',
LocalPort => 8080,
Listen => 10,

# which certificate to offer
# with SNI support there can be different certificates per hostname
SSL_cert_file => 'cert.pem',
SSL_key_file => 'key.pem',
) or die "failed to listen: $!";

# accept client
my $client = $server->accept or die
"failed to accept or ssl handshake: $!, $SSL_ERROR";

```

This will automatically use a secure set of ciphers and SSL version and also supports Forward Secrecy with (Elliptic-Curve) Diffie-Hellmann Key Exchange.

If you are doing a forking or threading server, we recommend that you do the SSL handshake inside the new process/thread so that the master is free for new connections.

We recommend this because a client with improper or slow SSL handshake could make the server block in the handshake which would be bad to do on the listening socket:

```

# inet server
my $server = IO::Socket::INET->new(
# where to listen
LocalAddr => '127.0.0.1',
LocalPort => 8080,
Listen => 10,
);

# accept client
my $client = $server->accept or die;

# SSL upgrade client (in new process/thread)
IO::Socket::SSL->start_SSL($client,
SSL_server => 1,
SSL_cert_file => 'cert.pem',
SSL_key_file => 'key.pem',
) or die "failed to ssl handshake: $SSL_ERROR";

```

Like with normal sockets, neither forking nor threading servers scale well. It is recommended to use non-blocking sockets instead, see [L</"Using Non-Blocking Sockets">](#)

=head1 Common Usage Errors

This is a list of typical errors seen with the use of L<IO::Socket::SSL>:

=over 4

=item \*

Disabling verification with C<SSL\_verify\_mode>.

As described in L<"/Essential Information About SSL/TLS">, a proper identification of the peer is essential and failing to verify makes Man-In-The-Middle attacks possible.

Nevertheless, lots of scripts and even public modules or applications disable verification, because it is probably the easiest way to make the thing work and usually nobody notices any security problems anyway.

If the verification does not succeed with the default settings, one can do the following:

=over 8

=item \*

Make sure the needed CAs are in the store, maybe use C<SSL\_ca\_file> or C<SSL\_ca\_path> to specify a different CA store.

=item \*

If the validation fails because the certificate is self-signed and that's what you expect, you can use the C<SSL\_fingerprint> option to accept specific leaf certificates by their certificate or pubkey fingerprint.

=item \*

If the validation failed because the hostname does not match and you cannot access the host with the name given in the certificate, you can use C<SSL\_verifycn\_name> to specify the hostname you expect in the certificate.

=back

A common error pattern is also to disable verification if they found no CA store (different modules look at different "default" places).

Because L<IO::Socket::SSL> is now able to provide a usable CA store on most platforms (UNIX, Mac OSX and Windows) it is better to use the defaults provided by L<IO::Socket::SSL>.

If necessary these can be checked with the C<default\_ca> method.

=item \*

Polling of SSL sockets (e.g. select, poll and other event loops).

If you sysread one byte on a normal socket it will result in a syscall to read one byte. Thus, if more than one byte is available on the socket it will be kept in the network stack of your OS and the next select or poll call will return the socket as readable.

But, with SSL you don't deliver single bytes. Multiple data bytes are packaged and encrypted together in an SSL frame. Decryption can only be done on the whole frame, so a sysread for one byte actually reads the complete SSL frame from the socket, decrypts it and returns the first decrypted byte. Further sysreads will return more bytes from the same frame until all bytes are returned and the next SSL frame will be read from the socket.

Thus, in order to decide if you can read more data (e.g. if sysread will block) you must check if there are still data in the current SSL frame by calling C<pending> and if there are no data pending you might check the underlying socket with select or poll.

Another way might be if you try to sysread at least 16kByte all the time. 16kByte is the maximum size of an SSL frame and because sysread returns data from only a single SSL frame you can guarantee that there are no pending data.

See also L<"/Using Non-Blocking Sockets">.

=item \*

Expecting exactly the same behavior as plain sockets.

IO::Socket::SSL tries to emulate the usual socket behavior as good as possible, but full emulation can not be done. Specifically a read on the SSL socket might also result in a write on the TCP socket or a write on the SSL socket might result in a read on the TCP socket. Also C<accept> and B<close> on the SSL socket will result in writing and reading data to the TCP socket too.

Especially the hidden writes might result in a connection reset if the underlying TCP socket is already closed by the peer. Unless signal PIPE is explicitly handled by the application this will usually result in the application crashing. It is thus recommended to explicitly IGNORE signal PIPE so that the errors get propagated as EPIPE instead of causing a crash of the application.

=item \*

Set 'SSL\_version' or 'SSL\_cipher\_list' to a "better" value.

L<IO::Socket::SSL> tries to set these values to reasonable, secure values which are compatible with the rest of the world.

But, there are some scripts or modules out there which tried to be smart and get more secure or compatible settings.

Unfortunately, they did this years ago and never updated these values, so they are still forced to do only 'TLSv1' (instead of also using TLSv12 or TLSv11). Or they set 'HIGH' as the cipher list and thought they were secure, but did not notice that 'HIGH' includes anonymous ciphers, e.g. without identification of the peer.

So it is recommended to leave the settings at the secure defaults which L<IO::Socket::SSL> sets and which get updated from time to time to better fit the real world.

=item \*

Make SSL settings inaccessible by the user, together with bad builtin settings.

Some modules use L<IO::Socket::SSL>, but don't make the SSL settings available to the user. This is often combined with bad builtin settings or defaults (like switching verification off).

Thus the user needs to hack around these restrictions by using C<set\_args\_filter\_hack> or similar.

=item \*

Use of constants as strings.

Constants like C<SSL\_VERIFY\_PEER> or C<SSL\_WANT\_READ> should be used as constants and not be put inside quotes, because they represent numerical values.

=item \*

Forking and handling the socket in parent and child.

A B<fork> of the process will duplicate the internal user space SSL state of the socket. If both master and child interact with the socket by using their own SSL state strange error messages will happen. Such interaction includes explicit or implicit B<close> of the SSL socket. To avoid this the socket should be explicitly closed with B<SSL\_no\_shutdown>.

=item \*

Forking and executing a new process.

Since the SSL state is stored in user space it will be duplicated by a B<fork> but it will be lost when doing B<exec>. This means it is not possible to simply redirect stdin and stdout for the new process to the SSL socket by duplicating the relevant file handles. Instead explicitly exchanging plain data between

child-process and SSL socket are needed.

=back

## =head1 Common Problems with SSL

SSL is a complex protocol with multiple implementations and each of these has their own quirks. While most of these implementations work together, it often gets problematic with older versions, minimal versions in load balancers, or plain wrong setups.

Unfortunately these problems are hard to debug.

Helpful for debugging are a knowledge of SSL internals, Wireshark and the use of the debug settings of L<IO::Socket::SSL> and L<Net::SSLay>, which can both be set with C<\$IO::Socket::SSL::DEBUG>.

The following debug levels are defined, but used not in any consistent way:

=over 4

=item \*

0 - No debugging (default).

=item \*

1 - Print out errors from L<IO::Socket::SSL> and ciphers from L<Net::SSLay>.

=item \*

2 - Print also information about call flow from L<IO::Socket::SSL> and progress information from L<Net::SSLay>.

=item \*

3 - Print also some data dumps from L<IO::Socket::SSL> and from L<Net::SSLay>.

=back

Also, C<analyze-ssl.pl> from the ssl-tools repository at L<<https://github.com/noxxi/p5-ssl-tools>> might be a helpful tool when debugging SSL problems, as do the C<openssl> command line tool and a check with a different SSL implementation (e.g. a web browser).

The following problems are not uncommon:

=over 4

=item \*

Bad server setup: missing intermediate certificates.

It is a regular problem that administrators fail to include all necessary certificates into their server setup, e.g. everything needed to build the trust chain from the trusted root.

If they check the setup with the browser everything looks ok, because browsers work around these problems by caching any intermediate certificates and apply them to new connections if certificates are missing.

But, fresh browser profiles which have never seen these intermediates cannot fill in the missing certificates and fail to verify; the same is true with L<IO::Socket::SSL>.

=item \*

Old versions of servers or load balancers which do not understand specific TLS versions or croak on specific data.

From time to time one encounters an SSL peer, which just closes the connection inside the SSL handshake. This can usually be worked around by downgrading the SSL version, e.g. by setting C<SSL\_version>. Modern Browsers usually deal with such servers by automatically downgrading the SSL version and repeat the connection attempt until they succeed.

Worse servers do not close the underlying TCP connection but instead just drop the relevant packet. This is harder to detect because it looks like a stalled connection. But downgrading the SSL version often works here too.

A cause of such problems are often load balancers or security devices, which have hardware acceleration and only a minimal (and less robust) SSL stack. They can often be detected because they support much fewer ciphers than other implementations.

=item \*

Bad or old OpenSSL versions.

L<IO::Socket::SSL> uses OpenSSL with the help of the L<Net::SSLeay> library. It is recommend to have a recent version of this library, because it has more features and usually fewer known bugs.

=item \*

Validation of client certificates fail.

Make sure that the purpose of the certificate allows use as ssl client (check with `C<< openssl x509 -purpose >>`, that the necessary root certificate is in the path specified by `C<SSL_ca*>` (or the default path) and that any intermediate certificates needed to build the trust chain are sent by the client.

=item \*

Validation of self-signed certificate fails even if it is given with `C<SSL_ca*>` argument.

The `C<SSL_ca*>` arguments do not give a general trust store for arbitrary certificates but only specify a store for CA certificates which then can be used to verify other certificates. This especially means that certificates which are not a CA get simply ignored, notably self-signed certificates which do not also have the CA-flag set.

This behavior of OpenSSL differs from the more general trust-store concept which can be found in browsers and where it is possible to simply added arbitrary certificates (CA or not) as trusted.

=back

=head1 Using Non-Blocking Sockets

If you have a non-blocking socket, the expected behavior on read, write, accept or connect is to set `C<$!>` to `EWOULDBLOCK` if the operation cannot be completed immediately. Note that `EWOULDBLOCK` is the same as `EAGAIN` on UNIX systems, but is different on Windows.

With SSL, handshakes might occur at any time, even within an established connection. In these cases it is necessary to finish the handshake before you can read or write data. This might result in situations where you want to read but must first finish the write of a handshake or where you want to write but must first finish a read.

In these cases `C<$!>` is set to `EAGAIN` like expected, and additionally `C<$$SSL_ERROR>` is set to either `SSL_WANT_READ` or `SSL_WANT_WRITE`. Thus if you get `EWOULDBLOCK` on a SSL socket you must check `C<$$SSL_ERROR>` for `SSL_WANT_*` and adapt your event mask accordingly.

Using `readline` on non-blocking sockets does not make much sense and I would advise against using it.

And, while the behavior is not documented for other `L<IO::Socket>` classes, it will try to emulate the behavior seen there, e.g. to return the received data instead of blocking, even if the line is not complete. If an unrecoverable error occurs it will return nothing, even if it already received some data.



Also, I would advise against using C<accept> with a non-blocking SSL object because it might block and this is not what most would expect. The reason for this is that C<accept> on a non-blocking TCP socket (e.g. L<IO::Socket::IP>, L<IO::Socket::INET>..) results in a new TCP socket which does not inherit the non-blocking behavior of the master socket. And thus, the initial SSL handshake on the new socket inside C<IO::Socket::SSL::accept> will be done in a blocking way. To work around this you are safer by doing a TCP accept and later upgrade the TCP socket in a non-blocking way with C<start\_SSL> and C<accept\_SSL>.

```
my $cl = IO::Socket::SSL->new($dst);
$cl->blocking(0);
my $sel = IO::Select->new($cl);
while (1) {
# with SSL a call for reading n bytes does not result in reading of n
# bytes from the socket, but instead it must read at least one full SSL
# frame. If the socket has no new bytes, but there are unprocessed data
# from the SSL frame can_read will block!

# wait for data on socket
$sel->can_read();

# new data on socket or eof
READ:
# this does not read only 1 byte from socket, but reads the complete SSL
# frame and then just returns one byte. On subsequent calls it than
# returns more byte of the same SSL frame until it needs to read the
# next frame.
my $n = sysread( $cl,my $buf,1);
if ( ! defined $n ) {
    die $! if not ${EWOULDBLOCK};
    next if $SSL_ERROR == SSL_WANT_READ;
    if ( $SSL_ERROR == SSL_WANT_WRITE ) {
# need to write data on renegotiation
$sel->can_write;
next;
    }
    die "something went wrong: $SSL_ERROR";
} elsif ( ! $n ) {
    last; # eof
} else {
    # read next bytes
    # we might have still data within the current SSL frame
    # thus first process these data instead of waiting on the underlying
    # socket object
    goto READ if $cl->pending; # goto sysread
    next;          # goto $sel->can_read
}
}
```

```
}
```

Additionally there are differences to plain sockets when using select, poll, kqueue or similar technologies to get notified if data are available.

Relying only on these calls is not sufficient in all cases since unread data might be internally buffered in the SSL stack. To detect such buffering `B<pending()>` need to be used. Alternatively the buffering can be avoided by using `B<sysread>` with the maximum size of an SSL frame. See [L</"Common Usage Errors">](#) for details.

## =head1 Advanced Usage

### =head2 SNI Support

Newer extensions to SSL can distinguish between multiple hostnames on the same IP address using Server Name Indication (SNI).

Support for SNI on the client side was added somewhere in the OpenSSL 0.9.8 series, but with 1.0 a bug was fixed when the server could not decide about its hostname. Therefore client side SNI is only supported with OpenSSL 1.0 or higher in `L<IO::Socket::SSL>`.

With a supported version, SNI is used automatically on the client side, if it can determine the hostname from `C<PeerAddr>` or `C<PeerHost>` (which are synonyms in the underlying `IO::Socket::` classes and thus should never be set both or at least not to different values).

On unsupported OpenSSL versions it will silently not use SNI.

The hostname can also be given explicitly given with `C<SSL_hostname>`, but in this case it will throw in error, if SNI is not supported.

To check for support you might call `C<< IO::Socket::SSL->can_client_sni() >>`.

On the server side, earlier versions of OpenSSL are supported, but only together with `L<Net::SSLeay>` version `>= 1.50`.

To check for support you might call `C<< IO::Socket::SSL->can_server_sni() >>`.

If server side SNI is supported, you might specify different certificates per host with `C<SSL_cert*>` and `C<SSL_key*>`, and check the requested name using `C<get_servername>`.

### =head2 Talk Plain and SSL With The Same Socket

It is often required to first exchange some plain data and then upgrade the socket to SSL after some kind of STARTTLS command. Protocols like FTPS even need a way to downgrade the socket again back to plain.

The common way to do this would be to create a normal socket and use `C<start_SSL>` to upgrade and `stop_SSL` to downgrade:

```
my $sock = IO::Socket::INET->new(...) or die $!;
```

```
... exchange plain data on $sock until starttls command ...
IO::Socket::SSL->start_SSL($sock,%sslargs) or die $SSL_ERROR;
... now $sock is an IO::Socket::SSL object ...
... exchange data with SSL on $sock until stoptls command ...
$sock->stop_SSL or die $SSL_ERROR;
... now $sock is again an IO::Socket::INET object ...
```

But, lots of modules just derive directly from L<IO::Socket::INET>.

While this base class can be replaced with L<IO::Socket::SSL>, these modules cannot easily support different base classes for SSL and plain data and switch between these classes on a starttls command.

To help in this case, L<IO::Socket::SSL> can be reduced to a plain socket on startup, and connect\_SSL/accept\_SSL/start\_SSL can be used to enable SSL and C<stop\_SSL> to talk plain again:

```
my $sock = IO::Socket::SSL->new(
PeerAddr => ...
SSL_startHandshake => 0,
%sslargs
) or die $!;
... exchange plain data on $sock until starttls command ...
$sock->connect_SSL or die $SSL_ERROR;
... now $sock is an IO::Socket::SSL object ...
... exchange data with SSL on $sock until stoptls command ...
$sock->stop_SSL or die $SSL_ERROR;
... $sock is still an IO::Socket::SSL object ...
... but data exchanged again in plain ...
```

## =head1 Integration Into Own Modules

L<IO::Socket::SSL> behaves similarly to other L<IO::Socket> modules and thus could be integrated in the same way, but you have to take special care when using non-blocking I/O (like for handling timeouts) or using select or poll. Please study the documentation on how to deal with these differences.

Also, it is recommended to not set or touch most of the C<SSL\_\*> options, so that they keep their secure defaults. It is also recommended to let the user override these SSL specific settings without the need of global settings or hacks like C<set\_args\_filter\_hack>.

The notable exception is C<SSL\_verifycn\_scheme>.

This should be set to the hostname verification scheme required by the module or protocol.

## =head1 Description Of Methods

L<IO::Socket::SSL> inherits from another L<IO::Socket> module.

The choice of the super class depends on the installed modules:

=over 4

=item \*

If L<IO::Socket::IP> with at least version 0.20 is installed it will use this module as super class, transparently providing IPv6 and IPv4 support.

=item \*

If L<IO::Socket::INET6> is installed it will use this module as super class, transparently providing IPv6 and IPv4 support.

=item \*

Otherwise it will fall back to L<IO::Socket::INET>, which is a perl core module. With L<IO::Socket::INET> you only get IPv4 support.

=back

Please be aware that with the IPv6 capable super classes, it will look first for the IPv6 address of a given hostname. If the resolver provides an IPv6 address, but the host cannot be reached by IPv6, there will be no automatic fallback to IPv4.

To avoid these problems you can enforce IPv4 for a specific socket by using the C<Domain> or C<Family> option with the value AF\_INET as described in L<IO::Socket::IP>. Alternatively you can enforce IPv4 globally by loading L<IO::Socket::SSL> with the option 'inet4', in which case it will use the IPv4 only class L<IO::Socket::INET> as the super class.

L<IO::Socket::SSL> will provide all of the methods of its super class, but sometimes it will override them to match the behavior expected from SSL or to provide additional arguments.

The new or changed methods are described below, but please also read the section about SSL specific error handling.

=over 4

=item Error Handling

If an SSL specific error occurs, the global variable C<\${SSL\_ERROR}> will be set.

If the error occurred on an existing SSL socket, the method C<errstr> will

give access to the latest socket specific error.

Both `C<SSL_ERROR>` and the `C<errstr>` method give a dualvar similar to `C<!>`, e.g. providing an error number in numeric context or an error description in string context.

=item `B<new(...)>`

Creates a new `L<IO::Socket::SSL>` object. You may use all the friendly options that came bundled with the super class (e.g. `L<IO::Socket::IP>`, `L<IO::Socket::INET>`, ...) plus (optionally) the ones described below. If you don't specify any SSL related options it will do its best in using secure defaults, e.g. choosing good ciphers, enabling proper verification, etc.

=over 2

=item `SSL_server`

Set this option to a true value if the socket should be used as a server. If this is not explicitly set it is assumed if the `C<Listen>` parameter is given when creating the socket.

=item `SSL_hostname`

This can be given to specify the hostname used for SNI, which is needed if you have multiple SSL hostnames on the same IP address. If not given it will try to determine the hostname from `C<PeerAddr>`, which will fail if only an IP was given or if this argument is used within `C<start_SSL>`.

If you want to disable SNI, set this argument to "".

Currently only supported for the client side and will be ignored for the server side.

See section "SNI Support" for details of SNI the support.

=item `SSL_startHandshake`

If this option is set to false (defaults to true) it will not start the SSL handshake yet. This has to be done later with `C<accept_SSL>` or `C<connect_SSL>`. Before the handshake is started read/write/etc. can be used to exchange plain data.

=item `SSL_keepSocketOnError`

If this option is set to true (defaults to false) it will not close the underlying TCP socket on errors. In most cases there is no real use for this behavior since both sides of the TCP connection will probably have a

different idea of the current state of the connection.

=item SSL\_ca | SSL\_ca\_file | SSL\_ca\_path

Usually you want to verify that the peer certificate has been signed by a trusted certificate authority. In this case you should use this option to specify the file (C<SSL\_ca\_file>) or directory (C<SSL\_ca\_path>) containing the certificateZ<>(s) of the trusted certificate authorities.

C<SSL\_ca\_path> can also be an array or a string containing multiple path, where the path are separated by the platform specific separator. This separator is C<;> on DOS, Windows, Netware, C<,> on VMS and C<:> for all the other systems. If multiple path are given at least one of these must be accessible.

You can also give a list of X509\* certificate handles (like you get from L<Net::SSL> or L<IO::Socket::SSL::Utils::PEM\_xxx2cert>) with C<SSL\_ca>. These will be added to the CA store before path and file and thus take precedence.

If neither SSL\_ca, nor SSL\_ca\_file or SSL\_ca\_path are set it will use C<default\_ca()> to determine the user-set or system defaults.

If you really don't want to set a CA set SSL\_ca\_file or SSL\_ca\_path to C<\undef> or SSL\_ca to an empty list. (unfortunately C<"> is used by some modules using L<IO::Socket::SSL> when CA is not explicitly given).

=item SSL\_client\_ca | SSL\_client\_ca\_file

If verify\_mode is VERIFY\_PEER on the server side these options can be used to set the list of acceptable CAs for the client. This way the client can select they required certificate from a list of certificates.

The value for these options is similar to C<SSL\_ca> and C<SSL\_ca\_file>.

=item SSL\_fingerprint

Sometimes you have a self-signed certificate or a certificate issued by an unknown CA and you really want to accept it, but don't want to disable verification at all. In this case you can specify the fingerprint of the certificate as C<'algo\$hex\_fingerprint'>. C<algo> is a fingerprint algorithm supported by OpenSSL, e.g. 'sha1','sha256'... and C<hex\_fingerprint> is the hexadecimal representation of the binary fingerprint. Any colons inside the hex string will be ignored.

If you want to use the fingerprint of the pubkey inside the certificate instead of the certificate use the syntax C<'algo\$pub\$hex\_fingerprint'> instead.

To get the fingerprint of an established connection you can use C<get\_fingerprint>.

It is also possible to skip C<algo\$>, i.e. only specify the fingerprint. In this case the likely algorithms will be automatically detected based on the length of the digest string.

You can specify a list of fingerprints in case you have several acceptable certificates.

If a fingerprint matches the topmost (i.e. leaf) certificate no additional validations can make the verification fail.

=item SSL\_cert\_file | SSL\_cert | SSL\_key\_file | SSL\_key

If you create a server you usually need to specify a server certificate which should be verified by the client. Same is true for client certificates, which should be verified by the server.

The certificate can be given as a file with SSL\_cert\_file or as an internal representation of an X509\* object (like you get from L<Net::SSL> or L<IO::Socket::SSL::Utils::PEM\_xxx2cert>) with SSL\_cert.

If given as a file it will automatically detect the format.

Supported file formats are PEM, DER and PKCS#12, where PEM and PKCS#12 can contain the certificate and the chain to use, while DER can only contain a single certificate.

If given as a list of X509\* please note, that the all the chain certificates (e.g. all except the first) will be "consumed" by openssl and will be freed if the SSL context gets destroyed - so you should never free them yourself. But the servers certificate (e.g. the first) will not be consumed by openssl and thus must be freed by the application.

For each certificate a key is need, which can either be given as a file with SSL\_key\_file or as an internal representation of an EVP\_PKEY\* object with SSL\_key (like you get from L<Net::SSL> or L<IO::Socket::SSL::Utils::PEM\_xxx2key>).

If a key was already given within the PKCS#12 file specified by SSL\_cert\_file it will ignore any SSL\_key or SSL\_key\_file.

If no SSL\_key or SSL\_key\_file was given it will try to use the PEM file given with SSL\_cert\_file again, maybe it contains the key too.

If your SSL server should be able to use different certificates on the same IP address, depending on the name given by SNI, you can use a hash reference instead of a file with C<<hostname => cert\_file>>.

If your SSL server should be able to use both RSA and ECDSA certificates for the same domain/IP a similar hash reference like with SNI is given. The domain names used to specify the additional certificates should be C<hostname% whatever>, i.e. C<hostname%ecc> or similar. This needs at least OpenSSL 1.0.2. To let the server pick the certificate based on the clients cipher preference C<SSL\_honor\_cipher\_order> should be set to false.

In case certs and keys are needed but not given it might fall back to builtin defaults, see "Defaults for Cert, Key and CA".

Examples:

```
SSL_cert_file => 'mycert.pem',
```

```
SSL_key_file => 'mykey.pem',
```

```
SSL_cert_file => {  
  "foo.example.org" => 'foo-cert.pem',  
  "foo.example.org%ecc" => 'foo-ecc-cert.pem',  
  "bar.example.org" => 'bar-cert.pem',  
  # used when nothing matches or client does not support SNI  
  " => 'default-cert.pem',  
  '%ecc' => 'default-ecc-cert.pem',  
},  
SSL_key_file => {  
  "foo.example.org" => 'foo-key.pem',  
  "foo.example.org%ecc" => 'foo-ecc-key.pem',  
  "bar.example.org" => 'bar-key.pem',  
  # used when nothing matches or client does not support SNI  
  " => 'default-key.pem',  
  '%ecc' => 'default-ecc-key.pem',  
}
```

```
=item SSL_passwd_cb
```

If your private key is encrypted, you might not want the default password prompt from Net::SSLLeay. This option takes a reference to a subroutine that should return the password required to decrypt your private key.

```
=item SSL_use_cert
```

If this is true, it forces IO::Socket::SSL to use a certificate and key, even if you are setting up an SSL client. If this is set to 0 (the default), then you will only need a certificate and key if you are setting up a server.

SSL\_use\_cert will implicitly be set if SSL\_server is set.

For convenience it is also set if it was not given but a cert was given for use (SSL\_cert\_file or similar).

```
=item SSL_version
```

Sets the version of the SSL protocol used to transmit data.

'SSLv23' uses a handshake compatible with SSL2.0, SSL3.0 and TLS1.x, while 'SSLv2', 'SSLv3', 'TLSv1', 'TLSv1\_1', 'TLSv1\_2', or 'TLSv1\_3' restrict handshake and protocol to the specified version.

All values are case-insensitive. Instead of 'TLSv1\_1', 'TLSv1\_2', and 'TLSv1\_3' one can also use 'TLSv11', 'TLSv12', and 'TLSv13'. Support for 'TLSv1\_1', 'TLSv1\_2', and 'TLSv1\_3' requires recent versions of Net::SSLLeay



and openssl.

Independent from the handshake format you can limit to set of accepted SSL versions by adding !version separated by ':':

The default SSL\_version is 'SSLv23:!SSLv3:!SSLv2' which means, that the handshake format is compatible to SSL2.0 and higher, but that the successful handshake is limited to TLS1.0 and higher, that is no SSL2.0 or SSL3.0 because both of these versions have serious security issues and should not be used anymore.

You can also use !TLSv1\_1 and !TLSv1\_2 to disable TLS versions 1.1 and 1.2 while still allowing TLS version 1.0.

Setting the version instead to 'TLSv1' might break interaction with older clients, which need and SSL2.0 compatible handshake. On the other side some clients just close the connection when they receive a TLS version 1.1 request. In this case setting the version to 'SSLv23:!SSLv2:!SSLv3:!TLSv1\_1:!TLSv1\_2' might help.

=item SSL\_cipher\_list

If this option is set the cipher list for the connection will be set to the given value, e.g. something like 'ALL:!LOW:!EXP:!aNULL'. Look into the OpenSSL documentation ([L<http://www.openssl.org/docs/apps/ciphers.html#CIPHER\\_STRINGS>](http://www.openssl.org/docs/apps/ciphers.html#CIPHER_STRINGS)) for more details.

Unless you fail to contact your peer because of no shared ciphers it is recommended to leave this option at the default setting. The default setting prefers ciphers with forward secrecy, disables anonymous authentication and disables known insecure ciphers like MD5, DES etc. This gives a grade A result at the tests of SSL Labs.

To use the less secure OpenSSL builtin default (whatever this is) set SSL\_cipher\_list to "".

In case different cipher lists are needed for different SNI hosts a hash can be given with the host as key and the cipher suite as value, similar to B<SSL\_cert\*>.

=item SSL\_honor\_cipher\_order

If this option is true the cipher order the server specified is used instead of the order proposed by the client. This option defaults to true to make use of our secure cipher list setting.

=item SSL\_dh\_file

To create a server which provides forward secrecy you need to either give the DH parameters or (better, because faster) the ECDH curve. This setting cares

about DH parameters.

To support non-elliptic Diffie-Hellman key exchange a suitable file needs to be given here or the `SSL_dh` should be used with an appropriate value. See `dhparam` command in `openssl` for more information.

If neither `C<SSL_dh_file>` nor `C<SSL_dh>` are set a builtin DH parameter with a length of 2048 bit is used to offer DH key exchange by default. If you don't want this (e.g. disable DH key exchange) explicitly set this or the `C<SSL_dh>` parameter to `undef`.

=item `SSL_dh`

Like `SSL_dh_file`, but instead of giving a file you use a preloaded or generated DH\*.

=item `SSL_ecdh_curve`

To create a server which provides forward secrecy you need to either give the DH parameters or (better, because faster) the ECDH curve. This setting cares about the ECDH curve(s).

To support Elliptic Curve Diffie-Hellmann key exchange the OID or NID of at least one suitable curve needs to be provided here.

With OpenSSL 1.1.0+ this parameter defaults to `C<auto>`, which means that it lets OpenSSL pick the best settings. If support for `CTX_set_ecdh_auto` is implemented in `Net::SSL` (needs at least version 1.86) it will use this to implement the same default. Otherwise it will default to `C<prime256v1>` (builtin of OpenSSL) in order to offer ECDH key exchange by default.

If setting groups or curves is supported by `Net::SSL` (needs at least version 1.86) then multiple curves can be given here in the order of the preference, i.e. `C<P-521:P-384:P-256>`. When used at the client side this will include the supported curves as extension in the TLS handshake.

If you don't want to have ECDH key exchange this could be set to `undef` or set `C<SSL_ciphers>` to exclude all of these ciphers.

You can check if ECDH support is available by calling `C<< IO::Socket::SSL->can_ecdh >>`.

=item `SSL_verify_mode`

This option sets the verification mode for the peer certificate. You may combine `SSL_VERIFY_PEER` (`verify_peer`), `SSL_VERIFY_FAIL_IF_NO_PEER_CERT` (fail verification if no peer certificate exists; ignored for clients), `SSL_VERIFY_CLIENT_ONCE` (verify client once; ignored for clients).

See OpenSSL man page for `SSL_CTX_set_verify` for more information.

The default is `SSL_VERIFY_NONE` for server (e.g. no check for client certificate) and `SSL_VERIFY_PEER` for client (check server certificate).

=item `SSL_verify_callback`

If you want to verify certificates yourself, you can pass a sub reference along with this parameter to do so. When the callback is called, it will be passed:

=over 4

=item 1.

a true/false value that indicates what OpenSSL thinks of the certificate,

=item 2.

a C-style memory address of the certificate store,

=item 3.

a string containing the certificate's issuer attributes and owner attributes, and

=item 4.

a string containing any errors encountered (0 if no errors).

=item 5.

a C-style memory address of the peer's own certificate (convertible to PEM form with `Net::SSLay::PEM_get_string_X509()`).

=item 6.

The depth of the certificate in the chain. Depth 0 is the leaf certificate.

=back

The function should return 1 or 0, depending on whether it thinks the certificate is valid or invalid. The default is to let OpenSSL do all of the busy work.

The callback will be called for each element in the certificate chain.

See the OpenSSL documentation for `SSL_CTX_set_verify` for more information.

=item `SSL_verifcyn_scheme`

The scheme is used to correctly verify the identity inside the certificate by using the hostname of the peer.

See the information about the verification schemes in `B<verify_hostname>`.

If you don't specify a scheme it will use 'default', but only complain loudly if the name verification fails instead of letting the whole certificate verification fail. THIS WILL CHANGE, e.g. it will let the certificate verification fail in the future if the hostname does not match the certificate !!!! To override the name used in verification use B<SSL\_verifycn\_name>.

The scheme 'default' is a superset of the usual schemes, which will accept the hostname in common name and subjectAltName and allow wildcards everywhere. While using this scheme is way more secure than no name verification at all you better should use the scheme specific to your application protocol, e.g. 'http', 'ftp'...

If you are really sure, that you don't want to verify the identity using the hostname you can use 'none' as a scheme. In this case you'd better have alternative forms of verification, like a certificate fingerprint or do a manual verification later by calling B<verify\_hostname> yourself.

=item SSL\_verifycn\_publicsuffix

This option is used to specify the behavior when checking wildcard certificates for public suffixes, e.g. no wildcard certificates for \*.com or \*.co.uk should be accepted, while \*.example.com or \*.example.co.uk is ok.

If not specified it will simply use the builtin default of L<IO::Socket::SSL::PublicSuffix>, you can create another object with from\_string or from\_file of this module.

To disable verification of public suffix set this option to C<">.

=item SSL\_verifycn\_name

Set the name which is used in verification of hostname. If SSL\_verifycn\_scheme is set and no SSL\_verifycn\_name is given it will try to use SSL\_hostname or PeerHost and PeerAddr settings and fail if no name can be determined. If SSL\_verifycn\_scheme is not set it will use a default scheme and warn if it cannot determine a hostname, but it will not fail.

Using PeerHost or PeerAddr works only if you create the connection directly with C<< IO::Socket::SSL->new >>, if an IO::Socket::INET object is upgraded with B<start\_SSL> the name has to be given in B<SSL\_verifycn\_name> or B<SSL\_hostname>.

=item SSL\_check\_crl

If you want to verify that the peer certificate has not been revoked by the signing authority, set this value to true. OpenSSL will search for the CRL in your SSL\_ca\_path, or use the file specified by SSL\_crl\_file. See the Net::SSLeay documentation for more details.

Note that this functionality appears to be broken with OpenSSL <v0.9.7b, so its use with lower versions will result in an error.

=item SSL\_crl\_file

If you want to specify the CRL file to be used, set this value to the pathname to be used. This must be used in addition to setting SSL\_check\_crl.

=item SSL\_ocsp\_mode

Defines how certificate revocation is done using OCSP (Online Status Revocation Protocol). The default is to send a request for OCSP stapling to the server and if the server sends an OCSP response back the result will be used.

Any other OCSP checking needs to be done manually with C<ocsp\_resolver>.

The following flags can be combined with C<|>:

=over 8

=item SSL\_OCSP\_NO\_STAPLE

Don't ask for OCSP stapling.

This is the default if SSL\_verify\_mode is VERIFY\_NONE.

=item SSL\_OCSP\_TRY\_STAPLE

Try OCSP stapling, but don't complain if it gets no stapled response back.

This is the default if SSL\_verify\_mode is VERIFY\_PEER (the default).

=item SSL\_OCSP\_MUST\_STAPLE

Consider it a hard error, if the server does not send a stapled OCSP response back. Most servers currently send no stapled OCSP response back.

=item SSL\_OCSP\_FAIL\_HARD

Fail hard on response errors, default is to fail soft like the browsers do.

Soft errors mean, that the OCSP response is not usable, e.g. no response, error response, no valid signature etc.

Certificate revocations inside a verified response are considered hard errors in any case.

Soft errors inside a stapled response are never considered hard, e.g. it is expected that in this case an OCSP request will be send to the responsible OCSP responder.

=item SSL\_OCSP\_FULL\_CHAIN

This will set up the C<ocsp\_resolver> so that all certificates from the peer chain will be checked, otherwise only the leaf certificate will be checked against revocation.

=back

=item SSL\_ocsp\_staple\_callback

If this callback is defined, it will be called with the SSL object and the OCSP response handle obtained from the peer, e.g. C<<\$cb->(\$ssl,\$resp)>>.

If the peer did not provide a stapled OCSP response the function will be called with C<\$resp=undef>.

Because the OCSP response handle is no longer valid after leaving this function it should not be copied or freed. If access to the response is necessary after leaving this function it can be serialized with C<Net::SSLLeay::i2d\_OCSP\_RESPONSE>.

If no such callback is provided, it will use the default one, which verifies the response and uses it to check if the certificate(s) of the connection got revoked.

=item SSL\_ocsp\_cache

With this option a cache can be given for caching OCSP responses, which could be shared between different SSL contexts. If not given a cache specific to the SSL context only will be used.

You can either create a new cache with

C<< IO::Socket::SSL::OCSP\_Cache->new([size]) >> or implement your own cache, which needs to have methods C<put(\$key,%entry)> and C<get(\$key)> (returning C< \%entry >) where entry is the hash representation of the OCSP response with fields like C<nextUpdate>. The default implementation of the cache will consider responses valid as long as C<nextUpdate> is less than the current time.

=item SSL\_reuse\_ctx

If you have already set the above options for a previous instance of IO::Socket::SSL, then you can reuse the SSL context of that instance by passing it as the value for the SSL\_reuse\_ctx parameter. You may also create a new instance of the IO::Socket::SSL::SSL\_Context class, using any context options that you desire without specifying connection options, and pass that here instead.

If you use this option, all other context-related options that you pass in the same call to new() will be ignored unless the context supplied was invalid. Note that, contrary to versions of IO::Socket::SSL below v0.90, a

global SSL context will not be implicitly used unless you use the `set_default_context()` function.

=item `SSL_create_ctx_callback`

With this callback you can make individual settings to the context after it got created and the default setup was done.

The callback will be called with the CTX object from `Net::SSLeay` as the single argument.

Example for limiting the server session cache size:

```
SSL_create_ctx_callback => sub {  
    my $ctx = shift;  
    Net::SSLeay::CTX_sess_set_cache_size($ctx,128);  
}
```

=item `SSL_session_cache_size`

If you make repeated connections to the same host/port and the SSL renegotiation time is an issue, you can turn on client-side session caching with this option by specifying a positive cache size. For successive connections, pass the `SSL_reuse_ctx` option to the `new()` calls (or use `set_default_context()`) to make use of the cached sessions. The session cache size refers to the number of unique host/port pairs that can be stored at one time; the oldest sessions in the cache will be removed if new ones are added.

This option does not effect the session cache a server has for it's clients, e.g. it does not affect SSL objects with `SSL_server` set.

Note that session caching with TLS 1.3 needs at least `Net::SSLeay` 1.86.

=item `SSL_session_cache`

Specifies session cache object which should be used instead of creating a new. Overrides `SSL_session_cache_size`.

This option is useful if you want to reuse the cache, but not the rest of the context.

A session cache object can be created using `C<< IO::Socket::SSL::Session_Cache->new( cachesize ) >>`.

Use `set_default_session_cache()` to set a global cache object.

=item `SSL_session_key`

Specifies a key to use for lookups and inserts into client-side session cache. Per default ip:port of destination will be used, but sometimes you want to

share the same session over multiple ports on the same server (like with FTPS).

=item SSL\_session\_id\_context

This gives an id for the servers session cache. It's necessary if you want clients to connect with a client certificate. If not given but SSL\_verify\_mode specifies the need for client certificate a context unique id will be picked.

=item SSL\_error\_trap

When using the accept() or connect() methods, it may be the case that the actual socket connection works but the SSL negotiation fails, as in the case of an HTTP client connecting to an HTTPS server. Passing a subroutine ref attached to this parameter allows you to gain control of the orphaned socket instead of having it be closed forcibly.

The subroutine, if called, will be passed two parameters:  
a reference to the socket on which the SSL negotiation failed and the full text of the error message.

=item SSL\_npn\_protocols

If used on the server side it specifies list of protocols advertised by SSL server as an array ref, e.g. ['spdy/2','http1.1'].

On the client side it specifies the protocols offered by the client for NPN as an array ref.

See also method C<next\_proto\_negotiated>.

Next Protocol Negotiation (NPN) is available with Net::SSLeay 1.46+ and openssl-1.0.1+. NPN is unavailable in TLSv1.3 protocol.

To check support you might call C<< IO::Socket::SSL->can\_npn() >>.

If you use this option with an unsupported Net::SSLeay/OpenSSL it will throw an error.

=item SSL\_alpn\_protocols

If used on the server side it specifies list of protocols supported by the SSL server as an array ref, e.g. ['http/2.0', 'spdy/3.1','http/1.1'].

On the client side it specifies the protocols advertised by the client for ALPN as an array ref.

See also method C<alpn\_selected>.

Application-Layer Protocol Negotiation (ALPN) is available with Net::SSLeay 1.56+ and openssl-1.0.2+. More details about the extension are in RFC7301. To check support you might call C<< IO::Socket::SSL->can\_alpn() >>. If you use this option with an unsupported Net::SSLeay/OpenSSL it will throw an error.

Note that some client implementations may encounter problems if both NPN and ALPN are specified. Since ALPN is intended as a replacement for NPN, try



providing ALPN protocols then fall back to NPN if that fails.

```
=item SSL_ticket_keycb => [$sub,$data] | $sub
```

This is a callback used for stateless session reuse (Session Tickets, RFC 5077).

This callback will be called as C<< \$sub->(\$data,[\$key\_name]) >> where C<\$data> is the argument given to SSL\_ticket\_keycb (or undef) and C<\$key\_name> depends on the mode:

```
=over 8
```

```
=item encrypt ticket
```

If a ticket needs to be encrypted the callback will be called without C<\$key\_name>. In this case it should return C<(\$current\_key,\$current\_key\_name>) where C<\$current\_key> is the current key (32 byte random data) and C<\$current\_key\_name> the name associated with this key (exactly 16 byte). This C<\$current\_key\_name> will be incorporated into the ticket.

```
=item decrypt ticket
```

If a ticket needs to be decrypted the callback will be called with C<\$key\_name> as found in the ticket. It should return C<(\$key,\$current\_key\_name>) where C<\$key> is the key associated with the given C<\$key\_name> and C<\$current\_key\_name> the name associated with the currently active key. If C<\$current\_key\_name> is different from the given C<\$key\_name> the callback will be called again to re-encrypt the ticket with the currently active key.

If no key can be found which matches the given C<\$key\_name> then this function should return nothing (empty list).

This mechanism should be used to limit the life time for each key encrypting the ticket. Compromise of a ticket encryption key might lead to decryption of SSL sessions which used session tickets protected by this key.

```
=back
```

Example:

```
Net::SSLeay::RAND_bytes(my $oldkey,32);
Net::SSLeay::RAND_bytes(my $newkey,32);
my $oldkey_name = pack("a16",'oldsecret');
my $newkey_name = pack("a16",'newsecret');

my @keys = (
    [ $newkey_name, $newkey ], # current active key
    [ $oldkey_name, $oldkey ], # already expired
```

```

);

my $keycb = [ sub {
    my ($mykeys,$name) = @_ ;

    # return (current_key, current_key_name) if no name given
    return ($mykeys->[0][1],$mykeys->[0][0]) if ! $name;

    # return (matching_key, current_key_name) if we find a key matching
    # the given name
    for(my $i = 0; $i<@$mykeys; $i++) {
    next if $name ne $mykeys->[$i][0];
    return ($mykeys->[$i][1],$mykeys->[0][0]);
    }

    # no matching key found
    return;
},\@keys ];

my $srv = IO::Socket::SSL->new(..., SSL_ticket_keycb => $keycb);

```

=back

=item B<accept>

This behaves similar to the accept function of the underlying socket class, but additionally does the initial SSL handshake. But because the underlying socket class does return a blocking file handle even when accept is called on a non-blocking socket, the SSL handshake on the new file object will be done in a blocking way. Please see the section about non-blocking I/O for details. If you don't like this behavior you should do accept on the TCP socket and then upgrade it with C<start\_SSL> later.

=item B<connect(...)>

This behaves similar to the connect function but also does an SSL handshake. Because you cannot give SSL specific arguments to this function, you should better either use C<new> to create a connect SSL socket or C<start\_SSL> to upgrade an established TCP socket to SSL.

=item B<close(...)>

Contrary to a close for a simple INET socket a close in SSL also mandates a proper shutdown of the SSL part. This is done by sending a close notify message by both peers.

A naive implementation would thus wait until it receives the

close notify message from the peer - which conflicts with the commonly expected semantic that a close will not block. The default behavior is thus to only send a close notify but not wait for the close notify of the peer. If this is required C<SSL\_fast\_shutdown> need to be explicitly set to false.

There are also cases where a SSL shutdown should not be done at all. This is true for example when forking to let a child deal with the socket and closing the socket in the parent process. A naive explicit C<close> or an implicit close when destroying the socket in the parent would send a close notify to the peer which would make the SSL socket in the client process unusable. In this case an explicit C<close> with C<SSL\_no\_shutdown> set to true should be done in the parent process.

For more details and other arguments see C<stop\_SSL> which gets called from C<close> to shutdown the SSL state of the socket.

=item B<sysread( BUF, LEN, [ OFFSET ] )>

This function behaves from the outside the same as B<sysread> in other L<IO::Socket> objects, e.g. it returns at most LEN bytes of data.

But in reality it reads not only LEN bytes from the underlying socket, but at a single SSL frame. It then returns up to LEN bytes it decrypted from this SSL frame. If the frame contained more data than requested it will return only LEN data, buffer the rest and return it on further read calls.

This means, that it might be possible to read data, even if the underlying socket is not readable, so using poll or select might not be sufficient.

sysread will only return data from a single SSL frame, e.g. either the pending data from the already buffered frame or it will read a frame from the underlying socket and return the decrypted data. It will not return data spanning several SSL frames in a single call.

Also, calls to sysread might fail, because it must first finish an SSL handshake.

To understand these behaviors is essential, if you write applications which use event loops and/or non-blocking sockets. Please read the specific sections in this documentation.

=item B<syswrite( BUF, [ LEN, [ OFFSET ] ] )>

This functions behaves from the outside the same as B<syswrite> in other L<IO::Socket> objects, e.g. it will write at most LEN bytes to the socket, but there is no guarantee, that all LEN bytes are written. It will return the number of bytes written.

Because it basically just calls SSL\_write from OpenSSL syswrite will write at most a single SSL frame. This means, that no more than 16.384 bytes, which is the maximum size of an SSL frame, will be written at once.

For non-blocking sockets SSL specific behavior applies.

Please read the specific section in this documentation.

=item B<peek( BUF, LEN, [ OFFSET ])>

This function has exactly the same syntax as B<sysread>, and performs nearly the same task but will not advance the read position so that successive calls to peek() with the same arguments will return the same results. This function requires OpenSSL 0.9.6a or later to work.

=item B<pending()>

This function gives you the number of bytes available without reading from the underlying socket object. This function is essential if you work with event loops, please see the section about polling SSL sockets.

=item B<get\_fingerprint([algo,certificate,pubkey])>

This methods returns the fingerprint of the given certificate in the form C<algo\$digest\_hex>, where C<algo> is the used algorithm, default 'sha256'. If no certificate is given the peer certificate of the connection is used. If C<pubkey> is true it will not return the fingerprint of the certificate but instead the fingerprint of the pubkey inside the certificate as C<algo\$pub\$digest\_hex>.

=item B<get\_fingerprint\_bin([algo,certificate,pubkey])>

This methods returns the binary fingerprint of the given certificate by using the algorithm C<algo>, default 'sha256'. If no certificate is given the peer certificate of the connection is used. If C<pubkey> is true it will not return the fingerprint of the certificate but instead the fingerprint of the pubkey inside the certificate.

=item B<get\_cipher()>

Returns the string form of the cipher that the IO::Socket::SSL object is using.

=item B<get\_sslversion()>

Returns the string representation of the SSL version of an established connection.

=item B<get\_sslversion\_int()>

Returns the integer representation of the SSL version of an established connection.

=item B<get\_session\_reused()>

This returns true if the session got reused and false otherwise. Note that with a reused session no certificates are send within the handshake and no ciphers are offered and thus functions which rely on this might not work.

=item B<dump\_peer\_certificate()>

Returns a parsable string with select fields from the peer SSL certificate. This method directly returns the result of the dump\_peer\_certificate() method of Net::SSLay.

=item B<peer\_certificate(\$field;[\$refresh])>

If a peer certificate exists, this function can retrieve values from it. If no field is given the internal representation of certificate from Net::SSLay is returned. If refresh is true it will not used a cached version, but check again in case the certificate of the connection has changed due to renegotiation.

The following fields can be queried:

=over 8

=item authority (alias issuer)

The certificate authority which signed the certificate.

=item owner (alias subject)

The owner of the certificate.

=item commonName (alias cn) - only for Net::SSLay version >=1.30

The common name, usually the server name for SSL certificates.

=item subjectAltNames - only for Net::SSLay version >=1.33

Alternative names for the subject, usually different names for the same server, like example.org, example.com, \*.example.com.

It returns a list of (typ,value) with typ GEN\_DNS, GEN\_IPADD etc (these constants are exported from IO::Socket::SSL). See Net::SSLay::X509\_get\_subjectAltNames.

=back

=item B<sock\_certificate(\$field)>

This is similar to C<peer\_certificate> but will return the sites own certificate. The same arguments for B<\$field> can be used. If no B<\$field> is given the certificate handle from the underlying OpenSSL will be returned. This handle will only be valid as long as the SSL connection exists and if used afterwards it might result in strange crashes of the application.

=item B<peer\_certificates>

This returns all the certificates send by the peer, e.g. first the peers own certificate and then the rest of the chain. You might use B<CERT\_asHash> from L<IO::Socket::SSL::Utils> to inspect each of the certificates.

This function depends on a version of Net::SSLey >= 1.58 .

=item B<get\_servername>

This gives the name requested by the client if Server Name Indication (SNI) was used.

=item B<verify\_hostname(\$hostname,\$scheme,\$publicsuffix)>

This verifies the given hostname against the peer certificate using the given scheme. Hostname is usually what you specify within the PeerAddr. See the C<SSL\_verifycn\_publicsuffix> parameter for an explanation of suffix checking and for the possible values.

Verification of hostname against a certificate is different between various applications and RFCs. Some scheme allow wildcards for hostnames, some only in subjectAltNames, and even their different wildcard schemes are possible. RFC 6125 provides a good overview.

To ease the verification the following schemes are predefined (both protocol name and rfcXXXX name can be used):

=over 8

=item rfc2818, xmpp (rfc3920), ftp (rfc4217)

Extended wildcards in subjectAltNames and common name are possible, e.g. \*.example.org or even www\*.example.org. The common name will be only checked if no DNS names are given in subjectAltNames.

=item http (alias www)

While name checking is defined in rfc2818 the current browsers usually accept also an IP address (w/o wildcards) within the common name as long as no subjectAltNames are defined. Thus this is rfc2818 extended with this feature.

=item smtp (rfc2595), imap, pop3, acap (rfc4642), netconf (rfc5538), syslog (rfc5425), snmp (rfc5953)

Simple wildcards in subjectAltNames are possible, e.g. \*.example.org matches www.example.org but not lala.www.example.org. If nothing from subjectAltNames match it checks against the common name, where wildcards are also allowed to match the full leftmost label.

=item ldap (rfc4513)

Simple wildcards are allowed in subjectAltNames, but not in common name. Common name will be checked even if subjectAltNames exist.

=item sip (rfc5922)

No wildcards are allowed and common name is checked even if subjectAltNames exist.

=item gist (rfc5971)

Simple wildcards are allowed in subjectAltNames and common name, but common name will only be checked if there are no DNS names in subjectAltNames.

=item default

This is a superset of all the rules and is automatically used if no scheme is given but a hostname (instead of IP) is known. Extended wildcards are allowed in subjectAltNames and common name and common name is checked always.

=item none

No verification will be done. Actually it does not make any sense to call verify\_hostname in this case.

=back

The scheme can be given either by specifying the name for one of the above predefined schemes, or by using a hash which can have the following keys and values:

=over 8

=item check\_cn: 0|'always'|'when\_only'

Determines if the common name gets checked. If 'always' it will always be checked (like in ldap), if 'when\_only' it will only be checked if no names are given in subjectAltNames (like in http), for any other values the common name

will not be checked.

=item wildcards\_in\_alt: 0|'full\_label'|'anywhere'

Determines if and where wildcards in subjectAltNames are possible. If 'full\_label' only cases like \*.example.org will be possible (like in ldap), for 'anywhere' www\*.example.org is possible too (like http), dangerous things like but www\*.org or even '\*' will not be allowed.

For compatibility with older versions 'leftmost' can be given instead of 'full\_label'.

=item wildcards\_in\_cn: 0|'full\_label'|'anywhere'

Similar to wildcards\_in\_alt, but checks the common name. There is no predefined scheme which allows wildcards in common names.

=item ip\_in\_cn: 0|1|4|6

Determines if an IP address is allowed in the common name (no wildcards are allowed). If set to 4 or 6 it only allows IPv4 or IPv6 addresses, any other true value allows both.

=item callback: \&coderef

If you give a subroutine for verification it will be called with the arguments (\$hostname,\$commonName,@subjectAltNames), where hostname is the name given for verification, commonName is the result from peer\_certificate('cn') and subjectAltNames is the result from peer\_certificate('subjectAltNames').

All other arguments for the verification scheme will be ignored in this case.

=back

=item B<next\_proto\_negotiated(>

This method returns the name of negotiated protocol - e.g. 'http/1.1'. It works for both client and server side of SSL connection.

NPN support is available with Net::SSLeay 1.46+ and openssl-1.0.1+.

To check support you might call C<< IO::Socket::SSL->can\_npn() >>.

=item B<alpn\_selected(>

Returns the protocol negotiated via ALPN as a string, e.g. 'http/1.1', 'http/2.0' or 'spdy/3.1'.

ALPN support is available with Net::SSLeay 1.56+ and openssl-1.0.2+.

To check support, use C<< IO::Socket::SSL->can\_alpn() >>.



=item B<errstr()>

Returns the last error (in string form) that occurred. If you do not have a real object to perform this method on, call `IO::Socket::SSL::errstr()` instead.

For read and write errors on non-blocking sockets, this method may include the string `C<SSL wants a read first!>` or `C<SSL wants a write first!>` meaning that the other side is expecting to read from or write to the socket and wants to be satisfied before you get to do anything. But with version 0.98 you are better comparing the global exported variable `$SSL_ERROR` against the exported symbols `SSL_WANT_READ` and `SSL_WANT_WRITE`.

=item B<opened()>

This returns false if the socket could not be opened, 1 if the socket could be opened and the SSL handshake was successful done and -1 if the underlying `IO::Handle` is open, but the SSL handshake failed.

=item B<< IO::Socket::SSL->start\_SSL(\$socket, ... ) >>

This will convert a glob reference or a socket that you provide to an `IO::Socket::SSL` object. You may also pass parameters to specify context or connection options as with a call to `new()`. If you are using this function on an `accept()`ed socket, you must set the parameter "SSL\_server" to 1, i.e. `IO::Socket::SSL->start_SSL($socket, SSL_server => 1)`. If you have a class that inherits from `IO::Socket::SSL` and you want the `$socket` to be blessed into your own class instead, use `MyClass->start_SSL($socket)` to achieve the desired effect.

Note that if `start_SSL()` fails in SSL negotiation, `$socket` will remain blessed in its original class. For non-blocking sockets you better just upgrade the socket to `IO::Socket::SSL` and call `accept_SSL` or `connect_SSL` and the upgraded object. To just upgrade the socket set `B<SSL_startHandshake>` explicitly to 0. If you call `start_SSL` w/o this parameter it will revert to blocking behavior for `accept_SSL` and `connect_SSL`.

If given the parameter "Timeout" it will stop if after the timeout no SSL connection was established. This parameter is only used for blocking sockets, if it is not given the default Timeout from the underlying `IO::Socket` will be used.

=item B<stop\_SSL(...)>

This is the opposite of `start_SSL()`, `connect_SSL()` and `accept_SSL()`, e.g. it will shutdown the SSL connection and return to the class before `start_SSL()`. It gets the same arguments as `close()`, in fact `close()` calls `stop_SSL()` (but without downgrading the class).

Will return true if it succeeded and undef if failed. This might be the case for non-blocking sockets. In this case \$! is set to EWOULDBLOCK and the ssl error to SSL\_WANT\_READ or SSL\_WANT\_WRITE. In this case the call should be retried again with the same arguments once the socket is ready.

For calling from C<stop\_SSL> C<SSL\_fast\_shutdown> default to false, e.g. it waits for the close\_notify of the peer. This is necessary in case you want to downgrade the socket and continue to use it as a plain socket.

After stop\_SSL the socket can again be used to exchange plain data.

=item B<connect\_SSL>, B<accept\_SSL>

These functions should be used to do the relevant handshake, if the socket got created with C<new> or upgraded with C<start\_SSL> and C<SSL\_startHandshake> was set to false.

They will return undef until the handshake succeeded or an error got thrown.

As long as the function returns undef and \$! is set to EWOULDBLOCK one could retry the call after the socket got readable (SSL\_WANT\_READ) or writeable (SSL\_WANT\_WRITE).

=item B<ocsp\_resolver>

This will create an OCSP resolver object, which can be used to create OCSP requests for the certificates of the SSL connection. Which certificates are verified depends on the setting of C<SSL\_ocsp\_mode>: by default only the leaf certificate will be checked, but with SSL\_OCSP\_FULL\_CHAIN all chain certificates will be checked.

Because to create an OCSP request the certificate and its issuer certificate need to be known it is not possible to check certificates when the trust chain is incomplete or if the certificate is self-signed.

The OCSP resolver gets created by calling C<< \$ssl->ocsp\_resolver >> and provides the following methods:

=over 8

=item hard\_error

This returns the hard error when checking the OCSP response.

Hard errors are certificate revocations. With the C<SSL\_ocsp\_mode> of SSL\_OCSP\_FAIL\_HARD any soft error (e.g. failures to get signed information about the certificates) will be considered a hard error too.

The OCSP resolving will stop on the first hard error.

The method will return undef as long as no hard errors occurred and still requests to be resolved. If all requests got resolved and no hard errors occurred the method will return C<">.

=item soft\_error

This returns the soft error(s) which occurred when asking the OCSP responders.

=item requests

This will return a hash consisting of C<(url,request)>-tuples, e.g. which contain the OCSP request string and the URL where it should be sent too. The usual way to send such a request is as HTTP POST request with a content-type of C<application/ocsp-request> or as a GET request with the base64 and url-encoded request is added to the path of the URL.

After you've handled all these requests and added the response with C<add\_response> you should better call this method again to make sure, that no more requests are outstanding. IO::Socket::SSL will combine multiple OCSP requests for the same server inside a single request, but some server don't give a response to all these requests, so that one has to ask again with the remaining requests.

=item add\_response(\$uri,\$response)

This method takes the HTTP body of the response which got received when sending the OCSP request to C<\$uri>. If no response was received or an error occurred one should either retry or consider C<\$response> as empty which will trigger a soft error.

The method returns the current value of C<hard\_error>, e.g. a defined value when no more requests need to be done.

=item resolve\_blocking(%args)

This combines C<requests> and C<add\_response> which L<HTTP::Tiny> to do all necessary requests in a blocking way. C<%args> will be given to L<HTTP::Tiny> so that you can put proxy settings etc here. L<HTTP::Tiny> will be called with C<verify\_SSL> of false, because the OCSP responses have their own signatures so no extra SSL verification is needed.

If you don't want to use blocking requests you need to roll your own user agent with C<requests> and C<add\_response>.

=back

=item B<< IO::Socket::SSL->new\_from\_fd(\$fd, [mode], %sslargs) >>

This will convert a socket identified via a file descriptor into an SSL socket. Note that the argument list does not include a "MODE" argument; if you supply one, it will be thoughtfully ignored (for compatibility with IO::Socket::INET). Instead, a mode of '+<' is assumed, and the file descriptor passed must be able to handle such I/O because the initial SSL handshake requires bidirectional communication.

Internally the given \$fd will be upgraded to a socket object using the C<new\_from\_fd> method of the super class (L<IO::Socket::INET> or similar) and then C<start\_SSL> will be called using the given C<%sslargs>.

If C<\$fd> is already an IO::Socket object you should better call C<start\_SSL> directly.

```
=item B<IO::Socket::SSL::default_ca([ path|dir| SSL_ca_file => ..., SSL_ca_path => ... ])>
```

Determines or sets the default CA path.

If existing path or dir or a hash is given it will set the default CA path to this value and never try to detect it automatically.

If C<undef> is given it will forget any stored defaults and continue with detection of system defaults.

If no arguments are given it will start detection of system defaults, unless it has already stored user-set or previously detected values.

The detection of system defaults works similar to OpenSSL, e.g. it will check the directory specified in environment variable SSL\_CERT\_DIR or the path OPENSSLDIR/certs (SSLCERTS: on VMS) and the file specified in environment variable SSL\_CERT\_FILE or the path OPENSSLDIR/cert.pem (SSLCERTS:cert.pem on VMS). Contrary to OpenSSL it will check if the SSL\_ca\_path contains PEM files with the hash as file name and if the SSL\_ca\_file looks like PEM.

If no usable system default can be found it will try to load and use L<Mozilla::CA> and if not available give up detection.

The result of the detection will be saved to speed up future calls.

The function returns the saved default CA as hash with SSL\_ca\_file and SSL\_ca\_path.

```
=item B<IO::Socket::SSL::set_default_context(...)>
```

You may use this to make IO::Socket::SSL automatically re-use a given context (unless specifically overridden in a call to new()).

It accepts one argument, which should be either an IO::Socket::SSL object or an IO::Socket::SSL::SSL\_Context object.

See the SSL\_reuse\_ctx option of new() for more details.

Note that this sets the default context globally, so use with caution (esp. in mod\_perl scripts).

```
=item B<IO::Socket::SSL::set_default_session_cache(...)>
```

You may use this to make IO::Socket::SSL automatically re-use a given session cache (unless specifically overridden in a call to new()).

It accepts one argument, which should be an IO::Socket::SSL::Session\_Cache object or similar (e.g. something which implements get\_session, add\_session and del\_session like IO::Socket::SSL::Session\_Cache does).

See the SSL\_session\_cache option of new() for more details.

Note that this sets the default cache globally, so use with caution.

=item B<IO::Socket::SSL::set\_defaults(%args)>

With this function one can set defaults for all SSL\_\* parameter used for creation of the context, like the SSL\_verify\* parameter. Any SSL\_\* parameter can be given or the following short versions:

=over 8

=item mode - SSL\_verify\_mode

=item callback - SSL\_verify\_callback

=item scheme - SSL\_verifycn\_scheme

=item name - SSL\_verifycn\_name

=back

=item B<IO::Socket::SSL::set\_client\_defaults(%args)>

Similar to C<set\_defaults>, but only sets the defaults for client mode.

=item B<IO::Socket::SSL::set\_server\_defaults(%args)>

Similar to C<set\_defaults>, but only sets the defaults for server mode.

=item B<IO::Socket::SSL::set\_args\_filter\_hack(\&code|'use\_defaults')>

Sometimes one has to use code which uses unwanted or invalid arguments for SSL, typically disabling SSL verification or setting wrong ciphers or SSL versions.

With this hack it is possible to override these settings and restore sanity.

Example:

```
IO::Socket::SSL::set_args_filter_hack( sub {
my ($is_server,$args) = @_;
if ( ! $is_server ) {
    # client settings - enable verification with default CA
    # and fallback hostname verification etc
    delete @{$args}{qw(
SSL_verify_mode
```

```

SSL_ca_file
SSL_ca_path
SSL_verifycn_scheme
SSL_version
    });
    # and add some fingerprints for known certs which are signed by
    # unknown CAs or are self-signed
    $args->{SSL_fingerprint} = ...
}
});

```

With the short setting `C<set_args_filter_hack('use_defaults')>` it will prefer the default settings in all cases. These default settings can be modified with `C<set_defaults>`, `C<set_client_defaults>` and `C<set_server_defaults>`.

=back

The following methods are unsupported (not to mention futile!) and `IO::Socket::SSL` will emit a large CROAK() if you are silly enough to use them:

=over 4

=item truncate

=item stat

=item ungetc

=item setbuf

=item setvbuf

=item fdopen

=item send/recv

Note that `send()` and `recv()` cannot be reliably trapped by a tied filehandle (such as that used by `IO::Socket::SSL`) and so may send unencrypted data over the socket. Object-oriented calls to these functions will fail, telling you to use the `print/printf/syswrite` and `read/sysread` families instead.

=back

=head1 DEPRECATIONS

The following functions are deprecated and are only retained for compatibility:

=over 2

=item context\_init()

use the SSL\_reuse\_ctx option if you want to re-use a context

=item socketToSSL() and socket\_to\_SSL()

use IO::Socket::SSL->start\_SSL() instead

=item kill\_socket()

use close() instead

=item get\_peer\_certificate()

use the peer\_certificate() function instead.

Used to return X509\_Certificate with methods subject\_name and issuer\_name.

Now simply returns \$self which has these methods (although deprecated).

=item issuer\_name()

use peer\_certificate( 'issuer' ) instead

=item subject\_name()

use peer\_certificate( 'subject' ) instead

=back

=head1 EXAMPLES

See the 'example' directory, the tests in 't' and also the tools in 'util'.

=head1 BUGS

If you use IO::Socket::SSL together with threads you should load it (e.g. use or require) inside the main thread before creating any other threads which use it. This way it is much faster because it will be initialized only once. Also there are reports that it might crash the other way.

Creating an IO::Socket::SSL object in one thread and closing it in another thread will not work.

IO::Socket::SSL does not work together with Storable::fd\_retrieve/fd\_store. See BUGS file for more information and how to work around the problem.

Non-blocking and timeouts (which are based on non-blocking) are not supported on Win32, because the underlying IO::Socket::INET does not support non-blocking on this platform.

If you have a server and it looks like you have a memory leak you might check the size of your session cache. Default for Net::SSLey seems to be 20480, see the example for SSL\_create\_ctx\_callback for how to limit it.

TLS 1.3 support regarding session reuse is incomplete.

=head1 SEE ALSO

IO::Socket::INET, IO::Socket::INET6, IO::Socket::IP, Net::SSLey.

=head1 THANKS

Many thanks to all who added patches or reported bugs or helped IO::Socket::SSL another way. Please keep reporting bugs and help with patches, even if they just fix the documentation.

Special thanks to the team of Net::SSLey for the good cooperation.

=head1 AUTHORS

Steffen Ullrich, <sullr at cpan.org> is the current maintainer.

Peter Behroozi, <behrooz at fas.harvard.edu> (Note the lack of an "i" at the end of "behrooz")

Marko Asplund, <marko.asplund at kronodoc.fi>, was the original author of IO::Socket::SSL.

Patches incorporated from various people, see file Changes.

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expand-archive-pGhmkBIu/IO-Socket-SSL-2.066/lib/IO/Socket/SSL.pod

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4.module\_el8.6.0+2811+fe6c84b0.src.rpm-cosi-expand-archive-0X12HeuT/perl-IO-Socket-SSL.spec

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file\_io/unix/mktemp.c, strings/apr\_strings.c:

```
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From network\_io/unix/inet\_ntop.c, network\_io/unix/inet\_pton.c:

```
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From dso/aix/dso.c:

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From strings/apr\_strnatcmp.c, include/apr\_strings.h:

strnatcmp.c -- Perform 'natural order' comparisons of strings in C.  
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```
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#  
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#  
  
## <summary>Polaris dbgd Policy Rules.</summary>  
  
#####  
## <summary>  
##   Write dbgd /var/run socket file  
## </summary>  
## <param name="domain">  
##   <summary>  
##     Domain allowed access.  
##   </summary>  
## </param>  
#  
interface(`polaris_dbgd_var_sock_write`,`
```

```
gen_require(`
    type polaris_dbgd_t;
    type polaris_dbgd_var_run_t;
    type var_run_t;
`)
write_sock_files_pattern($1, var_run_t, polaris_dbgd_var_run_t)
allow $1 polaris_dbgd_t:unix_stream_socket { connectto };
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdbgdbgd.if

No license file was found, but licenses were detected in source scan.

```
#
# July 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
## <summary>Polaris cpp_stats Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppstats.if

No license file was found, but licenses were detected in source scan.

```
#
# November 2020, Christine Hwang
#
# Copyright (c) 2017-2021 by Cisco Systems, Inc.
# All rights reserved
#
```

```
# Map GNSS TTY to correct device context
```

```
/dev/ttyS1          -c gen_context(system_u:object_r:polaris_cabo_gnss_device_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscabognss.fc

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polarisnginx, 1.0);
```

```

gen_require(
    type polaris_nginx_t;
)

polaris_btrace_data_manage(polaris_nginx_t)
polaris_chasfs_manage(polaris_nginx_t)
polaris_tdlresolve_read(polaris_nginx_t)
polaris_tdlldb_list_dirs(polaris_nginx_t)
polaris_cpld_read(polaris_nginx_t)
polaris_lua_read(polaris_nginx_t)
polaris_flashlib_read(polaris_nginx_t)
polaris_crft_data_manage(polaris_nginx_t)

polaris_ripc_sman_ui_serv_connect(polaris_nginx_t)

polaris_lua_read(polaris_nginx_t)
polaris_disk_harddisk_read_lnk(polaris_nginx_t)

allow polaris_nginx_t self:tcp_socket { bind create listen accept setopt getopt shutdown};
allow polaris_nginx_t self:capability2 block_suspend;
allow polaris_nginx_t self:capability { setgid setuid sys_resource };

polaris_lfts_dev_use(polaris_nginx_t)
logging_send_syslog_msg(polaris_nginx_t)

corenet_tcp_connect_http_port(polaris_nginx_t)
corenet_tcp_bind_generic_node(polaris_nginx_t)
corenet_tcp_bind_http_port(polaris_nginx_t)
corenet_tcp_connect_pkiserver_port(polaris_nginx_t)
# FIXME: add interface to allow bind to port 1025-65535
corenet_tcp_bind_all_ports(polaris_nginx_t)
#Allow the nginx to search/read the web servers config files
apache_read_config(polaris_nginx_t)
apache_search_config(polaris_nginx_t)
# allow read httpd_sys_content_t (/var/www/...)
apache_read_sys_content(polaris_nginx_t)

gen_require(
    type httpd_var_run_t;
    type syslogd_var_run_t;
)
setattr_dirs_pattern(polaris_nginx_t, httpd_var_run_t, httpd_var_run_t)
manage_dirs_pattern(polaris_nginx_t, httpd_var_run_t, httpd_var_run_t)
manage_files_pattern(polaris_nginx_t, httpd_var_run_t, httpd_var_run_t)
manage_sock_files_pattern(polaris_nginx_t, httpd_var_run_t, httpd_var_run_t)
files_pid_filetrans(polaris_nginx_t, httpd_var_run_t, { file sock_file dir unix_stream_socket })

```



```

polaris_socketat_nsfs_read(polaris_nginx_t)
# socketat does setsockopt SO_VRF
allow polaris_nginx_t self:capability net_admin;
auth_use_nsswitch(polaris_nginx_t)

allow polaris_nginx_t tmp_t:dir create_dir_perms;
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "ngx_access.log")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "ngx_error.log")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "nginx.pid")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "nginx.lock.accept")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "nginx.lock.cookie_tbl")
files_tmp_filetrans(polaris_nginx_t, httpd_log_t, file, "nginx.lock.login_count")
filetrans_pattern(polaris_nginx_t, syslogd_var_run_t, httpd_log_t, file, "openresty.log")
filetrans_pattern(polaris_nginx_t, syslogd_var_run_t, httpd_log_t, file, "ngxcsrf.log")
filetrans_pattern(polaris_nginx_t, syslogd_var_run_t, httpd_log_t, file, "ngxtest.log")
create_dirs_pattern(polaris_nginx_t, httpd_log_t, httpd_log_t)
manage_files_pattern(polaris_nginx_t, httpd_log_t, httpd_log_t)
apache_read_log(polaris_nginx_t)
apache_write_log(polaris_nginx_t)

polaris_restconf_tmp_use(polaris_nginx_t)
dev_read_sysfs(polaris_nginx_t)

# dev/zram0 needs fs_t:filesystem getattr
ifdef(`quake_platform',`
fs_getattr_xattr_fs(polaris_nginx_t)
')

type polaris_nginx_tmp_t;
files_tmp_file(polaris_nginx_tmp_t)
manage_files_pattern(polaris_nginx_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
manage_dirs_pattern(polaris_nginx_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, file, "nginx_aaa")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, file, "nginx_master")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, file, "nginx_session")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, file, "ciscosdwan.cfg")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "proxy_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "client_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "fastcgi_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "scgi_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "uwsgi_temp")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "pki")
files_tmp_filetrans(polaris_nginx_t, polaris_nginx_tmp_t, dir, "auth")

polaris_restconf_read(polaris_nginx_t)

#####
# webui_helper.sh/webui_helper_upgrade.sh

```

```
#####
```

```
polaris_process_domain_template(nginx_webui)  
polaris_process_domain_template(nginx_webui_install)
```

```
polaris_nginx_exec_domain(polaris_nginx_webui_t, polaris_nginx_webui_exec_t)  
polaris_nginx_exec_domain(polaris_nginx_webui_install_t, polaris_nginx_webui_install_exec_t)
```

```
corecmd_exec_bin(polaris_nginx_webui_t)  
corecmd_exec_bin(polaris_nginx_webui_install_t)
```

```
# allow read of /etc/passwd  
auth_use_nsswitch(polaris_nginx_webui_t)  
auth_use_nsswitch(polaris_nginx_webui_install_t)
```

```
#allow polaris_nginx_webui_t/polaris_nginx_webui_install_t access to nginx webui /tmp base folder  
# /tmp/nginx/webui_tmp  
manage_files_pattern(polaris_nginx_webui_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)  
manage_files_pattern(polaris_nginx_webui_install_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
```

```
#allow polaris_file_transfer_client_t to access nginx webui /tmp base folder  
# /tmp/nginx/webui_tmp. We also need to allow chvrf to use the FIFO in cases  
# where we use the VRF interface
```

```
gen_require(  
    type polaris_file_transfer_client_t;  
    type polaris_chvrf_t;  
)  
manage_files_pattern(polaris_file_transfer_client_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)  
manage_fifo_files_pattern(polaris_file_transfer_client_t, polaris_nginx_t, polaris_nginx_t)  
manage_fifo_files_pattern(polaris_chvrf_t, polaris_nginx_t, polaris_nginx_t)
```

```
#fts_client binary requires access to chassis, tdlresolve and cpld  
polaris_tdlresolve_read(polaris_file_transfer_client_t)  
polaris_chasfs_manage(polaris_file_transfer_client_t)  
polaris_cpld_read(polaris_file_transfer_client_t, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
```

```
gen_require(  
    type polaris_file_transfer_client_exec_t;  
)  
polaris_bexecute_domain(polaris_file_transfer_client_t, polaris_file_transfer_client_exec_t)
```

```
type polaris_fts_client_tmp_t;  
files_tmp_file(polaris_fts_client_tmp_t)  
polaris_fts_client_tmp_manage(polaris_file_transfer_client_t)
```

```
# on ultra /var/www directory created by systemd unit that runs /mount_packages.sh  
# under unconfined_service_t domain  
gen_require(  
    type polaris_unconfined_service_t;  
)
```

```

    type unconfined_service_t;
)
files_var_filetrans(unconfined_service_t, httpd_sys_content_t, dir, "www")

allow polaris_nginx_t self:capability dac_override;

#iox local mgr in webui connects to caf service on port 8098
corenet_tcp_connect_polaris_caf_api_port(polaris_nginx_t)

# IOx downloads the application package using network protocol (e.g http)
gen_require(
    type fifo_var_run_t;
)
allow polaris_file_transfer_client_t fifo_var_run_t:fifo_file read;

# webui connects to dbm backend service on port 9090
corenet_tcp_connect_polaris_wnc_mgrd_port(polaris_nginx_t)

# webui connects to poljvm service on port 9093
corenet_tcp_connect_polaris_poljvm_websocket_port(polaris_nginx_t)

# remote docker workflow
corenet_tcp_connect_us_cli_port(polaris_nginx_t)

# webui sw mgmt app which does install and smu, invokes webui helper shell
# scripts which inturn invoke installer scripts. Hence need to provide transition
# rule to polaris_install_engine_t domain
polaris_install_engine_domtrans(polaris_nginx_webui_install_t)
polaris_install_show_domtrans(polaris_nginx_webui_install_t)

# Allow pipe operations during install command invocation
polaris_nginx_manage_fifo_files(polaris_bexecute_t)
polaris_nginx_manage_fifo_files(polaris_code_verify_t)
polaris_nginx_manage_fifo_files(polaris_install_engine_t)
polaris_nginx_manage_fifo_files(polaris_install_show_t)
polaris_nginx_manage_fifo_files(rsync_t)

# During install-add via WebUI, code_sign_verify generates a file:map denial
# "/usr/bin/code_sign_verify package
# /tmp/patch/smus/10_vwlc_apsp_ap3g3_17.6.bin/mount/C9800-CL-mono-patch.2021-01-11_11.31_radonep"
require {
    type etc_runtime_t;
}
allow polaris_code_verify_t etc_runtime_t:file map;

# Provide sys_resource capability to webui install scripts for sys_pipe calls.
allow polaris_nginx_webui_install_t self:capability sys_resource;

```

```

# nginx/webui File-manager app provides bootflash file-mgmt facility.
# as part of this it needs RW access to bootflash.
# TODO: Bug CSCvp83328 to isolate the access to another utility, which
# can have its own domain and nginx_t can transition to it.
polaris_bootflash_manage(polaris_nginx_t)

# allow nginx to manage core files
polaris_core_file_manage(polaris_nginx_t)

# luajit module for nginx triggers execmem denial due to mprotect call.
# TODO: cdets CSCvp70095 is used to track this vulnerability in
# current nginx component.
allow polaris_nginx_t self:process execmem;

# FIXME : allow shell/binary execution
# Elevated privelage needs to be addressed
# Tracked by Bugid : CSCvp93448
corecmd_exec_bin(polaris_nginx_t)
corecmd_exec_shell(polaris_nginx_t)

#FIXME
# Need to re-evaluate these privileges
#Tracked by Bugid : CSCvp92908, CSCvt81963(fts_client)
polaris_file_transfer_client_domtrans(polaris_nginx_webui_install_t)
# nginx need access btrace fifo file:
polaris_use_btrace_fifo(polaris_nginx_t)
gen_require(
    type proc_t;
)
manage_files_pattern(polaris_nginx_t, polaris_nginx_t,polaris_nginx_t)
allow polaris_nginx_t proc_t.filesystem { associate };
# nginx needs access to /dev/stdout which is owned by pman
allow polaris_nginx_t polaris_pman_t:fifo_file open;

#####
# aireos_translate_helper.sh
# Invokes a python library that converts aireos config to ewlc config.
#####
type polaris_aireos_translator_scripts_t;
files_type(polaris_aireos_translator_scripts_t)
polaris_process_domain_template(nginx_webui_aireos_translator)
polaris_nginx_exec_domain(polaris_nginx_webui_aireos_translator_t,
polaris_nginx_webui_aireos_translator_exec_t)
allow polaris_nginx_t polaris_aireos_translator_scripts_t.dir { getattr open read search };
allow polaris_nginx_t polaris_aireos_translator_scripts_t.file { getattr ioctl open read };
allow polaris_nginx_t polaris_nginx_webui_aireos_translator_exec_t.file ioctl;
allow polaris_nginx_t self:process setfscreate;

```

files\_list\_var(polaris\_nginx\_t)

```
#####  
# ra_trace_webui_helper.sh  
# Invokes mcp_trace_filter.sh to perform radio active tracing.  
#####  
polaris_process_domain_template(nginx_webui_trace_filter)  
polaris_nginx_exec_domain(polaris_nginx_webui_trace_filter_t, polaris_nginx_webui_trace_filter_exec_t)  
corecmd_exec_bin(polaris_nginx_webui_trace_filter_t)  
manage_files_pattern(polaris_nginx_webui_trace_filter_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)  
manage_dirs_pattern(polaris_nginx_webui_trace_filter_t, polaris_nginx_tmp_t, polaris_nginx_tmp_t)  
auth_use_nsswitch(polaris_nginx_webui_trace_filter_t)  
polaris_trace_filter_domtrans(polaris_nginx_webui_trace_filter_t)  
polaris_nginx_manage_fifo_files(polaris_trace_filter_t)
```

```
#####  
# nginx_helper.sh  
#nginx show command helper run by pman invoking curl  
#####  
polaris_utility_domain_template(nginx_helper)  
polaris_pman_entry(polaris_nginx_helper_t, polaris_nginx_helper_exec_t)
```

```
#allow execution of nginx_helper.sh  
corecmd_exec_bin(polaris_nginx_helper_t)
```

```
#allow read of /etc/passwd  
auth_use_nsswitch(polaris_nginx_helper_t)
```

```
#allow access to the tmp fifo file  
polaris_use_btrace_fifo(polaris_nginx_helper_t)
```

```
# nginx_helper.sh reads from chasfs  
polaris_chasfs_manage(polaris_nginx_helper_t)
```

```
gen_require(  
    type polaris_curl_t;  
)
```

```
# allow execution of /usr/bin/curl on the pkiserver port  
polaris_curl_domtrans(polaris_nginx_helper_t)  
corenet_tcp_connect_pkiserver_port(polaris_curl_t)
```

```
#allow curl to write into chasfs  
polaris_chasfs_manage(polaris_curl_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnginx.te

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```
#
# July 2017, Victor Kamensky
#
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#

## <summary>Polaris cpp_cdm Policy Rules.</summary>

#####
## <summary>
##   Allow access to semaphore with type polaris_cpp_cdm_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_cdm_sem_use`,`
    gen_require(`
        type polaris_cpp_cdm_t;
    `)
    allow $1 polaris_cpp_cdm_t:sem rw_sem_perms;
)`

#####
## <summary>
##   Allow access to shared memory with type polaris_cpp_cdm_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_cdm_shm_use`,`
    gen_require(`
        type polaris_cpp_cdm_t;
    `)
    allow $1 polaris_cpp_cdm_t:shm rw_shm_perms;
)`

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppcdm.if
```

No license file was found, but licenses were detected in source scan.

```
#
# April 2017, Victor Kamensky
#
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# All rights reserved
#

## <summary>Polaris dmi_ndbmand Policy Rules.</summary>

#####
## <summary>
##   Work with NDBLOAD_LOCK_PATH.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ndbload_lock_use`,`
    gen_require(`
        type polaris_dmi_ndbutil_lock_t;
        type tmp_t;
    `)
    manage_files_pattern($1, tmp_t, polaris_dmi_ndbutil_lock_t)
    files_tmp_filetrans($1, polaris_dmi_ndbutil_lock_t, file, ".l.ndbutil-load")
    files_tmp_filetrans($1, polaris_dmi_ndbutil_lock_t, file, ".l.ndbutil-use")
)

#####
## <summary>
##   Manage polaris_ndbmand_ndbutil_t files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ndbmand_ndbutil_manage`,`
    gen_require(`
        type polaris_ndbmand_ndbutil_t;
        type polaris_confd_ndbutil_lock_t;
    `)
    manage_files_pattern($1, polaris_confd_ndbutil_lock_t, polaris_ndbmand_ndbutil_t)
)
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmindbmand.if

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris sif_mgr Policy Rules.</summary>

#####
## <summary>
##   Allow the specified domain able to read sif_mgr /tmp files.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     File name in /tmp that the sif_mgr domain creates and other domains
##     access.
##   </summary>
## </param>
#
interface(`polaris_sif_mgr_tmp_files_read`,`
    gen_require(`
        type polaris_sif_mgr_tmp_t;
    `)

    read_files_pattern($1, polaris_sif_mgr_tmp_t, polaris_sif_mgr_tmp_t)
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissifmgr.if

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```



```

## <summary>Polaris Chasfs Policy Rules.</summary>

#####
# Chasfs policy
#####

#####
## <summary>
##   Manage chasfs files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_chasfs_manage`,`
gen_require(`
type polaris_chasfs_t;
`)
    manage_dirs_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
    manage_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
    manage_lnk_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
    manage_fifo_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
    manage_sock_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)

    allow $1 polaris_chasfs_t:{file dir} watch;

    # chasfs contains a lot of weird permission files
    allow $1 self:capability dac_read_search;
`)

#####
## <summary>
##   Read chasfs files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_chasfs_read`,`
gen_require(`
type polaris_chasfs_t;

```

```

)
list_dirs_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
read_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
read_lnk_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
read_fifo_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)
read_sock_files_pattern($1, polaris_chasfs_t, polaris_chasfs_t)

allow $1 polaris_chasfs_t:{file dir} watch;

# chasfs contains a lot of weird permission files
allow $1 self:capability dac_read_search;
)

#####
## <summary>
##   Manage chasync file(user_input_custom.xml)
## </summary>
## <param name="domain">
##   <summary>
##     getattr allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_chasync_files_manage`,`
  gen_require(`
    type polaris_chasync_files_t;
  `)
  manage_files_pattern($1, polaris_chasync_files_t, polaris_chasync_files_t)
)

#####
## <summary>
##   Watch read chasfs directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_chasfs_watch_read`,`
  gen_require(`
    type polaris_chasfs_t;
  `)
  allow $1 polaris_chasfs_t:dir watch_reads;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarischasfs.if

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#

# March 2017, Victor Kamensky

#

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#

/dev/dev\_lfts -c gen\_context(system\_u:object\_r:polaris\_lfts\_device\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislfts.fc

No license file was found, but licenses were detected in source scan.

#

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#

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#

## <summary>Polaris GR Manager Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgrmgr.if

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#

policy\_module(polarisngwc, 1.0);

# chdrvmmmap device (MMAP Driver for ASIC Memory mapping)

type polaris\_chdrvmmmap\_device\_t;

dev\_node(polaris\_chdrvmmmap\_device\_t)

# gettysburg\_fpga device (/dev/gettysburg\_dev1)

type polaris\_gettysburg\_fpga\_device\_t;

dev\_node(polaris\_gettysburg\_fpga\_device\_t)

```

# dplr io memory mapping driver /dev/cisco/dplriomem
type polaris_dplr_iomem_mmapdrv_device_t;
dev_node(polaris_dplr_iomem_mmapdrv_device_t)

# /dev/shm/ngwc_shm shared memory
type polaris_ngwc_shm_t;
files_type(polaris_ngwc_shm_t)

# /dev/shm/ngwc_scc_shm shared memory
type polaris_ngwc_scc_shm_t;
files_type(polaris_ngwc_scc_shm_t)

# /dev/shm/iomd_to_fed_ptp_offload shared memory
type polaris_ngwc_itfpo_t;
files_type(polaris_ngwc_itfpo_t)

# /dev/shm/sdm shared memory
type polaris_sdm_shm_t;
files_type(polaris_sdm_shm_t)

# /dev/shm/sem.i2c_sem00N quake sempaphor
type polaris_quake_i2c_t;
files_type(polaris_quake_i2c_t)

#FPGA io memory mapping driver /dev/cisco/fpgaiomem
type polaris_fpga_iomem_mmapfpga_device_t;
dev_node(polaris_fpga_iomem_mmapfpga_device_t)

# Mapping permission for /dev/shm/<name>
#ifdef(^quake_platform',`
gen_require(`
    type systemd_tmpfiles_t;
    `)
mmap_files_pattern(systemd_tmpfiles_t, polaris_quake_i2c_t, polaris_quake_i2c_t)
`)

# In combined image we have several policies and we choose
# one to use in run-time, but file system is shared and
# labeled with different file_context files, so it is
# possible that we may have some labels that other policy
# does not understand for now just hard missing entries
#ifdef(^nyquist_platform',`
type polaris_cm_cc_exec_t;
files_type(polaris_cm_cc_exec_t)
type polaris_cm_fp_exec_t;
files_type(polaris_cm_fp_exec_t)
type polaris_flashcheck_exec_t;
files_type(polaris_flashcheck_exec_t)

```

```

type polaris_emd_exec_t;
files_type(polaris_emd_exec_t)
type polaris_ngwc_ishow_exec_t;
files_type(polaris_ngwc_ishow_exec_t)

# Adding here as this unmount command is specific to Nyquist platform.
# /bin/cat9k_ssd_auth_cmds.sh
polaris_utility_domain_template(ssd_unmount)
corecmd_exec_bin(polaris_ssd_unmount_t)
storage_getattr_fixed_disk_dev(polaris_ssd_unmount_t)
fstools_domtrans(polaris_ssd_unmount_t)
mount_domtrans(polaris_ssd_unmount_t)
polaris_use_btrace_fifo(polaris_ssd_unmount_t)

#allow to read /etc/passwd
auth_use_nsswitch(polaris_ssd_unmount_t)
polaris_chasfs_read(polaris_ssd_unmount_t)
polaris_cpld_read(polaris_ssd_unmount_t)

#Read /tmp/sw/boot files
polaris_boot_tmp_read(polaris_ssd_unmount_t)
# Allow read to btrace tmp files
polaris_btrace_tmppub_read(polaris_ssd_unmount_t)
# Allow getattr to tmpfs
fs_getattr_tmpfs(polaris_ssd_unmount_t)
# Allow read to ssd auth tmp files /tmp/ssd_blk_device created by udev
polaris_read_ssd_tmp_files(polaris_ssd_unmount_t)

# allow creation/access of temporary files created by bash such as
# /tmp/sh-thd-1499428203 etc
type polaris_ssd_unmount_tmp_t;
files_tmp_file(polaris_ssd_unmount_tmp_t)
files_tmp_filetrans(polaris_ssd_unmount_t, polaris_ssd_unmount_tmp_t, file)
manage_files_pattern(polaris_ssd_unmount_t, polaris_ssd_unmount_tmp_t, polaris_ssd_unmount_tmp_t)
allow polaris_ssd_unmount_t polaris_ssd_unmount_tmp_t:file { unlink };

#Allow nfs dir/file read
rpc_manage_nfs_state_data_dir(polaris_ssd_unmount_t)
rpc_manage_nfs_state_data(polaris_ssd_unmount_t)
#Allow read access to files on nfsd file system
fs_read_nfsd_files(polaris_ssd_unmount_t)
kernel_rw_rpc_sysctls(polaris_ssd_unmount_t)
fs_getattr_xattr_fs(polaris_ssd_unmount_t)

# allow create/sendto/connect operations for logger
allow polaris_ssd_unmount_t self:unix_dgram_socket sendto;
allow polaris_ssd_unmount_t self:unix_dgram_socket create_socket_perms;
logging_create_devlog_dev(polaris_ssd_unmount_t)

```

```

logging_send_syslog_msg(polaris_ssd_unmount_t)
polaris_persistent_getattr(polaris_ssd_unmount_t)
#allow dir:search getattr read for udev tmp files
#allow file:write open for udev tmp files
polaris_udev_tmp_manage(polaris_ssd_unmount_t)
gen_require(`
    type rsync_exec_t;
    type rsync_port_t;
`)
#allow tcp_socket:name_connect for rsync_port_t
#polaris_ssd_unmount_t has superset privileges of rsync, so its good
#to run rsync in unmount domain. This is not the case everywhere. Please use
#corenet_tcp_connect_rsync_port if rsync needs to be run in its own domain
allow polaris_ssd_unmount_t rsync_port_t:tcp_socket name_connect;
#allow file:get_attr exec read open map execute_no_trans for rsync_exec_t
allow polaris_ssd_unmount_t rsync_exec_t:file { execute execute_no_trans getattr map open read };
#allow dir:getattr for removable_t
polaris_getattr_removable(polaris_ssd_unmount_t)
`)
#ifdef(`passport_platform',`
type polaris_auto_upgrade_server_rp_exec_t;
files_type(polaris_auto_upgrade_server_rp_exec_t)
type polaris_bt_logger_exec_t;
files_type(polaris_bt_logger_exec_t)
type polaris_cmm_exec_t;
files_type(polaris_cmm_exec_t)
type polaris_ngwc_plfm_mgr_exec_t;
files_type(polaris_ngwc_plfm_mgr_exec_t)
type polaris_sif_mgr_exec_t;
files_type(polaris_sif_mgr_exec_t)
type polaris_torch_exec_t;
files_type(polaris_torch_exec_t)
type polaris_xcvr_test_exec_t;
files_type(polaris_xcvr_test_exec_t)
type polaris_faked_exec_t;
files_type(polaris_faked_exec_t)
type polaris_emd_exec_t;
files_type(polaris_emd_exec_t)
type polaris_ngwc_ishow_exec_t;
files_type(polaris_ngwc_ishow_exec_t)
type polaris_gr_mgr_exec_t;
files_type(polaris_gr_mgr_exec_t)
type polaris_ioxss_rp_exec_t;
files_type(polaris_ioxss_rp_exec_t)
`)
#ifdef(`starfleet_platform',`
type polaris_xcvr_test_exec_t;
files_type(polaris_xcvr_test_exec_t)

```

```
type polaris_auto_upgrade_server_rp_exec_t;
files_type(polaris_auto_upgrade_server_rp_exec_t)
type polaris_bt_logger_exec_t;
files_type(polaris_bt_logger_exec_t)
type polaris_cmm_exec_t;
files_type(polaris_cmm_exec_t)
type polaris_ngwc_plfm_mgr_exec_t;
files_type(polaris_ngwc_plfm_mgr_exec_t)
type polaris_sif_mgr_exec_t;
files_type(polaris_sif_mgr_exec_t);
type polaris_torch_exec_t;
files_type(polaris_torch_exec_t);
')
```

```
type polaris_disk_ucode0_t;
files_type(polaris_disk_ucode0_t);
```

```
type polaris_nplum_power_file_t;
polaris_pfile_type(polaris_nplum_power_file_t)
```

```
#permission for /u0
optional_policy(`
    gen_require(`
        type polaris_periodic_t;
    `)
    polaris_disk_ucode0_read_lnk(polaris_periodic_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwc.te

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```
#
# February 2020, Victor Kamensky
#
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#
```

```
## <summary>Polaris cfmgr Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Write cfmgr /var/run socket file
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```

## </summary>
## </param>
#
interface(`polaris_cfgmgr_var_sock_write`,`
    gen_require(`
        type polaris_cfgmgr_t;
        type polaris_cfgmgr_var_run_t;
        type var_run_t;
    `)
    write_sock_files_pattern($1, var_run_t, polaris_cfgmgr_var_run_t)
    allow $1 polaris_cfgmgr_t:unix_stream_socket { connectto };
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscfgmgr.if

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```

#
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#

```

```

policy_module(polarisstackmgr, 1.0);

```

```

gen_require(`
    type polaris_stack_mgr_t;
`)
polaris_btrace_data_manage(polaris_stack_mgr_t)
polaris_crft_data_manage(polaris_stack_mgr_t)
polaris_chasfs_manage(polaris_stack_mgr_t)
polaris_tdlresolve_read(polaris_stack_mgr_t)
polaris_tdlldb_list_dirs(polaris_stack_mgr_t)
polaris_cpld_read(polaris_stack_mgr_t)
polaris_lua_read(polaris_stack_mgr_t)
polaris_flashlib_read(polaris_stack_mgr_t)

polaris_rpc_sman_ui_serv_connect(polaris_stack_mgr_t)

polaris_db_tdlldb_dir_use(polaris_stack_mgr_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_stack_mgr_t)

allow polaris_stack_mgr_t self:capability { dac_override };

polaris_dyncfg_tmp_read(polaris_stack_mgr_t)

```



```

corecmd_exec_bin(polaris_stack_mgr_t)
corecmd_exec_shell(polaris_stack_mgr_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_stack_mgr_t)

# read /proc/cmdline
kernel_read_system_state(polaris_stack_mgr_t)

# open /dev/ttyS0 console in stack_console_write_init
term_use_unallocated_ttys(polaris_stack_mgr_t)

# on ngwc/vwlc FIPS code reads /tmp/hw_entropy
polaris_hw_entropy_use(polaris_stack_mgr_t)

#stackmgr runs mcp_trace_request.sh
polaris_trace_request_domtrans(polaris_stack_mgr_t)

#stack_mgr needs to be able to access /tmp/issu_stk/prst_sync_rld_info_prsd
polaris_issu_stack_tmp_manage(polaris_stack_mgr_t)

# may use mcp_chvrf.sh to access other nodes in system.
# Note that we do not actually need to transition to the chvrf domain, however
# a file descriptor leak can occur and the domain transition permission macro
# expands to allow polaris_chvrf_t to access the fifo
polaris_chvrf_domtrans(polaris_stack_mgr_t)

#Allow read on bootflash to be able to read reload_history
polaris_bootflash_read(polaris_stack_mgr_t)

# stackmgr tmp files
type polaris_stack_mgr_tmp_t;
files_tmp_file(polaris_stack_mgr_tmp_t)
files_tmp_filetrans(polaris_stack_mgr_t, polaris_stack_mgr_tmp_t, file, "ngwc_reload_reason")
manage_files_pattern(polaris_stack_mgr_t, polaris_stack_mgr_tmp_t, polaris_stack_mgr_tmp_t)

allow polaris_stack_mgr_t self:capability sys_nice;
allow polaris_stack_mgr_t self:process setsched;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisstackmgr.te
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#
# January 2018, Manohar Hungund
#
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```

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#

# polarisoctdplogrp file contexts place holder

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisoctdplogrp.fc

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#

# February 2020, Victor Kamensky

#

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#

## <summary>Polaris cedge\_start Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedgestart.if

No license file was found, but licenses were detected in source scan.

dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

define(^ polaris\_mqipc\_service\_server\_aux',`dnl

type \$1;

polaris\_mqipc\_type(\$1)

polaris\_mqipc\_\$2\_create\_name(\$3)')

define(^ polaris\_mqipc\_service\_server',`dnl

polaris\_mqipc\_service\_server\_aux(mqipc\_label(\$1), mqipc\_stem(\$1), process\_label(\$2))dnl

')

define(^ polaris\_mqipc\_service\_client\_aux',`dnl

polaris\_mqipc\_\$2\_use(\$3)')

define(^ polaris\_mqipc\_service\_client',`dnl

polaris\_mqipc\_service\_client\_aux(mqipc\_label(\$1), mqipc\_stem(\$1), process\_label(\$2))dnl

')

define(^ polaris\_mqipc\_service\_server\_elastic\_client',`')

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_mqipc\_te.m4

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```
#
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#
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#

## <summary>Polaris polarisqfp Policy Rules.</summary>

#####
## <summary>
##   Work (read, write, ioctl) with /dev/netmap device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_netmap_dev_use',`
gen_require(`
    type device_t;
    type polaris_netmap_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_netmap_device_t)
    read_chr_files_pattern($1, device_t, polaris_netmap_device_t)
    allow $1 polaris_netmap_device_t:chr_file map;
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/svc_eng_puntNN devices
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_svc_eng_punt_dev_use',`
gen_require(`
    type device_t;
    type polaris_sep_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_sep_device_t)
    read_chr_files_pattern($1, device_t, polaris_sep_device_t)
```

```

)

#####
## <summary>
## Allow access to semaphore with type polaris_qfp_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_qfp_sem_use`,`
    gen_require(`
        type polaris_qfp_t;
    `)
    allow $1 polaris_qfp_t:sem rw_sem_perms;
)

#####
## <summary>
## Send messages to qfp unix datagram sockets.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_qfp_dgram_send`,`
    gen_require(`
        type polaris_qfp_t;
    `)

    allow $1 polaris_qfp_t:unix_dgram_socket sendto;
)

# CSR & C8KV infiniband devices in Azure
interface(`polaris_infiniband_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_infiniband_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_infiniband_device_t)
    read_chr_files_pattern($1, device_t, polaris_infiniband_device_t)
    allow $1 polaris_infiniband_device_t:chr_file map;
)

```

```
#####
## <summary>
##   Execute iodbd.sh script in the polaris_iodbd_t domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_iodbd_domtrans`,`
    gen_require(`
        type polaris_iodbd_t, polaris_iodbd_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_iodbd_exec_t, polaris_iodbd_t)
`)
```

```
#####
## <summary>
##   Manage files and directoris under /tmp/iodb
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_iodb_tmp_manage`,`
    gen_require(`
        type polaris_iodb_tmp_t;
    `)

    manage_files_pattern($1, polaris_iodb_tmp_t,polaris_iodb_tmp_t)
    manage_dirs_pattern($1, polaris_iodb_tmp_t, polaris_iodb_tmp_t)

    fs_getattr_tmpfs($1)
`)
```

```
#####
## <summary>
##   Manage files and directoris under /tmp/memif
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
## </param>
```

```

## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_qfp_memif_manage`,`
    gen_require(`
        type polaris_qfp_memif_t;
    `)
    manage_files_pattern($1, polaris_qfp_memif_t, polaris_qfp_memif_t)
    manage_sock_files_pattern($1, polaris_qfp_memif_t, polaris_qfp_memif_t)
    gen_require(`
        type tmp_t;
    `)
    manage_dirs_pattern($1, { tmp_t polaris_qfp_memif_t }, polaris_qfp_memif_t)
    allow $1 polaris_qfp_memif_t:file map;
`)

```

#####

```

## <summary>
##   polaris_qfp_log_manage
## </summary>
## <param name="filename">
##   <summary>
##     Name of the file being managed.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_qfp_log_manage`,`
    type polaris_qfp_var_log_t;
    logging_log_file(polaris_qfp_var_log_t)
    logging_log_filetrans(polaris_qfp_t, polaris_qfp_var_log_t, file, $1)
    manage_files_pattern(polaris_qfp_t, var_log_t, polaris_qfp_var_log_t)
`)

```

#####

```

## <summary>
##   Work (read, write, ioctl) with /dev/icp_adf_ctl and
## /dev/icp_dev_mem devices
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_icp_dev_use`,`
    gen_require(`

```

```

    type device_t;
    type polaris_icp_device_t;
)
    write_chr_files_pattern($1, device_t, polaris_icp_device_t)
    read_chr_files_pattern($1, device_t, polaris_icp_device_t)
    allow $1 polaris_icp_device_t:chr_file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisqfp.if

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```

#
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#
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#

```

```

/usr/binos/bin/*.linux_iosd.*ms -- gen_context(system_u:object_r:polaris_iosd_exec_t,s0)
/usr/binos/bin/mcpcc-lc-ms -- gen_context(system_u:object_r:polaris_iosd_exec_t,s0)

```

```

/tmp/boottime          gen_context(system_u:object_r:polaris_iosd_tmp_files_t,s0)
/tmp/booted           gen_context(system_u:object_r:polaris_iosd_tmp_files_t,s0)
/tmp/restconf(/.*)?   gen_context(system_u:object_r:polaris_restconf_tmp_t,s0)

```

```

/tmp/netio0(/.*)?     gen_context(system_u:object_r:polaris_iosd_tmp_files_t,s0)
/tmp/nginx.conf       gen_context(system_u:object_r:httpd_config_t,s0)

```

```

/bootflash/.geo(/.*)? gen_context(system_u:object_r:polaris_geodb_files_t,s0)
/harddisk/.geo(/.*)?  gen_context(system_u:object_r:polaris_geodb_files_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiosd.fc

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```

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#

```

## <summary>Polaris cli\_agent Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscliagent.if

No license file was found, but licenses were detected in source scan.

```
#  
# August 2017, Shawn Lu  
#  
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#
```

```
# polarisrogued file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrogued.fc
```

No license file was found, but licenses were detected in source scan.

```
#  
# July 2017, Victor Kamensky  
#  
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#
```

```
## <summary>Polaris MCP Platform Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/scooby
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_scooby_dev_use`,
```

```
gen_require(`
```

```
type device_t;
```

```
type polaris_scooby_device_t;
```

```
`)
```

```
write_chr_files_pattern($1, device_t, polaris_scooby_device_t)
```

```
read_chr_files_pattern($1, device_t, polaris_scooby_device_t)
```

```
')
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/spa[0123]
```

```
## </summary>
```

```
## <param name="domain">
```



```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_spa_dev_use`,`
gen_require(`
    type device_t;
    type polaris_spa_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_spa_device_t)
    read_chr_files_pattern($1, device_t, polaris_spa_device_t)
    allow $1 polaris_spa_device_t:chr_file map;
)

#####
## <summary>
## Work (read, write, ioctl) with /dev/htdp[0-9]*
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_htdp_dev_use`,`
gen_require(`
    type device_t;
    type polaris_htdp_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_htdp_device_t)
    read_chr_files_pattern($1, device_t, polaris_htdp_device_t)
)

#####
## <summary>
## Work (read, write, ioctl) with /sys/devices/virtual/sys_platform
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_sysfs_platform_dev_use`,`
gen_require(`
    type polaris_sysfs_platform_t;
`)

```

```

    manage_files_pattern($1, polaris_sysfs_platform_t, polaris_sysfs_platform_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/ds31408
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ds31408_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_ds31408_device_t;
    `)
    rw_chr_files_pattern($1, device_t, polaris_ds31408_device_t)
)

#####
## <summary>
##   Allow access to /dev/cbdma
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cbdma_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_cbdma_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_cbdma_device_t)
    read_chr_files_pattern($1, device_t, polaris_cbdma_device_t)
    allow $1 polaris_cbdma_device_t:chr_file map;
)

#####
## <summary>
##   Allow access to /dev/cpp_htdp
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>

```

```

## </param>
#
interface(`polaris_cpp_htdp_dev_use`,`
    gen_require(`
        type polaris_cpp_htdp_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_cpp_htdp_device_t)
    read_chr_files_pattern($1, device_t, polaris_cpp_htdp_device_t)
    allow $1 polaris_cpp_htdp_device_t:chr_file map;
)

```

```
#####
```

```

## <summary>
##   Allow access to /dev/n2_device
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_n2_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_n2_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_n2_device_t)
    read_chr_files_pattern($1, device_t, polaris_n2_device_t)
)

```

```
#####
```

```

## <summary>
##   Allow access to /dev/cy2213
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_cy2213_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_cy2213_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_cy2213_device_t)
    read_chr_files_pattern($1, device_t, polaris_cy2213_device_t)
)

```

```
#####
## <summary>
##   Allow access to /dev/vega
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vega_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_vega_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_vega_device_t)
    read_chr_files_pattern($1, device_t, polaris_vega_device_t)
`)
```

```
#####
## <summary>
##   Work (read, write, ioctl) with /dev/dash_fpga device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dash_dev_mcp_use`,`
    gen_require(`
        type device_t;
        type polaris_dash_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_dash_device_t)
    read_chr_files_pattern($1, device_t, polaris_dash_device_t)
    allow $1 polaris_dash_device_t:chr_file map;
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismcp.if

No license file was found, but licenses were detected in source scan.

dnl

dnl April 2018, Victor Kamensky

dnl

dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.

```
dnl All rights reserved
dnl
dnl Crankshaft (Overlord, Utah and Fugazi) Platform Max Bay Limits
max_bay_map_set(`rp', `per_bay', 3)
max_bay_map_set(`cc', `per_bay', 3)
max_bay_map_set(`fp', `per_bay', 3)

max_bay_ripc_map_set(`rp', `per_bay', 3)
max_bay_ripc_map_set(`cc', `per_bay', 3)
max_bay_ripc_map_set(`fp', `per_bay', 3)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/mcpmaps.m4
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2021 by Cisco Systems, Inc.
# All rights reserved
#
```

```
policy_module(polarisiosd, 1.0);
```

```
gen_require(`
    type polaris_iosd_t;
')
```

```
#####
# mqipc manual, one that missing in platform tdl file
#####
```

```
ifdef(`nyquist_platform',`
gen_require(`
    type polaris_bt_logger_iosd_mqipc_t;
')
# iosd may start first and create this mqipc channel
polaris_mqipc_create_name(polaris_iosd_t, polaris_bt_logger_iosd_mqipc_t, bt_logger_iosd)
')
```

```
polaris_btrace_data_manage_all(polaris_iosd_t)
polaris_chasfs_manage(polaris_iosd_t)
polaris_tdlresolve_read(polaris_iosd_t)
polaris_tdlldb_list_dirs(polaris_iosd_t)
polaris_cpld_read(polaris_iosd_t)
polaris_lua_read(polaris_iosd_t)
polaris_flashlib_read(polaris_iosd_t)
polaris_crft_data_manage_all(polaris_iosd_t)
```

```

optional_policy(
polaris_gnmib_gnoi_images_manage(polaris_iosd_t)
')

polaris_ripc_sman_ui_serv_connect(polaris_iosd_t)

polaris_db_tlddb_dir_use(polaris_iosd_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_iosd_t)

# allow iosd read/write via hostname <>
systemd_hostnamed_manage_config(polaris_iosd_t)

# creates /etc/netns/1/resolv.conf via ip domain-name <> command
# creates /etc/netns/vrf.VRFNAME via ip vfr VRFNAME command
# creates /etc/netns/vrf.VRFNAME/resolv.conf via ip
# domain-name vrf VRFNAME <> command
gen_require(
    type net_conf_t;
)
files_etc_filetrans(polaris_iosd_t, net_conf_t, file, "resolv.conf")
files_etc_filetrans(polaris_iosd_t, net_conf_t, file, "hosts")
files_etc_filetrans(polaris_iosd_t, net_conf_t, dir, "netns")
sysnet_manage_config(polaris_iosd_t)
sysnet_manage_config_dirs(polaris_iosd_t)

# for pluggable FS, allow iosd to access files on them.
polaris_getattr_removable(polaris_iosd_t)
polaris_removable_manage(polaris_iosd_t)
fs_read_removable_symlinks(polaris_iosd_t)

polaris_lsmpi_dev_use(polaris_iosd_t)
polaris_lsmpi_sysctl_read(polaris_iosd_t)
polaris_cfg_data_manage(polaris_iosd_t)
polaris_proc_rmonbifo_read(polaris_iosd_t)

polaris_icc_broken_relocations(polaris_iosd_t)

allow polaris_iosd_t self:capability { sys_nice chown fsetid sys_rawio dac_override dac_read_search ipc_lock };

gen_require(
    type httpd_config_t;
    type tmp_t;
)

# iosd creates /tmp/nginx.conf file
manage_files_pattern(polaris_iosd_t, tmp_t, httpd_config_t)

```

```

# transition nginx.conf into httpd_config_t
files_tmp_filetrans(polaris_iosd_t, httpd_config_t, file, "nginx.conf")
# RW access to /usr/binos/conf/nginx-conf/servers (utd feature)
manage_dirs_pattern(polaris_iosd_t, httpd_config_t, httpd_config_t)

#iosd create /tmp/nginx/cert/ca.cert
polaris_nginx_tmp_manage(polaris_iosd_t)

# !!!LOOK AT ME!!! - we allow iosd to read raw memory
# dev_read_raw_memory(polaris_iosd_t)

polaris_flashlib_write(polaris_iosd_t)
polaris_nvram_manage(polaris_iosd_t)
polaris_persistent_manage(polaris_iosd_t)

# smu management in iosd (linked in via libbcrdu.so) accesses
# files created by the installer under /tmp/patch
polaris_install_tmp_read(polaris_iosd_t)

optional_policy(`
polaris_cpp_tmp_ifdev_use(polaris_iosd_t)
`)

polaris_dyncfg_tmp_read(polaris_iosd_t)

# lsmapi_fetch_linux_ifindex tries to ioctl(skfd, SIOCGIFINDEX, &ifr) on
# non existent ethN interface, as result kernel triggers attempt to
# load kernel module that would correspond to such interface. Deny
# and don't audit iosd_t attempt to load kernel modules.
# LOOK AT ME: in long term we don't want iosd even try to load modules
# and we would actually would want to report and fail such
kernel_dontaudit_request_load_module(polaris_iosd_t)

# iosd calls nice function to change fast path priority (mcp_fastpath_thread_func)
allow polaris_iosd_t self:process setsched;

ifdef(`crankshaft_family',`
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
`)

ifdef(`mcp_family',`
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
allow polaris_iosd_t polaris_iosd_t:tun_socket relabelfrom;
`)

# on ultra iosd is figuring out parameters of interfaces of underlying

```

```

# hypervisors kvm, vmware, etc. See vxe_gethd_ifdb_scan
ifdef(^crankshaft_family',`
dev_rw_sysfs(polaris_iosd_t)
polaris_disk_objstore_manage(polaris_iosd_t)
`)
ifdef(^vxe_family',`
dev_read_sysfs(polaris_iosd_t)
polaris_disk_objstore_manage(polaris_iosd_t)
polaris_objstore_sem_use(polaris_iosd_t)
`)
ifdef(^vwlc_platform',`
polaris_disk_objstore_manage(polaris_iosd_t)
optional_policy(`
    polaris_vwlc_grub_efi_use(polaris_iosd_t)
`)
`)
ifdef(^wlc_family',`
dev_read_sysfs(polaris_iosd_t)
polaris_tlscd_uds_manage(polaris_iosd_t)
gen_require(`
    type polaris_tlscd_t;
`)
allow polaris_iosd_t polaris_tlscd_t:unix_dgram_socket sendto;
`)
# on 1ng mcpcc-lc-ms reads /sys/devices/system/cpu/online
ifdef(^mcp_family',`
dev_read_sysfs(polaris_iosd_t)
`)
# neptune need to figure fan type by reading
# /sys/bus/platform/devices/nios/n2h_fan_ctrl_fan_tray_status
ifdef(^neptune_platform',`
dev_read_sysfs(polaris_iosd_t)
`)
# radium need to figure fan type by reading
# /sys/bus/platform/devices/nios/n2h_fan_ctrl_fan_tray_status
ifdef(^radium_platform',`
dev_read_sysfs(polaris_iosd_t)
`)
# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(^quake_platform',`
dev_read_sysfs(polaris_iosd_t)
`)
# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(^supernova_platform',`
dev_read_sysfs(polaris_iosd_t)
`)

# work with /tmp/boottime, /tmp/booted files: create/write

```



```

type polaris_iosd_tmp_files_t;
files_tmp_file(polaris_iosd_tmp_files_t)
files_tmp_filetrans(polaris_iosd_t, polaris_iosd_tmp_files_t, file, "boottime")
files_tmp_filetrans(polaris_iosd_t, polaris_iosd_tmp_files_t, file, "booted")
create_files_pattern(polaris_iosd_t, polaris_iosd_tmp_files_t, polaris_iosd_tmp_files_t)

#allow polaris_iosd_t polaris_udev_tmp_files_t:dir { getattr open read search };
#allow polaris_iosd_t polaris_udev_tmp_files_t:file { open, read, write };
# LOOK AT ME (need to review write access with iosd team)
polaris_udev_tmp_manage(polaris_iosd_t)

# work with /tmp/restconf
type polaris_restconf_tmp_t;
files_tmp_file(polaris_restconf_tmp_t)
polaris_restconf_tmp_use(polaris_iosd_t)

files_tmp_filetrans(polaris_iosd_t, polaris_restconf_tmp_t, dir, "restconf")
filetrans_pattern(polaris_iosd_t, polaris_restconf_tmp_t, polaris_restconf_tmp_t, file)

# work with /tmp/netio0
files_tmp_filetrans(polaris_iosd_t, polaris_iosd_tmp_files_t, dir, "netio0")
# sockets and dirs created under /tmp/netio0
manage_dirs_pattern(polaris_iosd_t, polaris_iosd_tmp_files_t, polaris_iosd_tmp_files_t)
manage_sock_files_pattern(polaris_iosd_t, polaris_iosd_tmp_files_t, polaris_iosd_tmp_files_t)
allow polaris_iosd_t self:unix_dgram_socket create_socket_perms;

gen_require(
    type inetd_child_t;
)
# sendto permission for /tmp/netio0/ttyC100
allow polaris_iosd_t inetd_child_t:unix_dgram_socket sendto;

polaris_socketat_nsfs_read(polaris_iosd_t)

# onep uses TIPC sockets see onep_tipc_transport_start
allow polaris_iosd_t self:socket { bind create listen accept getattr read write ioctl getopt setopt };

# mcp_eobc_create_socket creates UDP socket for eobc
corenet_udp_bind_polaris_iosd_eobc_port(polaris_iosd_t)
gen_require(
    type node_t;
)
allow polaris_iosd_t node_t:udp_socket node_bind;
allow polaris_iosd_t self:udp_socket { bind create ioctl setopt read write };

# direct access to serial TTY devices like /dev/ttyS1
term_use_unallocated_ttys(polaris_iosd_t)

```

```

# on ultra cvac_load_config function tried to access cdrom0:/iosxe_config.txt
# and if exists read
#ifdef(^vxe_family',`
fs_read_iso9660_files(polaris_iosd_t)
`)
#ifdef(^wlc_family',`
fs_read_iso9660_files(polaris_iosd_t)
`)

# ifs_get_free_bytes invokes mcp_fs_statfs and eventually mcp_wrapper_statvfs
# with "/bootflash"...this needs attr access for "/"
fs_getattr_xattr_fs(polaris_iosd_t)

# iosd works with cpp /dev/shm//cpp_ifdev_shmem shared mmory
optional_policy(`
polaris_cpp_tmpfs_ifdev_rw(polaris_iosd_t)
`)

# iosd reads/writes into grubenv for confreg
optional_policy(`
polaris_grub_efi_use(polaris_iosd_t)
`)

# when /bootflash or /harddisk are 100% full
allow polaris_iosd_t self:capability sys_resource;

# mcp_set_clock wants to call settimeofday
allow polaris_iosd_t self:capability sys_time;

# Need this for bluetooth to work. HCI library uses this
allow polaris_iosd_t self:capability net_raw;

#ifdef(^mcp_family',`
polaris_obfl_data_read(polaris_iosd_t)
`)

# iosd uses quack on mcp and crankshaft and ngwc
#ifdef(^mcp_family',`
polaris_quack_dev_use(polaris_iosd_t)
`)
#ifdef(^crankshaft_family',`
polaris_quack_dev_use(polaris_iosd_t)
`)
#ifdef(^ngwc_family',`
polaris_quack_dev_use(polaris_iosd_t)
`)
#ifdef(^qwlc_platform',`
polaris_quack_dev_use(polaris_iosd_t)
`)

```

```

)
ifdef(^katar_platform',`
polaris_quack_dev_use(polaris_iosd_t)
`)

ifdef(^mcp_family',`
polaris_spa_dev_use(polaris_iosd_t)
polaris_sysfs_platform_dev_use(polaris_iosd_t)
`)

# on 1ng write/ioctl into /dev/cpld-ha
# on vwlc ha scenario, iosd needs write access to /dev/cpld-ha
optional_policy(`
polaris_cpld_dev_use(polaris_iosd_t)
`)

# deals with /dev/shm files semaphors; like uuid_sem semaphore
# created by btrace_get_uuid function
type polaris_iosd_tmpfs_t;
files_tmpfs_file(polaris_iosd_tmpfs_t)
fs_tmpfs_filetrans(polaris_iosd_t, polaris_iosd_tmpfs_t, file)
manage_files_pattern(polaris_iosd_t, tmpfs_t, polaris_iosd_tmpfs_t)

optional_policy(`
polaris_iodb_tmp_manage(polaris_iosd_t)
`)

# on ngwc FIPS code reads /tmp/hw_entropy
# seems like iosd can delete the file as well
polaris_hw_entropy_create(polaris_iosd_t)

optional_policy(`
#on macallan iosd needs to access /dev/cpld
polaris_cpld_dev_read(polaris_iosd_t)
`)

# on tsn iosd needs write access to
# sys/devices/platform/cpld/reg_rp_reset_button_status
# sys/devices/platform/cpn-110-master DSR/DTR status
ifdef(^crankshaft_family',`
type polaris_quake_i2c_t;

polaris_cpld_write(polaris_iosd_t)
polaris_ggpio_dev_read_write(polaris_iosd_t)
polaris_quake_i2c_manage(polaris_iosd_t)
`)

```

```

ifdef(`katar_platform',`
polaris_cpld_write(polaris_iosd_t)
')

# on tsn iosd needs access to /sys/devices/platform/moka_fpga
# /sys/devices/platform/moka_fpga/led_status
optional_policy(`
polaris_mokafpga_rw(polaris_iosd_t)
')

# iosd reads /tmp/iosd_level
polaris_lm_tmp_read(polaris_iosd_t)

# iosd needs manage_dirs, manage_files and manage_lnk
# permissions at "/tmp/ufs/lic0/<remote_ip>/*"
optional_policy(`
polaris_ncd_tmp_manage(polaris_iosd_t)
')

# access NFS mounted directories from other nodes or members
fs_getattr_nfs(polaris_iosd_t)

# mcp/mcprp/if_unix_se.c code works with /sys/devices/virtual/contdev
# files and /proc/net/dev
polaris_manage_contdev_dev(polaris_iosd_t)
kernel_read_network_state(polaris_iosd_t)

# iosd creates /tmp/iox_xml.dat file
optional_policy(`
polaris_iox_manage_tmp_files(polaris_iosd_t)
')

polaris_caf_var_run_files_manage(polaris_iosd_t)
container_read_lib_files(polaris_iosd_t)

# work with files like /tmp/rp/.shell_exec.5B1BF1D7648E21AEE3000002
type polaris_iosd2iox_tmp_t;
files_tmp_file(polaris_iosd2iox_tmp_t)
files_tmp_filetrans(polaris_iosd_t, polaris_iosd2iox_tmp_t, file)
polaris_iosd2iox_tmp_manage(polaris_iosd_t)
# work with response
optional_policy(`
    polaris_iox2iosd_tmp_manage(polaris_iosd_t)
')

polaris_sandbox_file_dir_list(polaris_iosd_t)

# lfts 2.0 iosd provides route information to kernel. it talks

```

```

# using generic netlink family socket. See iosd bsock_sar_netlink_process
# process
allow polaris_iosd_t self:netlink_generic_socket create_socket_perms;
allow polaris_iosd_t self:netlink_socket create_socket_perms;

# LOOK AT ME
# on nyquist iosd accesses files like lic0-2:/sanosync.data.readLock
# from saLockCheck function and it happens just right after lic0-2 was
# mounted over NFSv4. It seems that labels from remote node did not
# take an effect yet. For now allow access to dir and files that
# are not yet labeled.
ifdef(`nyquist_platform',`
files_manage_isid_type_dirs(polaris_iosd_t)
files_manage_isid_type_files(polaris_iosd_t)
')

ifdef(`ngwc_family',`
polaris_getattr_filesystem_disk_ucode(polaris_iosd_t)
#policy needed for accessing sys/bus/usb/drivers/usb/*/authorized
dev_rw_sysfs(polaris_iosd_t)
')

ifdef(`passport_platform',`
polaris_cm_rp_tmp_manage(polaris_iosd_t)
')

polaris_lfts_dev_use(polaris_iosd_t)

# /dev/shm/vrf_shm access for show command
polaris_vrf_shm_manage(polaris_iosd_t)

# /dev/shm/sdm access
optional_policy(`
polaris_sdm_shm_manage(polaris_iosd_t)
')

# iosd needs access to logging facility
logging_send_syslog_msg(polaris_iosd_t)

#iosd need access to /webui/*.odm files
polaris_read_webui_files(polaris_iosd_t)

# allow getting binos networking stats AF_NETLINK
allow polaris_iosd_t self:netlink_route_socket rw_netlink_socket_perms;

# confd needs to talk with IOSd via real linux udp snmp socket
allow polaris_iosd_t self:udp_socket { create_socket_perms recv_msg send_msg };
corenet_udp_bind_snmp_port(polaris_iosd_t)

```

```

# PLEASE LOOK AT code should not use sysv IPC ARIs,
# instead POSIX variants must be used. Remove after
# code changed in proper way
# allow access sysv semaphor created by qfp process
#ifdef(`vxe_family',`
polaris_qfp_sem_use(polaris_iosd_t)
')
#ifdef(`wlc_family',`
polaris_qfp_sem_use(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
')

# lsmpi replacement punt/inject over domain sockets
#ifdef(`vxe_family',`
polaris_pi_uds_manage(polaris_iosd_t)
polaris_qfp_dgram_send(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
')

# CSR when operating in VGA mode uses /dev/tty0 as the console for the system
# (including IOSD).IOSD setup scripts pass in the tty device(s) to use in the
# REAL_CONSOLE and REAL_AUX environment variables. IOSD configures the tty
# for its operation and hence need the capability.
allow polaris_iosd_t self:capability sys_tty_config;

# LOOK AT ME: hot patch upon a reboot requires execmem operation - which
# currently is not allowed. Remove the following policy when CSCvq59763
# has been completed.
allow polaris_iosd_t self:process execmem;

# /dev/epaN on qwlc/asr1k(mcp)
optional_policy(`
polaris_epa_dev_use(polaris_iosd_t)
')

# /dev/qae_mem device access on overlord
optional_policy(`
polaris_qae_dev_use(polaris_iosd_t)
')

# ioucon binary invoked on standby console attach.
polaris_ioucon_dgram_send(polaris_iosd_t)

# usb device requires read permissions.
kernel_read_debugfs(polaris_iosd_t)

```

```

# iosd requires access to /tmp/sv
ifdef(`ngwc_family',`
polaris_sv_tmp_use(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
')

polaris_i2c_use(polaris_iosd_t)

# on CSR AWS deployment iosd needs read access to /dev/console
term_read_console(polaris_iosd_t)

# On vxe platforms the cloudint config is stored in /varied. We need
# to be able to read it.
ifdef(`vxe_family',`
polaris_disk_varied_read(polaris_iosd_t)
')

# In stacked and ha setup secondary SUP bootflash and hardisk
# are mounted on active and is accessed by iosd.
polaris_getattr_bootflash(polaris_iosd_t)
polaris_getattr_harddisk(polaris_iosd_t)

# read access to /dev/random
dev_read_rand(polaris_iosd_t)

# Allow access of /tmp/maroon_stats files
polaris_maroon_data_manage_all(polaris_iosd_t)

#access to /dev/bp_async device on nanook platform
optional_policy(`
polaris_bp_async_dev_use(polaris_iosd_t)
')

#Permission for access file attribute to list the file info
polaris_caf_tmp_files_getattr(polaris_iosd_t)

#DB persistence
polaris_tldbpersist_setup(polaris_iosd_t)
polaris_tmp_tldb_persist_setup(polaris_iosd_t)

# IOSCC needs access to /mnt/firmware for intelligent spa during bootup
polaris_firmware_read(polaris_iosd_t)

# On Sparrow platform: IOSd requires access to /dev/remap_mem0
# and /dev/usb_console for OOB management
# Also allows access to /dev/sparrow_psu and /dev/net/tun

```

```

# /dev/shm/sem._dev_i2c_0 sempaphor
#ifdef(^sparrow_platform',`
gen_require(`
    type polaris_cm_cc_tmpfs_t;
`)
polaris_remap_mem_dev_use(polaris_iosd_t)
term_use_usb_ttys(polaris_iosd_t)
polaris_sparrow_psu_dev_use(polaris_iosd_t)
polaris_i2c_sem_manage(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
mmap_files_pattern(polaris_iosd_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
`)

# On Blackheart platform: /dev/shm/sem._dev_i2c_0 sempaphor
# Allow access to /tmp/udev/etc/udev/msata/udev-info and /dev/net/tun
# Allow access to /dev/remap_mem0 for alarm port
#ifdef(^blackheart_platform',`
gen_require(`
    type polaris_cm_cc_tmpfs_t;
`)
polaris_udev_access(polaris_iosd_t)
polaris_remap_mem_dev_use(polaris_iosd_t)
polaris_i2c_sem_manage(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
mmap_files_pattern(polaris_iosd_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
`)

# handle /tmp/rp/.iosp_client_app token
type polaris_iosp_client_app_token_t;
files_tmp_file(polaris_iosp_client_app_token_t)
files_tmp_filetrans(polaris_iosd_t, polaris_iosp_client_app_token_t, file, ".iosp_client_app")
manage_files_pattern(polaris_iosd_t, polaris_iosp_client_app_token_t, polaris_iosp_client_app_token_t)

# handle /tmp/rp/.iosp_client_dmi token
type polaris_iosp_client_dmi_token_t;
files_tmp_file(polaris_iosp_client_dmi_token_t)
files_tmp_filetrans(polaris_iosd_t, polaris_iosp_client_dmi_token_t, file, ".iosp_client_dmi")
manage_files_pattern(polaris_iosd_t, polaris_iosp_client_dmi_token_t, polaris_iosp_client_dmi_token_t)

# handle /tmp/rp/.iosp_dmiauthd token
type polaris_dmiauthd_token_t;
files_tmp_file(polaris_dmiauthd_token_t)
files_tmp_filetrans(polaris_iosd_t, polaris_dmiauthd_token_t, file, ".iosp_dmiauthd")
manage_files_pattern(polaris_iosd_t, polaris_dmiauthd_token_t, polaris_dmiauthd_token_t)

# handle /tmp/rp/.iosp_gnmib token

```



```

type polaris_gnmib_token_t;
files_tmp_file(polaris_gnmib_token_t)
files_tmp_filetrans(polaris_iosd_t, polaris_gnmib_token_t, file, ".iosp_gnmib")
manage_files_pattern(polaris_iosd_t, polaris_gnmib_token_t, polaris_gnmib_token_t)

polaris_udev_tmp_watch(polaris_iosd_t)

# Interfaces needed for Aventus platform, allow access to
# /dev/shm/sem._dev_i2c_0 sempaphor
# /dev/usb_console for OOB management
# /dev/net/tun
# brctl process needs access to fifo_file
ifdef(^aventus_platform',`
gen_require(`
    type brctl_t;
    type polaris_pman_t;
    type polaris_cm_cc_tmpfs_t;
    type ifconfig_t;
    type polaris_i2c_device_t;
`)
polaris_i2c_sem_manage(polaris_iosd_t)
ifconfig_attach_tun_iface(polaris_iosd_t)
corenet_rw_tun_tap_dev(polaris_iosd_t)
term_use_usb_ttys(polaris_iosd_t)
allow brctl_t polaris_pman_t:fifo_file append;
mmap_files_pattern(polaris_iosd_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
allow ifconfig_t polaris_i2c_device_t:chr_file { read write };
`)

# allow access and modify files in /tftp/inv directory
# TODO Need to revisit this for further analysis
ifdef(^mcp_family',`
gen_require(`
    type tftpd_dir_rw_t;
`)
read_files_pattern(polaris_iosd_t, tftpd_dir_rw_t, tftpd_dir_rw_t)
`)

#allow access and modify awips file in /bootflash
gen_require(`
type polaris_awips_signature_file_t;
`)
filetrans_pattern(polaris_iosd_t, polaris_disk_bootflash_t, polaris_awips_signature_file_t, file, "awips.json")
allow polaris_iosd_t polaris_awips_signature_file_t:file { write create read open getattr unlink };

# handle geodb file access
type polaris_geodb_files_t;
polaris_disk_type(polaris_geodb_files_t)

```

```

filetrans_pattern(polaris_iosd_t, polaris_disk_bootflash_t, polaris_geodb_files_t, dir, ".geo")
filetrans_pattern(polaris_iosd_t, polaris_disk_harddisk_t, polaris_geodb_files_t, dir, ".geo")
polaris_geodb_files_manage(polaris_iosd_t)

# handle /var/ip_local_port_range
type polaris_ip_linux_port_var_t;
files_tmp_file(polaris_ip_linux_port_var_t)
files_var_filetrans(polaris_iosd_t, polaris_ip_linux_port_var_t, file, "ip_local_port_range")

# linux_iosd-imag access to file /var/ip_local_port_range
manage_files_pattern(polaris_iosd_t, var_t, polaris_ip_linux_port_var_t)

# Allow access to /bootflash/certs
polaris_wlc_ap_cert_manage(polaris_iosd_t)

# commad "ls" on /var/ip_local_port_range
gen_require(
    type polaris_shell_t;
)
allow polaris_shell_t polaris_ip_linux_port_var_t:file getattr;

# handling /boot/vcpu_template.txt or /csl_p_0/vcpu_template.txt file
# created by iosd by platform resource config command
type polaris_iosd_vcpu_t;
files_type(polaris_iosd_vcpu_t)
gen_require(
    type polaris_disk_csl_p_t;
    type polaris_disk_varied_t;
)
filetrans_pattern(polaris_iosd_t, { polaris_disk_csl_p_t polaris_disk_varied_t }, polaris_iosd_vcpu_t, file,
"vcpu_template.txt")
manage_files_pattern(polaris_iosd_t, { polaris_disk_csl_p_t polaris_disk_varied_t }, polaris_iosd_vcpu_t)

# allow open/read/search cgroup files like /sys/fs/cgroup/cpu,cpuacct/machine
fs_read_cgroup_files(polaris_iosd_t)
fs_search_cgroup_dirs(polaris_iosd_t)
# for Dynamic Core Allocation IOSd needs write access to cpu sets/shares
ifdef(`crankshaft_family',`
fs_write_cgroup_files(polaris_iosd_t)
)

# sdwan_admintech_generate() creates admintech and admintech_trace files
gen_require(
    type polaris_admin_tech_data_t;
)
polaris_bootflash_filetrans(polaris_iosd_t, polaris_admin_tech_data_t, file, "admintech")
polaris_bootflash_filetrans(polaris_iosd_t, polaris_admin_tech_data_t, file, "admintech_trace")
filetrans_pattern(polaris_iosd_t, polaris_chasfs_t, polaris_admin_tech_data_t, file, "ios_admintech_done")

```

```

filetrans_pattern(polaris_iosd_t, polaris_chasfs_t, polaris_admin_tech_data_t, file, "ios_admintech_request")
polaris_admin_tech_data_manage(polaris_iosd_t)
# with "/bootflash"...this needs attr to access for logfile
polaris_user_file_getattr(polaris_iosd_t)
allow polaris_iosd_t polaris_user_file_t:file { open unlink };
#=====
# petra platform
ifdef(^petra_platform',`
# iosd need access to petra fpga
polaris_iots_fpga_dev_use(polaris_iosd_t)
# iosd need access to memory devices
polaris_iots_tm_dev_use(polaris_iosd_t)
#allow map permission for /dev/shm/TM_A53_APIS
allow polaris_iosd_t polaris_iosd_tmpfs_t:file map;
#allow access to polaris_cm_rp_t sem
polaris_cm_rp_sem_use(polaris_iosd_t)
#allow access to userio
dev_rw_userio_dev(polaris_iosd_t)
allow polaris_iosd_t userio_device_t:chr_file { map };
#iosd need access to sysfs
dev_rw_sysfs(polaris_iosd_t)
allow polaris_iosd_t sysfs_t:file { create map };
dev_manage_sysfs_dirs(polaris_iosd_t)
# iosd need access to sdflash files image is stored
polaris_swipedrive_file_manage(polaris_iosd_t)
polaris_getattr_swipedrive(polaris_iosd_t)
#iosd need access to mmcblk0p3
gen_require(
    type polaris_disk_recovery_t;
)
allow polaris_iosd_t polaris_disk_recovery_t:filesystem getattr;
#iosd need access to mmcblk0p2
polaris_getattr_filesystem_disk_ucode(polaris_iosd_t)
# iosd need access to /dev/mvDmaDrv
polaris_mvDmaDrv_dev_use(polaris_iosd_t)
# iosd need access to /dev/mvIntDrv
polaris_mvIntDrv_dev_use(polaris_iosd_t)
#iosd need permission for LED
polaris_led_dev_use(polaris_iosd_t)
#iosd need access to rawip socket by initscripts/rc.d/init.d/iptables
allow polaris_iosd_t self:rawip_socket create_socket_perms;
#iosd needs access to /opt/cisco/caf/config/system-config.ini
polaris_caf_files_read(polaris_iosd_t)
#iosd need permission to /dev/rtc0 done via imsp_update_sw_hwclock()
dev_rw_realtime_clock(polaris_iosd_t)
)
# work with /tmp/usb-disable: create/write
type polaris_iosd_usb_disable_tmp_t;

```

```

files_tmp_file(polaris_iosd_usb_disable_tmp_t);
polaris_iosd_usb_disable_tmp_manage(polaris_iosd_t)

ifdef(`ngwc_family',`
# SELINUX Mismatch warning when doing power redundancy configuration commands
# Allow access /bootflash/nplum-power
polaris_nplum_power_manage(polaris_iosd_t)
')

optional_policy(
  polaris_efi_files_list_dirs(polaris_iosd_t)
)

# work with /dev/shm/mq.-iosd_to_timingd
type polaris_iosd_timing_mqipc_t;
polaris_mqipc_type(polaris_iosd_timing_mqipc_t)

polaris_mqipc_create_name(polaris_iosd_t, polaris_iosd_timing_mqipc_t, iosd_to_timingd)

# watch /tmp
allow polaris_iosd_t tmp_t:dir watch;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisiosd.te
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#
# January 2018, Manohar Hungund
#
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#

## <summary>Polaris oct_dp_log_rp Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisoctdplogrp.if
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#
# February 2020, Victor Kamensky
#
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#

## <summary>Polaris cedge Policy Rules.</summary>

```

```
#####
## <summary>
##   Manage /tmp/xml files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_cedge_xml_tmp_manage',`
  gen_require(`
    type polaris_cedge_xml_tmp_t;
  `)
  manage_dirs_pattern($1, polaris_cedge_xml_tmp_t, polaris_cedge_xml_tmp_t)
  manage_files_pattern($1, polaris_cedge_xml_tmp_t, polaris_cedge_xml_tmp_t)
  files_tmp_filetrans($1, polaris_cedge_xml_tmp_t, dir, "xml")

  allow $1 polaris_cedge_xml_tmp_t:dir { watch mounton };
  allow $1 polaris_cedge_xml_tmp_t:file map;
`)

```

```
#####
## <summary>
##   Manage /tmp/tmp files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_cedge_tmp_manage',`
  gen_require(`
    type polaris_cedge_tmp_t;
  `)
  manage_dirs_pattern($1, polaris_cedge_tmp_t, polaris_cedge_tmp_t)
  manage_files_pattern($1, polaris_cedge_tmp_t, polaris_cedge_tmp_t)
  files_tmp_filetrans($1, polaris_cedge_tmp_t, dir, "tmp")

`)

```

```
#####
## <summary>
##   Manage /etc/viptela files and directories
## </summary>
## <param name="domain">
##   <summary>

```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cedge_etc_manage',`
    gen_require(`
        type polaris_cedge_etc_t;
    `)
    manage_dirs_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    manage_files_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    manage_lnk_files_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    files_etc_filetrans($1, polaris_cedge_etc_t, dir, "viptela")
`)

```

```
#####
```

```

## <summary>
## Read /etc/viptela files and directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_cedge_etc_read',`
    gen_require(`
        type polaris_cedge_etc_t;
    `)
    search_dirs_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    read_files_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    read_lnk_files_pattern($1, polaris_cedge_etc_t, polaris_cedge_etc_t)
    files_etc_filetrans($1, polaris_cedge_etc_t, dir, "viptela")
`)

```

```
#####
```

```

## <summary>
## Watch cedge_etc directories and files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#

```

```

interface(`polaris_cedge_etc_watch',`
    gen_require(`
        type polaris_cedge_etc_t;
    `)

```

```

)
    allow $1 polaris_cedge_etc_t:{ dir file } watch;
)

#####
## <summary>
##   Read access /var/run/netns/* performed from vip_util_set_ns
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cedge_set_ns`,`
    init_read_state($1)
    fs_read_nsfs_files($1)
    sysnet_manage_ifconfig_run($1)
`)

#####
## <summary>
##   Read access /proc/1/ns/net performed from vip_util_reset_ns
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cedge_reset_ns`,`
    init_read_state($1)
`)

#####
## <summary>
##   Manage /dev/shm viptela files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cedge_tmpfs_manage`,`
    gen_require(`
        type polaris_cedge_tmpfs_t;
        type tmpfs_t;

```

```

    ')
    fs_tmpfs_filetrans($1, polaris_cedge_tmpfs_t, file)
    manage_files_pattern($1, tmpfs_t, polaris_cedge_tmpfs_t)
    allow $1 polaris_cedge_tmpfs_t:file map;
')

#####
## <summary>
##   Manage /tmp/.econfd2sysmgr-ipc files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_econfd2sysmgr_tmp_manage',`
    gen_require(`
        type polaris_econfd2sysmgr_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_econfd2sysmgr_tmp_t, polaris_econfd2sysmgr_tmp_t)
    manage_files_pattern($1, polaris_econfd2sysmgr_tmp_t, polaris_econfd2sysmgr_tmp_t)
    files_tmp_filetrans($1, polaris_econfd2sysmgr_tmp_t, dir, ".econfd2sysmgr-ipc")
    allow $1 polaris_econfd2sysmgr_tmp_t:dir watch;
')

#####
## <summary>
##   Manage /tmp/* labeled with polaris_vconfd_cert_tmp_t
##       for vconfd_script_upload_root_ca_cert_chain.sh to access
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vconfd_cert_tmp_manage',`
    gen_require(`
        type polaris_vconfd_cert_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_vconfd_cert_tmp_t, polaris_vconfd_cert_tmp_t)
    manage_files_pattern($1, polaris_vconfd_cert_tmp_t, polaris_vconfd_cert_tmp_t)
')

```

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedge.if



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```
#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris cpp_driver Policy Rules.</summary>

#####
## <summary>
##   Allow access to semaphore with type polaris_cpp_driver_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_driver_sem_use`,`
    gen_require(`
        type polaris_cpp_driver_t;
    `)
    allow $1 polaris_cpp_driver_t:sem rw_sem_perms;
)`

#####
## <summary>
##   Allow access to shared memory with type polaris_cpp_driver_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_driver_shm_use`,`
    gen_require(`
        type polaris_cpp_driver_t;
    `)
    allow $1 polaris_cpp_driver_t:shm rw_shm_perms;
)`

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppdriver.if
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris polarisautoupgrade Policy Rules.</summary>

#####
## <summary>
##   Execute auto-upgrade scripts in their own domain
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_autoupgrade_domtrans`,`
    gen_require(`
        type polaris_autoupgrade_t;
        type polaris_autoupgrade_exec_t;
    `)

    domtrans_pattern($1, polaris_autoupgrade_exec_t, polaris_autoupgrade_t)
)

#####
## <summary>
##   Manage tmp files created by autoupgrade.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_autoupgrade_tmp_manage`,`
    gen_require(`
        type polaris_autoupgrade_tmp_t;
    `)

    manage_files_pattern($1, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)
)
```

```
manage_lnk_files_pattern($1, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)
manage_fifo_files_pattern($1, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisautoupgrade.if

No license file was found, but licenses were detected in source scan.

```
#
# October 2019, Patrick O'Halloran
#
# Copyright (c) 2019-2020 by Cisco Systems, Inc.
# All rights reserved
#
## <summary>Polaris CRFT Policy Rules.</summary>
```

```
#####
# CRFT policy
#####
```

```
#####
## <summary>
## Allow read-only access to CRFT generated files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="file_type">
## <summary>
## File type of crft that corresponds to given domain.
## </summary>
## </param>
## <rolebase/>
#
```

```
interface(`polaris_crft_data_read`,`
gen_require(`
type polaris_crft_data_t;
type polaris_crft_request_t;
type polaris_crft_request_crft_t;
')
```

```
read_lnk_files_pattern($1, polaris_crft_data_t, polaris_crft_data_t)
polaris_disk_bootflash_read_lnk($1)
polaris_disk_harddisk_read_lnk($1)
read_files_pattern($1, polaris_crft_request_crft_t, polaris_crft_request_crft_t)
```

```

    allow $1 polaris_crft_request_t:fifo_file { ioctl write };
)

#####
## <summary>
##   Manage crft persistent files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_crft_data_manage`,`
    gen_require(`
        type polaris_crft_data_t;
    `)

    manage_dirs_pattern($1, polaris_crft_data_t, polaris_crft_data_t)
    manage_lnk_files_pattern($1, polaris_crft_data_t, polaris_crft_data_t)
    manage_files_pattern($1, polaris_crft_data_t, polaris_crft_data_t)
    # Note: Based on dicussion with SELinux team, we need to call this
    # out specifically here for lnk file access, as:
    # - NGWC /harddisk -(symlink)-> /misc/scratch -(symlink)-> /mnt/sda3/user
    polaris_disk_bootflash_read_lnk($1)
    polaris_disk_harddisk_read_lnk($1)
    allow $1 polaris_crft_data_t:file map;
)

#####
## <summary>
##   Manage crft files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_crft_data_manage_all`,`
    polaris_crft_data_manage($1)

    gen_require(`
        attribute polaris_crft_data_domain;
        type polaris_crft_data_t;
    `)
)

```

```
manage_files_pattern($1, polaris_crft_data_t, polaris_crft_data_domain)
manage_lnk_files_pattern($1, polaris_crft_data_t, polaris_crft_data_domain)
allow $1 polaris_crft_data_domain:file map;
')
```

```
#####
```

```
## <summary>
## Make the specified type usable as crft data file type.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.
## </summary>
## </param>
#
```

```
interface(`polaris_crft_data_type`,`
  files_type($1)
  polaris_pfile_type($1)
  gen_require(`
    attribute polaris_crft_data_domain;
  `)
  typeattribute $1 polaris_crft_data_domain;
')
```

```
#####
```

```
## <summary>
## Process to manage its own crft files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="file_type">
## <summary>
## File type of crft that corresponds to given domain.
## </summary>
## </param>
## <rolebase/>
#
```

```
interface(`polaris_crft_data_client`,`
  gen_require(`
    type polaris_crft_data_t;
  `)
)
```

```
manage_dirs_pattern($1, polaris_crft_data_t, $2)
manage_files_pattern($1, polaris_crft_data_t, $2)
```

```
manage_lnk_files_pattern($1, polaris_crft_data_t, $2)
filetrans_pattern($1, polaris_crft_data_t, $2, file)
allow $1 $2:file map;
)
```

```
#####
```

```
## <summary>
##   Process to manage its own crft files
## </summary>
## <param name="domain_stem">
##   <summary>
##     Steam of domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_crft_data_client_template`,
  gen_require(`
    attribute polaris_crft_data_domain;
    type polaris_crft_data_t;
  `)
)
```

```
type polaris_$1_crft_t;
polaris_crft_data_type(polaris_$1_crft_t)
polaris_crft_data_client(polaris_$1_t, polaris_$1_crft_t)
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscrft.if

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
/usr/cpp/bin/cpp_ha_top_level_server -- gen_context(system_u:object_r:polaris_cpp_ha_exec_t,s0)
/usr/cpp/bin/cpp_ha_top_level_server_ledp -- gen_context(system_u:object_r:polaris_cpp_ha_exec_t,s0)
/usr/cpp/bin/cpp_ha_top_level_server_us_ledp -- gen_context(system_u:object_r:polaris_cpp_ha_exec_t,s0)
/usr/cpp/bin/cpp_ha_top_level_server_vwlc -- gen_context(system_u:object_r:polaris_cpp_ha_exec_t,s0)
/usr/cpp/bin/cpp_ha_top_level_server_vwlc_ledp -- gen_context(system_u:object_r:polaris_cpp_ha_exec_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppha.fc

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```

#
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#
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#

policy_module(polariscfg, 1.0);

#####
# Cfg files policy
#####

type polaris_cfg_data_t;
files_type(polaris_cfg_data_t)

gen_require(
    attribute polaris_extended_domain;
)

files_tmp_filetrans(polaris_extended_domain, polaris_cfg_data_t, dir, "cfg")

#####
# cfg_sync.sh policy
#####

polaris_utility_domain_template(cfg_sync)

polaris_bexecute_domain(polaris_cfg_sync_t, polaris_cfg_sync_exec_t)

polaris_boot_tmp_read(polaris_cfg_sync_t)
polaris_btrace_data_manage(polaris_cfg_sync_t)
polaris_chasfs_read(polaris_cfg_sync_t)
polaris_cpld_read(polaris_cfg_sync_t)
polaris_use_btrace_fifo(polaris_cfg_sync_t)

corecmd_exec_bin(polaris_cfg_sync_t)
auth_use_nsswitch(polaris_cfg_sync_t)

polaris_bootflash_read(polaris_cfg_sync_t)
polaris_nvram_manage(polaris_cfg_sync_t)
telnet_use_ptys(polaris_cfg_sync_t)

gen_require(
    type rsync_t;
)
rsync_entry_domtrans(polaris_cfg_sync_t, rsync_t)
allow rsync_t polaris_cfg_sync_t:process sigchld;

```

```
# file descriptor leak when rsync is called
allow rsync_t polaris_cfg_sync_t:fifo_file { write getattr };
```

```
logging_send_syslog_msg(polaris_cfg_sync_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscfg.te
```

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```
dnl
```

```
dnl April 2018, Victor Kamensky
```

```
dnl
```

```
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
```

```
dnl All rights reserved
```

```
dnl
```

```
# polarisvxeipcbaseauto file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_base_fc.m4
```

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```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2020 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris cm_fp Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Execute cmand_fp in the polaris_cm_fp_t domain.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed to transition.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_cm_fp_domtrans',`
```

```
gen_require(`
```

```
type polaris_cm_fp_t, polaris_cm_fp_exec_t;
```

```
`)
```

```
corecmd_search_bin($1)
```

```
domtrans_pattern($1, polaris_cm_fp_exec_t, polaris_cm_fp_t)
```

```
`)
```



```
#####
## <summary>
## Allow the specified domain to manage cm_fp_tmp files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cm_fp_tmp_manage`,`
    gen_require(`
        type polaris_cm_fp_tmp_t;
        type tmp_t;
    `)

    manage_files_pattern($1, { polaris_cm_fp_tmp_t tmp_t }, polaris_cm_fp_tmp_t)
)`)

```

```
#####
## <summary>
## Create objects in /tmp with a polaris_cm_fp_tmp_t
## type using a type_transition.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cm_fp_tmp_filetrans`,`
    gen_require(`
        type polaris_cm_fp_tmp_t;
    `)

    files_tmp_filetrans($1, polaris_cm_fp_tmp_t, file, "octeon-remote-lock-pci:0")
)`)

```

```
#####
## <summary>
## Allow access to semaphore with type polaris_cm_fp_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_cm_fp_sem_use`,`
    gen_require(`
        type polaris_cm_fp_t;
    `)
    allow $1 polaris_cm_fp_t:sem rw_sem_perms;
`)

```

```

#####
## <summary>
##   Allow access to shared memory with type polaris_cm_fp_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_cm_fp_shm_use`,`
    gen_require(`
        type polaris_cm_fp_t;
    `)
    allow $1 polaris_cm_fp_t:shm rw_shm_perms;
`)

```

```

#####
## <summary>
##   Allow access to /dev/hkp with type polaris_cm_fp_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_hkp_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_hkp_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_hkp_device_t)
    read_chr_files_pattern($1, device_t, polaris_hkp_device_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmfp.if

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#

```
# August 2017, Shawn Lu
#
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#
```

```
# polarisifmgr file contexts place holder
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrifmgr.fc
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
# August 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris crankshaft Platform Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/linux-(user|kernel)-bde devices
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_bde_dev_use`,`
```

```
gen_require(`
```

```
    type device_t;
```

```
    type polaris_bde_device_t;
```

```
`)
```

```
    write_chr_files_pattern($1, device_t, polaris_bde_device_t)
```

```
    read_chr_files_pattern($1, device_t, polaris_bde_device_t)
```

```
    allow $1 polaris_bde_device_t:chr_file map;
```

```
`)
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/dash_fpga device
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```

## </summary>
## </param>
#
interface(`polaris_dash_dev_use',`
gen_require(`
    type device_t;
    type polaris_dash_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_dash_device_t)
    read_chr_files_pattern($1, device_t, polaris_dash_device_t)
    allow $1 polaris_dash_device_t:chr_file map;
)

```

```

#####
## <summary>
##   Work (read, write, ioctl) with /dev/huron_fpga device
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_huron_dev_use',`
gen_require(`
    type device_t;
    type polaris_huron_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_huron_device_t)
    read_chr_files_pattern($1, device_t, polaris_huron_device_t)
    allow $1 polaris_huron_device_t:chr_file map;
)

```

```

#####
## <summary>
##   Work (read, write, ioctl) with /dev/dplr_sumatra
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_sumatra_doppler_dev_use',`
gen_require(`
    type device_t;
    type polaris_sumatra_doppler_device_t;
`)

```

```
write_chr_files_pattern($1, device_t, polaris_sumatra_doppler_device_t)
read_chr_files_pattern($1, device_t, polaris_sumatra_doppler_device_t)
allow $1 polaris_sumatra_doppler_device_t:chr_file map;
')
```

```
#####
```

```
## <summary>
## Work (open, read, write, ioctl) with /dev/sirius_fpga device
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_sirius_fpga_dev_use`,`
```

```
gen_require(`
```

```
type device_t;
```

```
type polaris_siriusfpga_device_t;
```

```
`)
```

```
rw_chr_files_pattern($1, device_t, polaris_siriusfpga_device_t);
```

```
`)
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/nios device
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_nios_dev_use`,`
```

```
gen_require(`
```

```
type device_t;
```

```
type polaris_nios_device_t;
```

```
`)
```

```
write_chr_files_pattern($1, device_t, polaris_nios_device_t)
```

```
read_chr_files_pattern($1, device_t, polaris_nios_device_t)
```

```
`)
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/qaemem device
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_qae_dev_use`,`
gen_require(`
    type device_t;
    type polaris_qae_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_qae_device_t)
    read_chr_files_pattern($1, device_t, polaris_qae_device_t)
`)

#####
## <summary>
## Read mokafpga files in /sys/devices/platform directory
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_mokafpga_read`,`
gen_require(`
    type polaris_sysfs_mokafpga_t;
    type sysfs_t;
`)
    read_files_pattern($1, polaris_sysfs_mokafpga_t, polaris_sysfs_mokafpga_t)
    list_dirs_pattern($1, polaris_sysfs_mokafpga_t, polaris_sysfs_mokafpga_t)
`)

#####
## <summary>
## Read/Write mokafpga files in /sys/devices/platform directory
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_mokafpga_rw`,`
gen_require(`
    type polaris_sysfs_mokafpga_t;
    type sysfs_t;
`)
    rw_files_pattern($1, polaris_sysfs_mokafpga_t, polaris_sysfs_mokafpga_t)
`)

```

```

list_dirs_pattern($1, polaris_sysfs_mokafpga_t, polaris_sysfs_mokafpga_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/moka_fpga
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_mokafpga_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_mokafpga_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_mokafpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_mokafpga_device_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/nim_dm_0_1 and
## /dev/nim_dm devices
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_nim_dm_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_nim_dm_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_nim_dm_device_t)
    read_chr_files_pattern($1, device_t, polaris_nim_dm_device_t)
    allow $1 polaris_nim_dm_device_t:chr_file map;
    allow $1 device_t:chr_file map;
)

#####
## <summary>
##   Execute a domain transition to run load_usbnet.sh.

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_load_usbnet_domtrans`,`
    gen_require(`
        type polaris_load_usbnet_t, polaris_load_usbnet_exec_t;
    `)

    domtrans_pattern($1, polaris_load_usbnet_exec_t, polaris_load_usbnet_t)
`)

#####
## <summary>
##   Label and allow access to i2c semaphore files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_i2c_sem_manage`,`
    gen_require(`
        type tmpfs_t;
        type polaris_cm_cc_tmpfs_t;
    `)

    manage_files_pattern($1, tmpfs_t, polaris_cm_cc_tmpfs_t)
    mmap_files_pattern($1, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
`)

#####
## <summary>
## Work (read, write, ioctl) with /dev/bp_async device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_bp_async_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_bp_async_device_t;
    `)

```



```
)
write_chr_files_pattern($1, device_t, polaris_bp_async_device_t)
read_chr_files_pattern($1, device_t, polaris_bp_async_device_t)
allow $1 polaris_bp_async_device_t:chr_file map;
)
```

```
#####
```

```
## <summary>
## Label and allow access to i2c semaphore files.
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_udev_access',`
```

```
gen_require(`
```

```
type tmpfs_t;
```

```
type polaris_udev_tmp_files_t;
```

```
`)
```

```
manage_files_pattern($1, tmpfs_t, polaris_udev_tmp_files_t)
```

```
)
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/sparrow_psu device
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_sparrow_psu_dev_use',`
```

```
gen_require(`
```

```
type device_t;
```

```
type polaris_sparrow_psu_device_t;
```

```
`)
```

```
write_chr_files_pattern($1, device_t, polaris_sparrow_psu_device_t)
```

```
read_chr_files_pattern($1, device_t, polaris_sparrow_psu_device_t)
```

```
)
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/nutella_fpga device
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_nutella_fpga_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_nutella_fpga_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_nutella_fpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_nutella_fpga_device_t)
`)

```

```
#####
```

```

## <summary>
## Read and write to qcqmi devices.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_qcqmi_dev_use`,`
    gen_require(`
        type device_t, qcqmi_device_t;
    `)

    rw_chr_files_pattern($1, device_t, qcqmi_device_t)
`)

```

```
#####
```

```

## <summary>
## Work (read, write, ioctl) with /dev/sm_nim_adpt device files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_sm_nim_adpt_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_sm_nim_adpt_device_t;
    `)

    write_chr_files_pattern($1, device_t, polaris_sm_nim_adpt_device_t)

```

```
read_chr_files_pattern($1, device_t, polaris_sm_nim_adpt_device_t)
allow $1 polaris_sm_nim_adpt_device_t:chr_file map;
')
```

```
#####
```

```
## <summary>
##   Work (read, write, ioctl) with /dev/dio-*
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_dio_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_dio_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_dio_device_t)
    read_chr_files_pattern($1, device_t, polaris_dio_device_t)
    allow $1 polaris_dio_device_t:chr_file map;
')
```

```
#####
```

```
## <summary>
##   Read /dev/dio-*
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_dio_dev_read`,`
    gen_require(`
        type device_t;
        type polaris_dio_device_t;
    `)
    read_chr_files_pattern($1, device_t, polaris_dio_device_t)
')
```

```
#####
```

```
## <summary>
##   Work (read, write, ioctl) with /dev/ttyNMEA* and /dev/ttyTunNMEA*
## </summary>
## <param name="domain">
##   <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_tty_NMEA_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_tty_NMEA_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_tty_NMEA_device_t)
    read_chr_files_pattern($1, device_t, polaris_tty_NMEA_device_t)
    allow $1 polaris_tty_NMEA_device_t:chr_file map;
`)

```

```
#####
```

```

## <summary>
## Read /dev/ttyNMEA* and /dev/ttyTunNMEA*
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_tty_NMEA_dev_read`,`
    gen_require(`
        type device_t;
        type polaris_tty_NMEA_device_t;
    `)
    read_chr_files_pattern($1, device_t, polaris_tty_NMEA_device_t)
`)

```

```
#####
```

```

## <summary>
## Work (read, write, ioctl) with /dev/nim_phy
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_nim_phy_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_nim_phy_device_t;
    `)
    rw_chr_files_pattern($1, device_t, polaris_nim_phy_device_t)

```

```
allow $1 polaris_nim_phy_device_t:chr_file map;
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscrankshaft.if
```

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dnl

dnl July 2020, Victor Kamensky

dnl

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dnl

dnl c8kv Platform Max Bay Limits

```
max_bay_map_set(rp, per_bay, 0)
```

```
max_bay_map_set(cc, per_bay, 3)
```

```
max_bay_map_set(fp, per_bay, 0)
```

```
max_bay_ripc_map_set(rp, per_bay, 0)
```

```
max_bay_ripc_map_set(cc, per_bay, 3)
```

```
max_bay_ripc_map_set(fp, per_bay, 0)
```

```
max_bay_ripc_map_set(rp, global, 0)
```

```
max_bay_ripc_map_set(cc, global, 3)
```

```
max_bay_ripc_map_set(fp, global, 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/c8kvmaps.m4
```

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#

# August 2017, Victor Kamensky

#

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#

# /bootflash labels

```
/bootflash(/.*)? gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
```

```
/bootflash/.ssh(/.*)? gen_context(system_u:object_r:ssh_home_t,s0)
```

```
/bootflash/.ssh/ssh_host.*_key.pub gen_context(system_u:object_r:sshd_key_t,s0)
```

```
/bootflash/.ssh/ssh_host.*_key gen_context(system_u:object_r:sshd_key_t,s0)
```

```
/bootflash/tracelogs(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)
```

```
/bootflash/tan(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)
```

```
/bootflash/core(/.*)? gen_context(system_u:object_r:polaris_core_file_t,s0)
```

```
/bootflash/debug.conf gen_context(system_u:object_r:polaris_debug_conf_t,s0)
```

```
/bootflash/packages.conf gen_context(system_u:object_r:polaris_packages_conf_t,s0)
```

```

# /objstore/.swtam for hybrid TAM access
/objstore(/.*)?          gen_context(system_u:object_r:polaris_disk_objstore_t,s0)

/csl_p_0(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/csl_p_1(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/csl_s_0(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
/csl_s_1(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
/obfl(/.*)?             gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# not really a license file stored by iosd during platform resource config command
/csl_p_0/vcpu_template.txt      gen_context(system_u:object_r:polaris_iosd_vcpu_t,s0)

# nvram devices
/dev/bootflash2 -b          gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/dev/bootflash3 -b          gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/dev/sda2 -b                gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/dev/sda3 -b                gen_context(system_u:object_r:polaris_nvram_file_t,s0)

/dev/linux-user-bde -c gen_context(system_u:object_r:polaris_bde_device_t,s0)
/dev/linux-kernel-bde -c gen_context(system_u:object_r:polaris_bde_device_t,s0)

/dev/dash_fpga -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc0 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc1 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc2 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc3 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_nios -c gen_context(system_u:object_r:polaris_dash_device_t,s0)

/dev/huron_fpga -c gen_context(system_u:object_r:polaris_huron_device_t,s0)
/dev/dplr_sumatra -c gen_context(system_u:object_r:polaris_sumatra_doppler_device_t,s0)

/dev/nios -c gen_context(system_u:object_r:polaris_nios_device_t,s0)

/dev/qaе_mem -c gen_context(system_u:object_r:polaris_qae_device_t,s0)

/dev/icp_adf_gige_wd -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev0_csr -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev0_ring -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_mem -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_mem_page -c gen_context(system_u:object_r:polaris_icp_device_t,s0)

# moka fpga
/dev/moka_fpga -c gen_context(system_u:object_r:polaris_mokafpga_device_t,s0)
/dev/moka_fpga_cc -c gen_context(system_u:object_r:polaris_mokafpga_device_t,s0)

# for load usbnet module
/usr/bin/os/conf/load_usbnet.sh -- gen_context(system_u:object_r:polaris_load_usbnet_exec_t,s0)

```

```

/dev/nim_dm -c gen_context(system_u:object_r:polaris_nim_dm_device_t,s0)
/dev/nim_dm_0_1 -c gen_context(system_u:object_r:polaris_nim_dm_device_t,s0)

/dev/nim_phy -c gen_context(system_u:object_r:polaris_nim_phy_device_t,s0)

# file-system on blackheart/sparrow
# /crashinfo is symbolic link to /flash1
/crashinfo          gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)

# /flash is symbolic link to /flash1
/flash              gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# /flash0 NVRAM
/flash0(/.*)?      gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# /flash1 Bootflash
/flash1(/.*)?      gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/flash1/tracelogs(/.*)?      gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/flash1/.geo(/.*)?      gen_context(system_u:object_r:polaris_geodb_files_t,s0)
/flash1/.USWAP(/.*)?      gen_context(system_u:object_r:polaris_uswap_files_t,s0)
/flash1/.dbpersist(/.*)?      gen_context(system_u:object_r:polaris_disk_dbm_t,s0)
/flash1/debug.conf --      gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/flash1/packages.conf      gen_context(system_u:object_r:polaris_packages_conf_t,s0)
/flash1/core(/.*)?      gen_context(system_u:object_r:polaris_core_file_t,s0)
/flash1/.rollback_timer(/.*)?      gen_context(system_u:object_r:polaris_rbtimer_bootflash_t,s0)
/flash1/.installer(/.*)?      gen_context(system_u:object_r:polaris_disk_install_t,s0)
/flash1/.ssh(/.*)?      gen_context(system_u:object_r:ssh_home_t,s0)
/flash1/.ssh/ssh_host.*_key\,pub      gen_context(system_u:object_r:ssh_key_t,s0)
/flash1/.ssh/ssh_host.*_key      gen_context(system_u:object_r:ssh_key_t,s0)

# /flash3 OBFL
/flash3(/.*)?      gen_context(system_u:object_r:polaris_obfl_data_t,s0)
/flash3/OBFL(/.*)?      gen_context(system_u:object_r:polaris_obfl_data_t,s0)

#harddisk
/vol/harddisk(/.*)?      gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
/mnt/msata(/.*)?      gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)

# for usage by IOx
/vol/usb1(/.*)?      gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)

/dev/shm/sem\._dev_i2c_0      gen_context(system_u:object_r:polaris_cm_cc_tmpfs_t,s0)
/dev/shm/sem\._dev_i2c_1      gen_context(system_u:object_r:polaris_cm_cc_tmpfs_t,s0)
/dev/shm/sem\._dev_i2c_2      gen_context(system_u:object_r:polaris_cm_cc_tmpfs_t,s0)

/tmp/udev/etc/udev/msata/udev-info      gen_context(system_u:object_r:polaris_udev_tmp_files_t,s0)

# Nvram symlink on Aventus platform

```

```

/aventus_config/nvram          gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# Nvram symlink on Cabo platform
/cabo_config/nvram            gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# Device applicable to Betelgeuse platform
/dev/sirius_fpga              gen_context(system_u:object_r:polaris_siriusfpga_device_t,s0)

# Device applicable to Nanook platform
/dev/bp_async -c gen_context(system_u:object_r:polaris_bp_async_device_t,s0)

# Device applicable to Sparrow platform
/dev/remap_mem0 -c gen_context(system_u:object_r:polaris_remap_mem_device_t,s0)
/dev/sparrow_psu -c gen_context(system_u:object_r:polaris_sparrow_psu_device_t,s0)
/dev/dio-upstream -c gen_context(system_u:object_r:polaris_dio_device_t,s0)
/dev/dio-[1-4] -c gen_context(system_u:object_r:polaris_dio_device_t,s0)
/dev/ttyNMEA[0-1] -c gen_context(system_u:object_r:polaris_tty_NMEA_device_t,s0)
/dev/ttyTunNMEA[0-1] -c gen_context(system_u:object_r:polaris_tty_NMEA_device_t,s0)

# Device applicable to Nutella platform
/dev/nutella_fpga -c gen_context(system_u:object_r:polaris_nutella_fpga_device_t,s0)

#Only qcqmi0 and qcqmi1 are generated for Telit/SWI modems
/dev/qcqmi0 -c gen_context(system_u:object_r:qcqmi_device_t,s0)
/dev/qcqmi1 -c gen_context(system_u:object_r:qcqmi_device_t,s0)

#SM NIM Adpater Switzer-CC device files
/dev/sm_nim_adpt_fpga_1 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_nim_oir_1_0 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_nim_oir_1_1 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_fpga_2 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_nim_oir_2_0 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)
/dev/sm_nim_adpt_nim_oir_2_1 -c gen_context(system_u:object_r:polaris_sm_nim_adpt_device_t,s0)

# CLI: show platform hardware msata
/usr/binos/bin/msata_info.sh -- gen_context(system_u:object_r:polaris_msata_info_exec_t,s0)
/tmp/sata_status -- gen_context(system_u:object_r:polaris_sata_status_tmp_t,s0)

# Memory blocks and gpp for Nutella platform
/dev/mmcblk0gp0p1 gen_context(system_u:object_r:polaris_nutella_gp0_t,s0)
/gpp gen_context(system_u:object_r:polaris_nutella_gpp_t,s0)

# CLI: show platform hardware slot p[x] fan eeprom
/usr/binos/conf/mcp_fan_eeprom_cmd.sh -- gen_context(system_u:object_r:polaris_smart_fan_exec_t,s0)

/var/run/cwan_ezmanage_cwan_server -- gen_context(system_u:object_r:polaris_cwan_svr_var_run_t,s0)

```



Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscrankshaft.fc

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#

# March 2017, Victor Kamensky

#

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#

policy\_module(polariscmfp, 1.0);

gen\_require(`

type polaris\_cm\_fp\_t;

`)

polaris\_btrace\_data\_manage(polaris\_cm\_fp\_t)

polaris\_crft\_data\_manage(polaris\_cm\_fp\_t)

polaris\_chasfs\_manage(polaris\_cm\_fp\_t)

polaris\_tdlresolve\_read(polaris\_cm\_fp\_t)

polaris\_tdlldb\_list\_dirs(polaris\_cm\_fp\_t)

polaris\_cpld\_read(polaris\_cm\_fp\_t)

polaris\_flashlib\_read(polaris\_cm\_fp\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_cm\_fp\_t)

polaris\_cpld\_dev\_use(polaris\_cm\_fp\_t)

polaris\_proc\_rmonbifo\_read(polaris\_cm\_fp\_t)

polaris\_obfl\_data\_read(polaris\_cm\_fp\_t)

polaris\_persistent\_list\_dirs(polaris\_cm\_fp\_t)

polaris\_chasync\_files\_manage(polaris\_cm\_fp\_t)

# cman\_fp creates /tmp/cpp\_anon\_db file, instead of adding it to polaris\_cpp\_domain

# let us just grant access to cpp tmp files

polaris\_cpp\_tmp\_files\_use(polaris\_cm\_fp\_t, "cpp\_anon\_db")

# on 1ng works with /dev/cpp

polaris\_cpp\_dev\_use(polaris\_cm\_fp\_t)

# work with /dev/i2c devices

polaris\_i2c\_use(polaris\_cm\_fp\_t)

# on ultra read eeprom through i2c

# type=AVC msg=audit(1479556298.842:11): avc: denied { getattr } for pid=5464 comm="cman\_fp"

path="/sys/devices/i2c-0/i2c-1/1-0056/eeprom" dev="sysfs" ino=25556

scontext=system\_u:system\_r:polaris\_cm\_fp\_t:s0 tcontext=system\_u:object\_r:sysfs\_t:s0 tclass=file

# type=AVC msg=audit(1479556298.842:12): avc: denied { read write } for pid=5464 comm="cman\_fp"

name="eeprom" dev="sysfs" ino=25556 scontext=system\_u:system\_r:polaris\_cm\_fp\_t:s0

```

tcontext=system_u:object_r:sysfs_t:s0 tclass=file
dev_rw_sysfs(polaris_cm_fp_t)

polaris_icc_broken_relocations(polaris_cm_fp_t)

allow polaris_cm_fp_t self:udp_socket { create ioctl };

# cman_fp can start dyncfg_setup.sh, allow its transition to dyncfg_t type
polaris_dyncfg_domtrans(polaris_cm_fp_t)

# on 1ng cman_fp write into /bootflash/crypto/octeon_pci_console_dev0_20170723_075412.log
polaris_bootflash_manage(polaris_cm_fp_t)

polaris_disk_harddisk_read_lnk(polaris_cm_fp_t)

# write to devices like this /proc/bus/pci/04/00.0
kernel_read_system_state(polaris_cm_fp_t)
kernel_write_proc_files(polaris_cm_fp_t)

# cm_fp tmp files like /tmp/octeon-remote-lock-pci:0
type polaris_cm_fp_tmp_t;
files_tmp_file(polaris_cm_fp_tmp_t)
polaris_cm_fp_tmp_filetrans(polaris_cm_fp_t)
polaris_cm_fp_tmp_manage(polaris_cm_fp_t)
# besides /tmp/octeon-remote-lock-pci:0 all other files in /tmp
# are ours
files_tmp_filetrans(polaris_cm_fp_t, polaris_cm_fp_tmp_t, file)

# LOOK AT ME: raw memory write access
ifdef(^mcp_family',`
polaris_dev_mem_use(polaris_cm_fp_t)
`)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh55517)
ifdef(^crankshaft_family',`
polaris_dev_mem_use(polaris_cm_fp_t)
`)

# LOOK AT ME: raw memory access in dopler SDK remove after
# CSCvm34516 is fixed using CSCvm34630
ifdef(^starfleet_platform',`
polaris_dev_mem_use(polaris_cm_fp_t)
`)

# "show platform hardware slot F0 eobc interface standby rmon" leads to
# ioctl() call from cmlib_get_eobc_drv_info().
kernel_request_load_module(polaris_cm_fp_t)

```

```

# needed for "show platform hardware slot F0 eobc interface standby rmon"
kernel_read_network_state(polaris_cm_fp_t)

# on RP2/RP3 linecard cyan init happens within cm
#ifdef(^mcp_family',`
polaris_dyncfg_setup(polaris_cm_fp_t)
`)

allow polaris_cm_fp_t self:capability dac_override;

polaris_obfl_data_manage(polaris_cm_fp_t)

allow polaris_cm_fp_t self:netlink_route_socket rw_netlink_socket_perms;

#ifdef(^ngwc_family',`
# cmfp_asic_mmap_func() function in cmfp module uses
# /dev/chdrvmmmap for asic memory mapping
polaris_chdrvmmmap_dev_use(polaris_cm_fp_t)

# on macallan cman_fp needs access to /dev/cisco/dplriomem
# for mappin dplr io memory to application space.
polaris_dplr_iomem_mmapdrv_dev_use(polaris_cm_fp_t);

# on macallan iomd needs access to /dev/cisco/fpga_iomem
# for mapping FPGA io memory to application space.
polaris_fpga_iomem_mmapfpga_dev_use(polaris_cm_fp_t);
`)

optional_policy(`
# Allow /dev/dmammap access
polaris_dmammap_dev_use(polaris_cm_fp_t)
`)

# on starfleet need access to
# /sys/device/platform/cpld/reg_fan_control
polaris_cpld_write(polaris_cm_fp_t)

# /dev/shm/sdm access
optional_policy(`
polaris_sdm_shm_manage(polaris_cm_fp_t)
`)

logging_send_syslog_msg(polaris_cm_fp_t)

# /dev/epactrlN on qwlc
optional_policy(`
polaris_epa_dev_use(polaris_cm_fp_t)
`)

```

```

')

# /dev/astro on qwlc
optional_policy(`
polaris_astro_dev_use(polaris_cm_fp_t)
`)

# /dev/cpp_il on qwlc
optional_policy(`
polaris_cpp_il_dev_use(polaris_cm_fp_t)
`)

# on radium need to get model info
optional_policy(`
polaris_dash_dev_use(polaris_cm_fp_t)
`)

# on neptune, cavium library in o2_cavm_mem_map wants access to
# /sys/devices/pci0000:00/0000:00:01.0/0000:01:00.0/resource0
optional_policy(`
polaris_cpp_cavium_dma_map(polaris_cm_fp_t)
`)

# /dev/aikido access
polaris_aikido_dev_use(polaris_cm_fp_t)

optional_policy(`
# betelgeuse need access to /dev/sirius_fpga
polaris_sirius_fpga_dev_use(polaris_cm_fp_t)
`)

# access SERDES /tmp/serdes_asic_key_dir/*
optional_policy(`
polaris_serdes_asic_key_tmp_manage(polaris_cm_fp_t)
`)

type polaris_hkp_device_t;
dev_node(polaris_hkp_device_t)

# access /dev/iocp0
optional_policy(`
polaris_spa_dev_use(polaris_cm_fp_t)
`)

optional_policy(`
# access /dev/hkp
polaris_hkp_dev_use(polaris_cm_fp_t)
`)

```

```
polaris_n2_dev_use(polaris_cm_fp_t)
polaris_cy2213_dev_use(polaris_cm_fp_t)
polaris_ddr_dev_use(polaris_cm_fp_t)
polaris_vega_dev_use(polaris_cm_fp_t)
')
```

```
polaris_firmware_read(polaris_cm_fp_t)
```

```
# allow access to /csl_p_0/vcpu_template.txt
polaris_iosd_vcpu_read(polaris_cm_fp_t)
```

```
# allow Cabo access to i2c semaphores
#ifdef(^cabo_platform',`
polaris_i2c_sem_manage(polaris_cm_fp_t)
')
```

```
ifdef(^sumatra_platform',`
# access huron fpga on sumatra
polaris_huron_dev_use(polaris_cm_fp_t)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmfp.te
```

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```
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#
```

```
# polarisezmancc file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisezmancc.fc
```

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```
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#
```

```
policy_module(polarisripc, 1.0);
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisripc.te
```

```
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```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

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```
# All rights reserved
```

```
#
```

```
# polarisripc file contexts place holder
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisripc.fc
```

```
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```

```
dnl
```

```
dnl April 2018, Victor Kamensky
```

```
dnl
```

```
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```

```
dnl All rights reserved
```

```
dnl
```

```
divert(-1)
```

```
include(`polaris_process.m4')
```

```
include(`polaris_process_fc.m4')
```

```
include(`polaris_ipc_mqipc.m4')
```

```
include(`polaris_ipc_mqipc_fc.m4')
```

```
include(`polaris_ipc_ripc.m4')
```

```
include(`polaris_ipc_ripc_fc.m4')
```

```
include(`polaris_ipc_lipc.m4')
```

```
include(`polaris_ipc_lipc_fc.m4')
```

```
dnl Stub out non existent one
```

```
define(`polaris_websocket_service_server',`')
```

```
define(`polaris_cipc_service_server',`')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl
```

```
#
```

```
# This is a generated file! Instead of modifying this file,
```

```
# modify proper platform TDL file.
```

```
#
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_fc.m4

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#

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#

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#

policy\_module(polarisstorage, 1.0);

#####

# Persistent storage policy

#####

attribute polaris\_disk;

# Default disk types

type polaris\_disk\_bootflash\_t;

polaris\_disk\_type(polaris\_disk\_bootflash\_t)

type polaris\_disk\_varied\_t;

polaris\_disk\_type(polaris\_disk\_varied\_t)

type polaris\_disk\_harddisk\_t;

polaris\_disk\_type(polaris\_disk\_harddisk\_t)

type polaris\_disk\_csl\_p\_t;

polaris\_disk\_type(polaris\_disk\_csl\_p\_t)

type polaris\_disk\_csl\_s\_t;

polaris\_disk\_type(polaris\_disk\_csl\_s\_t)

type polaris\_disk\_objstore\_t;

polaris\_disk\_type(polaris\_disk\_objstore\_t)

type polaris\_disk\_crashinfo\_t;

polaris\_disk\_type(polaris\_disk\_crashinfo\_t)

type polaris\_disk\_license\_t;

polaris\_disk\_type(polaris\_disk\_license\_t)

type polaris\_disk\_ucose\_t;

polaris\_disk\_type(polaris\_disk\_ucose\_t)

type polaris\_disk\_recovery\_t;

```

polaris_disk_type(polaris_disk_recovery_t)

type polaris_disk_config_t;
polaris_disk_type(polaris_disk_config_t)

# Persistent files types
type polaris_system_report_t;
polaris_pfile_type(polaris_system_report_t)

type polaris_core_file_t;
polaris_pfile_type(polaris_core_file_t)

type polaris_debug_conf_t;
polaris_pfile_type(polaris_debug_conf_t)

type polaris_packages_conf_t;
polaris_pfile_type(polaris_packages_conf_t)

type polaris_grub_efi_t;
polaris_pfile_type(polaris_grub_efi_t)

# we label .ssh files residing on persistent storage as ssh_home_t
# and sshd_key_t
#
# below statement could/should be moved into ssh te file?
gen_require(
    type ssh_home_t;
    type sshd_key_t;
)
polaris_disk_type(ssh_home_t)
polaris_disk_type(sshd_key_t)

# handling /bootflash directory - created by systemd unit, note normally
# something will be mounted on top of it, but in some cases like RP2 line
# cards it will be ramfs directory.
gen_require(
    type root_t;
    type unconfined_service_t;
)
filetrans_pattern(unconfined_service_t, root_t, polaris_disk_bootflash_t, dir, "bootflash")

# nfsd accesses different persistent storage directories and it needs getattr
gen_require(
    type nfsd_t;
)
polaris_persistent_getattr(nfsd_t)

# on qwlc /misc/scratch symbolic link created by systemd-tmpfile, but then

```



```

# removed and recreated by harddisk mount systemd unit
gen_require(
    type unconfined_service_t;
    type mnt_t;
)
filetrans_pattern(unconfined_service_t, mnt_t, polaris_disk_bootflash_t, lnk_file, "scratch")

gen_require(
    type polaris_confd_t;
    type tmp_t;
)
filetrans_pattern(polaris_confd_t, tmp_t, polaris_packages_conf_t, file, "packages.conf")

# first time creation of /bootflash/core directory
gen_require(
    type initrc_t;
    type init_t;
)
filetrans_pattern({initrc_t init_t unconfined_service_t}, {polaris_disk_bootflash_t polaris_disk_harddisk_t},
polaris_core_file_t, dir, "core")

gen_require(
    type init_t;
)
files_tmp_filetrans(init_t, polaris_packages_conf_t, file, "packages.conf")

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisstorage.te

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```

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#

```

```

/usr/binos/conf/run_ioxn_gs_ha.sh -- gen_context(system_u:object_r:polaris_gsd_rp_exec_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgsdrp.fc

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```

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```

```
#

/usr/cpp/bin/cpp_sp_svr -- gen_context(system_u:object_r:polaris_cpp_sp_exec_t,s0)
/usr/cpp/bin/cpp_sp_svr_ledp -- gen_context(system_u:object_r:polaris_cpp_sp_exec_t,s0)
/usr/cpp/bin/cpp_sp_svr_us_ledp -- gen_context(system_u:object_r:polaris_cpp_sp_exec_t,s0)
/usr/cpp/bin/cpp_sp_svr_vwlc -- gen_context(system_u:object_r:polaris_cpp_sp_exec_t,s0)
/usr/cpp/bin/cpp_sp_svr_vwlc_ledp -- gen_context(system_u:object_r:polaris_cpp_sp_exec_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppsp.fc

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```
#
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#
```

```
## <summary>Polaris Btrace Policy Rules.</summary>
```

```
#####
```

```
# Btrace policy
```

```
#####
```

```
#####
```

```
## <summary>
```

```
## Manage btrace auxiliary files
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
## <rolebase/>
```

```
#
```

```
interface(`polaris_btrace_data_manage`,`
```

```
gen_require(`
```

```
type polaris_btrace_base_t;
```

```
type polaris_btrace_tmpfs_t;
```

```
type tmpfs_t;
```

```
`)
```

```
manage_dirs_pattern($1, polaris_btrace_base_t, polaris_btrace_base_t)
```

```
# work with cache files and dirs under /tmp/tmppub, like /tmp/tmppub/libs_cache
```

```
polaris_btrace_tmppub_manage($1)
```

```

    fs_tmpfs_filetrans($1, polaris_btrace_tmpfs_t, file, "oper_uid_shm")
    manage_files_pattern($1, tmpfs_t, polaris_btrace_tmpfs_t)
    allow $1 polaris_btrace_tmpfs_t:file map;
)

#####
## <summary>
##   Manage temporary (not yet persistent) btrace files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_manage_all`,`

    polaris_btrace_data_manage($1)

gen_require(`
    attribute polaris_btrace_data_domain;
    type polaris_btrace_base_t;
`)

    manage_files_pattern($1, polaris_btrace_base_t, polaris_btrace_data_domain)
    manage_lnk_files_pattern($1, polaris_btrace_base_t, polaris_btrace_data_domain)
    allow $1 polaris_btrace_data_domain:file map;

    # create temporary files in trace directory
    manage_files_pattern($1, polaris_btrace_base_t, polaris_btrace_base_t)
    manage_lnk_files_pattern($1, polaris_btrace_base_t, polaris_btrace_base_t)

    # watch btrace data directory for changes
    allow $1 polaris_btrace_base_t:dir watch;
)

#####
## <summary>
##   Manage btrace persitent files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#

```

```

interface(`polaris_btrace_persistent_data_manage`,`
gen_require(
    type polaris_btrace_data_t;
)

    manage_dirs_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
    manage_files_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
)

#####
## <summary>
##   Read btrace persitent files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_persistent_data_read`,`
gen_require(
    type polaris_btrace_data_t;
)

    search_dirs_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
    read_files_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
)

#####
## <summary>
##   Search btrace persitent files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_persistent_data_search`,`
gen_require(
    type polaris_btrace_data_t;
)

    search_dirs_pattern($1, polaris_btrace_data_t, polaris_btrace_data_t)
)

```

```

#####
## <summary>
##   Search tracelogs directions in bootflash, harddisk or crashinfo
## directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_search_tracelogs',`
gen_require(`
    type polaris_disk_harddisk_t;
    type polaris_disk_bootflash_t;
    type polaris_disk_crashinfo_t;
`)

    search_dirs_pattern($1, polaris_disk_harddisk_t, polaris_btrace_data_t)
    search_dirs_pattern($1, polaris_disk_bootflash_t, polaris_btrace_data_t)
    search_dirs_pattern($1, polaris_disk_crashinfo_t, polaris_btrace_data_t)
`)

#####
## <summary>
##   Manage btrace boot level config files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_lv1_config_manage',`
gen_require(`
    type polaris_btrace_lv1_config_t;
    type polaris_btrace_data_t;
`)

    manage_dirs_pattern($1, polaris_btrace_lv1_config_t, polaris_btrace_lv1_config_t)
    manage_files_pattern($1, polaris_btrace_lv1_config_t, polaris_btrace_lv1_config_t)
    filetrans_pattern($1, polaris_btrace_data_t, polaris_btrace_lv1_config_t, dir, "level_config")

    polaris_btrace_search_tracelogs($1)

    polaris_disk_bootflash_read_lnk($1)

```

```

    polaris_disk_harddisk_read_lnk($1)
    polaris_disk_crashinfo_read_lnk($1)
)

#####
## <summary>
##   Read ldb_tmp btrace meta data files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_ldb_tmp_read`,`
gen_require(`
type polaris_ldb_tmp_t;
)

    read_files_pattern($1, polaris_ldb_tmp_t, polaris_ldb_tmp_t)
)

#####
## <summary>
## Read and write all btrace or pman fifo file, used as
##   standard input/output.
## </summary>
## <param name="domain">
## <summary>
##   Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_use_btrace_fifo`,`
gen_require(`
type polaris_fifo_stdout_t;
)

    allow $1 polaris_fifo_stdout_t:fifo_file { rw_term_perms lock append create unlink getattr };

# For pmanlite, allow pmans grand-children to be able to operate on
# pipe created by pman.
polaris_use_pman_fifo($1)
)

```

```
#####
## <summary>
##   Execute create_luid_file_db in the its domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_create_ldb_domtrans`,`
  gen_require(`
    type polaris_create_ldb_t, polaris_create_ldb_exec_t;
  `)

  corecmd_search_bin($1)
  domtrans_pattern($1, polaris_create_ldb_exec_t, polaris_create_ldb_t)
)`)

```

```
#####
## <summary>
## Make the specified type usable as btrace data file type.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.
## </summary>
## </param>
#
interface(`polaris_btrace_data_type`,`
  files_type($1)
  gen_require(`
    attribute polaris_btrace_data_domain;
  `)
  typeattribute $1 polaris_btrace_data_domain;
)`)

```

```
#####
## <summary>
##   Process to manage its own btrace files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="file_type">
##   <summary>

```

```

## File type of btrace that corresponds to given domain.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_client',`
gen_require(`
type polaris_btrace_base_t;
`)

manage_files_pattern($1, polaris_btrace_base_t, $2)
manage_lnk_files_pattern($1, polaris_btrace_base_t, $2)
filetrans_pattern($1, polaris_btrace_base_t, $2, { file lnk_file })

# all clients check for /tmp/rp/trace/publish/timed/enabled control
# file presense, created by btman, may need its own type
gen_require(`
type polaris_btman_bt_t;
`)
getattr_files_pattern($1, polaris_btrace_base_t, polaris_btman_bt_t)

allow $1 $2:file map;
`)

#####
## <summary>
## Process to manage its own btrace files
## </summary>
## <param name="domain_stem">
## <summary>
## Steam of domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_client_template',`
gen_require(`
attribute polaris_btrace_data_domain;
type polaris_btrace_base_t;
`)

type polaris_$1_bt_t;
polaris_btrace_data_type(polaris_$1_bt_t)

polaris_btrace_data_client(polaris_$1_t, polaris_$1_bt_t)
`)

```



```
#####
## <summary>
## Execute mcp_trace_request.sh in its domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_trace_request_domtrans`,`
    gen_require(`
        type polaris_trace_request_t, polaris_trace_request_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_trace_request_exec_t, polaris_trace_request_t)
`)
```

```
#####
## <summary>
## Watch btrace directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_btrace_data_watch`,`
    gen_require(`
        type polaris_btrace_base_t;
        type polaris_btrace_data_t;
    `)

    allow $1 polaris_btrace_base_t:dir watch;
    allow $1 polaris_btrace_data_t:dir watch;
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtrace.if

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```
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```

```
#

policy_module(polaristamsrp, 1.0);

gen_require(
    type polaris_tams_rp_t;
)

polaris_btrace_data_manage(polaris_tams_rp_t)
polaris_crft_data_manage(polaris_tams_rp_t)
polaris_chasfs_manage(polaris_tams_rp_t)
polaris_tdlresolve_read(polaris_tams_rp_t)
polaris_tdlldb_list_dirs(polaris_tams_rp_t)
polaris_flashlib_read(polaris_tams_rp_t)
polaris_cpld_read(polaris_tams_rp_t)

polaris_rpc_sman_ui_serv_connect(polaris_tams_rp_t)

# tams_tamc_tipc_listener_init function create tipc socket
allow polaris_tams_rp_t self:socket { bind create listen accept getattr read write };

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristamsrp.te
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```

```
#
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#
```

```
policy_module(polarisiomd, 1.0);

gen_require(
    type polaris_iomd_t;
)

polaris_btrace_data_manage(polaris_iomd_t)
polaris_crft_data_manage(polaris_iomd_t)
polaris_chasfs_manage(polaris_iomd_t)
polaris_tdlresolve_read(polaris_iomd_t)
polaris_tdlldb_list_dirs(polaris_iomd_t)
polaris_cpld_read(polaris_iomd_t)
polaris_flashlib_read(polaris_iomd_t)

polaris_rpc_sman_ui_serv_connect(polaris_iomd_t)
```

```

polaris_db_tdlldb_dir_use(polaris_iomd_t)

polaris_dyncfg_tmp_read(polaris_iomd_t)
optional_policy(
polaris_spa_dev_use(polaris_iomd_t)
')

# allow objstore access
polaris_disk_objstore_read(polaris_iomd_t)

polaris_ngio_dev_use(polaris_iomd_t)

# deals with /dev/shm files semaphors; like uuid_sem semaphore
# created by btrace_get_uuid function
type polaris_iomd_tmpfs_t;
files_tmpfs_file(polaris_iomd_tmpfs_t)
fs_tmpfs_filetrans(polaris_iomd_t, polaris_iomd_tmpfs_t, file)
manage_files_pattern(polaris_iomd_t, tmpfs_t, polaris_iomd_tmpfs_t)
# sem_open through where_is_shmfs does stat on /dev/shm
fs_getattr_tmpfs(polaris_iomd_t)

#allow /dev/i2c device file
polaris_i2c_use(polaris_iomd_t)

#ifdef(^ngwc_family',`
# On Macallan platforms the following api call from iomd process,
# ngmodslot_is_upper_sup_present() does a read access of /dev/cpld
polaris_cpld_dev_read(polaris_iomd_t)
polaris_cpld_dev_use(polaris_iomd_t)

#allow cpp tmp file
polaris_cpp_tmp_files_use(polaris_iomd_t)

# In Macallan cards which use Doppler ASIC,
# IOMD module uses ngmod_doppler_mmap() api to get hold of
# MMapped Asic address. As part of the operation it uses
# /dev/chdrvmmmap device.
polaris_chdrvmmmap_dev_use(polaris_iomd_t)

# IOMD module invokes ASIC Scan functionality
# and calls asic_register_intr_handler () , which
# needs to access the doppler MSI devices
# /dev/msi/Slot[0-9]*/Doppler[0-9]/Group[0-9]
polaris_dplr_dev_use(polaris_iomd_t)
# but above still not enough at some point
# device like /dev/msi/Slot8/Doppler0/Group0 still
# considered as device_t, not clear need to look a bit more
dev_rw_generic_chr_files(polaris_iomd_t)

```

```

# on macallan iomd needs access to /dev/cisco/dplriomem
# for mapping dplr io memory to application space.
polaris_dplr_iomem_mmapdrv_dev_use(polaris_iomd_t);

# IOMD calls ngmod_obfl_errmssg_app_init() to initialize
# OBFL.
polaris_obfl_data_manage(polaris_iomd_t)

# IOMD fast path code invokes ngmod_fastpath_thread_func(),
# which increases the scheduler priority.
allow polaris_iomd_t self:capability sys_nice;
allow polaris_iomd_t self:process setsched;

# on macallan iomd needs access to /dev/cisco/fpga_iomem
# for mapping FPGA io memory to application space.
polaris_fpga_iomem_mmapfpga_dev_use(polaris_iomd_t);

optional_policy(`
# ASIC related mmap code in IOMD needs to access PCI scan related
# rescan shm mutex
polaris_cm_cc_tmpfs_manage(polaris_iomd_t)
`)

# both utah and macallan text relocations in libcpp_common_os.so
ifdef(`crankshaft_family',`
polaris_icc_broken_relocations(polaris_iomd_t)
# Nightwatch switch module needs to access the doppler devices
polaris_dplr_dev_use(polaris_iomd_t)
dev_rw_generic_chr_files(polaris_iomd_t)
allow polaris_iomd_t self:capability sys_nice;
allow polaris_iomd_t self:process setsched;
`)

optional_policy(`
# Allow /dev/dm mmap access
polaris_dm_mmap_dev_use(polaris_iomd_t)
`)

optional_policy(`
# on starfleet access gettysburg_fpga
polaris_gettysburg_fpga_dev_use(polaris_iomd_t)
`)

type polaris_iomd_tmp_t;
files_tmp_file(polaris_iomd_tmp_t)
manage_dirs_pattern(polaris_iomd_t, polaris_iomd_tmp_t, polaris_iomd_tmp_t)

```

```

manage_files_pattern(polaris_iomd_t, polaris_iomd_tmp_t, polaris_iomd_tmp_t)
manage_fifo_files_pattern(polaris_iomd_t, polaris_iomd_tmp_t, polaris_iomd_tmp_t)

# on macallan MRVL88X5113_DRV_PRINT macro outputs into /tmp/mrvl88x5113.log file
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, file, "mrvl88x5113.log")

logging_send_syslog_msg(polaris_iomd_t)

#ifdef(`ngwc_family',`
# from in115050_test_app_thread_create in
# drivers/userspace/inphi/dev_ephy_in115050/src/dev_ephy_in115050.c
# For macallan in115025_test_app_thread_create in
# drivers/userspace/inphi/dev_ephy_in115025/src/dev_ephy_in115025.c
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "test_inphi")

# In case of starfleet fixed the following module creates folder in /tmp
# /drivers/userspace/mrvl_phy/dev_ephy_mrvl88ec808/src/dev_ephy_m88ec808.c
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "test_mrvlphy")

#allow access to /tmp/serdes_asic_key_dir as this path is used both by
#cman_fp for programming DPP serdes and IOMD for programming n/w serdes
optional_policy(`
polaris_serdes_asic_key_tmp_manage(polaris_iomd_t)
')

#Doppler E mac creates lockfiles with names following
#the pattern /tmp/nug_asic_key_dir/nug_asic_key_[0-9]_[0-9]_[0-9]
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "nug_asic_key_dir")

#Doppler ES mac creates lockfiles with names following
#the pattern /tmp/rmt_asic_key_dir/rmt_asic_key_[0-9]_[0-9]_[0-9]
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "rmt_asic_key_dir")

# from etopus_spawn_serdes_tool_thread in
# binos/platforms/ngwc/doppler_sdk/drivers/serdes/Vendor/src/etopus_serdes.c
files_tmp_filetrans(polaris_iomd_t, polaris_iomd_tmp_t, dir, "test_etp")

#on starfleet access /dev/cpld, in iomd_starfleet_create_mmap()
polaris_cpld_dev_use(polaris_iomd_t)
')

optional_policy(`
polaris_ngwc_itfpo_manage(polaris_iomd_t)
')

# ngio device
type polaris_ngio_device_t;
dev_node(polaris_ngio_device_t)

```

```

#For NGIO modules iomd uses netlink socket (via backplane switch)
allow polaris_iomd_t self:netlink_socket { bind create };

ifdef(`sumatra_platform',`
#on Sumatra access /dev/cpld from iomd
polaris_cpld_dev_use(polaris_iomd_t)
# LOOK AT ME: After direct usage of /dev/mem is removed (CSCvw80796)
polaris_dev_mem_use(polaris_iomd_t)
polaris_sumatra_doppler_dev_use(polaris_iomd_t)

#access SERDES /tmp/serdes_asic_key_dir/*
polaris_serdes_asic_key_tmp_manage(polaris_iomd_t)

# access /dev/huron_fpga
polaris_huron_dev_use(polaris_iomd_t)

# manage "sysctrl_i2c.lck"
gen_require(`
    type polaris_cm_rp_tmp_t;
    `)
files_tmp_filetrans(polaris_iomd_t, polaris_cm_rp_tmp_t, file, "sysctrl_i2c.lck")
polaris_cm_rp_tmp_manage(polaris_iomd_t)

# comm="iomd" kmod="netdev-bp246"
kernel_request_load_module(polaris_iomd_t)

# work with /sys/devices/i2c-15/15-0076/...
dev_rw_sysfs(polaris_iomd_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiomd.te

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

```

define(`polaris_lipc_service_server_many',
    `ifelse($3, `',
        polaris_lipc_create_name(dollarsone, $1, "$2"),
        polaris_lipc_create_name(dollarsone, $1, "$2-b$3")
        `ifelse($3, 0, `polaris_lipc_create_name(dollarsone, $1, "$2")', `polaris_lipc_service_server_many($1, $2,
eval($3 - 1)))')')

```

```

define(`polaris_lipc_service_server_aux',`dnl
#####
## <summary>
## Create $2 lipc chanell.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <infoflow type="none"/>
#
interface(`polaris_lipc_$1_create_name",`
  gen_require(`
    type $2;
  ')
  $3
")

#####
## <summary>
## Write $2 lipc chanell.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="server">
## <summary>
## Domain of owner of lipc channel.
## </summary>
## </param>
## <infoflow type="none"/>
#
interface(`polaris_lipc_$1_write",`
  gen_require(`
    type $2;
  ')

  polaris_lipc_write(dollarsone, $2, dollarstwo)
")
')

define(`polaris_lipc_service_server',`dnl
polaris_lipc_service_server_aux(lipc_stem($1), lipc_label($1),
                                polaris_lipc_service_server_many(lipc_label($1), $5, max_scope_map($3, $4, $2)))')

```

```
define(`polaris_lipc_service_client',`')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_lipc_if.m4
```

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```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
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```

```
#
```

```
policy_module(polarisncd, 1.0);
```

```
gen_require(  
    type polaris_ncd_t;  
)
```

```
# allow sntp transition in its own domain when started by ncd
```

```
ntp_domtrans_ntpdate(polaris_ncd_t)
```

```
corecmd_exec_bin(polaris_ncd_t)  
corecmd_exec_shell(polaris_ncd_t)
```

```
# run ldd, which in turns execve "ld.so --verify"
```

```
libs_exec_ld_so(polaris_ncd_t)
```

```
# allow read of /etc/group and /etc/passwd
```

```
auth_use_nsswitch(polaris_ncd_t)
```

```
# allow to read /proc/meminfo
```

```
kernel_read_system_state(polaris_ncd_t)
```

```
# work with /tmp files (/tmp/ncd)
```

```
type polaris_ncd_tmp_t;
```

```
files_tmp_file(polaris_ncd_tmp_t)
```

```
manage_dirs_pattern(polaris_ncd_t, tmp_t, polaris_ncd_tmp_t)
```

```
manage_files_pattern(polaris_ncd_t, tmp_t, polaris_ncd_tmp_t)
```

```
manage_fifo_files_pattern(polaris_ncd_t, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
```

```
files_tmp_filetrans(polaris_ncd_t, polaris_ncd_tmp_t, file)
```

```
# create /tmp/ncd and /tmp/etc/ncd_work_dir directories
```

```
gen_require(  
    type polaris_etc_t;
```

```
)
```

```
manage_dirs_pattern(polaris_ncd_t, { tmp_t polaris_etc_t }, polaris_ncd_tmp_t)
```

```
files_tmp_filetrans(polaris_ncd_t, polaris_ncd_tmp_t, dir, "ncd")
```



```

# /tmp/etc/ncd_work_dir
filetrans_pattern(polaris_ncd_t, polaris_etc_t, polaris_ncd_tmp_t, dir, "ncd_work_dir")

# work with /tmp/ncd/inot_fifo
files_tmp_filetrans(polaris_ncd_t, polaris_ncd_tmp_t, fifo_file, "inot_fifo")
manage_fifo_files_pattern(polaris_ncd_t, tmp_t, polaris_ncd_tmp_t)

# allow snmp to read out fifo file
gen_require(
    type ntpd_t;
)
read_fifo_files_pattern(ntpd_t, polaris_ncd_tmp_t, polaris_ncd_tmp_t)

# work with /tmp/ufs directory. the ufs directory can be created
# by both polaris_ncd_t and udev_t subjects (depending upon platform
# logic)
gen_require(
    type udev_t;
    type unconfined_service_t;
)
files_tmp_filetrans( { polaris_ncd_t udev_t unconfined_service_t }, polaris_ncd_tmp_t, dir, "ufs")

polaris_btrace_data_manage(polaris_ncd_t)
polaris_chasfs_manage(polaris_ncd_t)
polaris_cpld_read(polaris_ncd_t)
polaris_proc_rmonbifo_read(polaris_ncd_t)
polaris_rmonbifo_tmp_read(polaris_ncd_t)
polaris_boot_tmp_read(polaris_ncd_t)
polaris_disk_crashinfo_getattr(polaris_ncd_t)
polaris_disk_bootflash_read_lnk(polaris_ncd_t)
polaris_flashlib_lock(polaris_ncd_t)
polaris_flashlib_read(polaris_ncd_t)
polaris_read_debug_conf(polaris_ncd_t)
polaris_read_packages_conf(polaris_ncd_t)

brctl_domtrans(polaris_ncd_t)
sysnet_domtrans_ifconfig(polaris_ncd_t)

# ncd.sh invokes ifup which in turn is calling dhclient
sysnet_domtrans_dhcp(polaris_ncd_t)

type polaris_ncd_etc_t;
files_config_file(polaris_ncd_etc_t)
gen_require(
    attribute domain;
)
files_etc_filetrans(domain, polaris_ncd_etc_t, file, "mount_data")
manage_dirs_pattern(polaris_ncd_t, polaris_ncd_etc_t, polaris_ncd_etc_t)

```

```

manage_files_pattern(polaris_ncd_t, polaris_ncd_etc_t, polaris_ncd_etc_t)

# runs exportsfs command
rpc_read_exports(polaris_ncd_t)
rpc_write_exports(polaris_ncd_t)
rpc_manage_nfs_state_data_dir(polaris_ncd_t)
rpc_manage_nfs_state_data(polaris_ncd_t)
fs_rw_nfsd_fs(polaris_ncd_t)
kernel_rw_rpc_sysctls(polaris_ncd_t)
fs_getattr_xattr_fs(polaris_ncd_t)

# reloads xinetd@/tmp/etc/xinetd.conf.consolidated.service and
# systemctl reload xinetd_brelay@eobc.service
systemd_exec_systemctl(polaris_ncd_t)
systemd_reload_all_services(polaris_ncd_t)
systemd_status_all_unit_files(polaris_ncd_t)

polaris_chvrf_domtrans(polaris_ncd_t)
# ncd process calls ifconfig and route and mcp_chvrf
gen_require(
    type polaris_chvrf_t;
)
sysnet_domtrans_ifconfig(polaris_chvrf_t)
allow polaris_chvrf_t self:capability net_admin;
allow polaris_chvrf_t self:udp_socket { create ioctl };
allow polaris_ncd_t self:process setpgid;

polaris_persistent_getattr(polaris_ncd_t)

# access to /etc/sysconfig/network-scripts
sysnet_read_config(polaris_ncd_t)

fs_getattr_tmpfs(polaris_ncd_t)

# manage file under /tmp/etc/ncd_work_dir
gen_require(
    type initrc_tmp_t;
    type initrc_t;
)
filetrans_pattern(polaris_ncd_t, initrc_tmp_t, polaris_ncd_tmp_t, dir,"ncd_work_dir")
polaris_ncd_tmp_manage(polaris_ncd_t)
# /tmp/root/loopback is created by initrc_t,but managed by ncd.sh.
# dynamic label directory "/tmp/root/loopback" as polaris_ncd_tmp_t
files_tmp_filetrans(initrc_t, polaris_ncd_tmp_t, dir, "loopback")
# flashutil has wrong file permission
allow polaris_ncd_t self:capability { dac_override sys_resource };

# access to /tmp/etc/xinetd.conf.consolidated

```

```

init_read_script_tmp_files(polaris_ncd_t)

allow polaris_ncd_t self:capability net_admin;

# search/getattr of /tmp/udev/etc/udev
polaris_udev_tmp_list_dirs(polaris_ncd_t)

# ncd calls mount to handle nfs directories
mount_domtrans(polaris_ncd_t)

#rsync_exec(polaris_ncd_t)
gen_require(
    type rsync_t;
    type rsync_tmp_t;
)
rsync_entry_domtrans(polaris_ncd_t, rsync_t)
allow rsync_t polaris_ncd_t:process sigchld;
# file descriptor leak when rsync is called
allow rsync_t polaris_ncd_t:fifo_file write;
# PLEASE LOOK AT ME: probably /tmp/rp/active_epoch deserves its own type
# /tmp/rp/active_epoch on its way to /tmp/chassis/local/rp/chasfs/rp/0/0/epoch
manage_files_pattern(polaris_ncd_t, rsync_tmp_t, rsync_tmp_t)

# creates files under /tmp/udev/etc/udev/
polaris_udev_tmp_manage(polaris_ncd_t)
allow polaris_ncd_t self:process setfscreate;

# run /sbin/hwclock in its own domain
clock_domtrans(polaris_ncd_t)
# stdin file descriptor leak when hwclock started
gen_require(
    type hwclock_t;
)
allow hwclock_t polaris_ncd_t:fifo_file read;

ifdef(`ngwc_family',`
polaris_getattr_filesystem_disk_ucode(polaris_ncd_t)
)

# update /tmp/etc/xinetd.conf.consolidated file
polaris_etc_append(polaris_ncd_t)

# ncd.sh adds entries to /etc/exports file
gen_require(
    type etc_t;
)
append_files_pattern(polaris_ncd_t, etc_t, etc_t)

```

```

# create and write into /tmp/unifiedfs/unifiedfs_log
manage_files_pattern(polaris_ncd_t, polaris_ufs_tmp_t, polaris_ufs_tmp_t)

polaris_ncd_rpcinfo_net(polaris_ncd_t)

# accessing /mnt/usb0
fs_search_removable(polaris_ncd_t)
polaris_getattr_removable(polaris_ncd_t)
polaris_getattr_removable(polaris_ufs_helper_t)

# ncd.sh calls ps command
# ps needs access to /sys/devices/system/cpu/online
# write/create to "/sys/module/nfs/parameters/nfs4_unique_id"
dev_rw_sysfs(polaris_ncd_t)
dev_manage_sysfs_dirs(polaris_ncd_t)
gen_require(
    type sysfs_t;
)
create_files_pattern(polaris_ncd_t, sysfs_t, sysfs_t)

# ps needs access to proc_t
kernel_read_system_state(polaris_ncd_t)
# ps needs access to state of all domains
domain_read_all_domains_state(polaris_ncd_t)

# send signal to ntpd
ntp_signal(polaris_ncd_t)

# ncd.sh executes hostname
hostname_exec(polaris_ncd_t)

# ncd.sh runs mcp_trace_request.sh
polaris_trace_request_domtrans(polaris_ncd_t)

# handling /usr/binos/conf/iosd_console_attach.sh

polaris_utility_domain_template(console_attach)

polaris_bexecute_domain(polaris_console_attach_t, polaris_console_attach_exec_t)

corecmd_exec_bin(polaris_console_attach_t)
auth_use_nsswitch(polaris_console_attach_t)

# execute ping over liin: usr/binos/conf/mcp_chvrf.sh liin /bin/ping -c 1 -w 300 192.168.1.6
polaris_chvrf_domtrans(polaris_console_attach_t)
# from chvrf.sh code executes ping command
gen_require(
    type polaris_chvrf_t;

```

```

    )
netutils_domtrans_ping(polaris_chvrf_t)
# send sigchld when it is done
gen_require(
    type ping_t;
)
allow ping_t polaris_console_attach_t:process sigchld;

polaris_boot_tmp_read(polaris_console_attach_t)
polaris_btrace_data_manage(polaris_console_attach_t)
polaris_chasfs_read(polaris_console_attach_t)
polaris_cpld_read(polaris_console_attach_t)
polaris_disk_bootflash_search(polaris_console_attach_t)
polaris_disk_crashinfo_getattr(polaris_console_attach_t)
polaris_ncd_tmp_read(polaris_console_attach_t)
polaris_read_debug_conf(polaris_console_attach_t)
polaris_rmonbifo_tmp_read(polaris_console_attach_t)
polaris_use_btrace_fifo(polaris_console_attach_t)

# read /proc/cmdline
kernel_read_system_state(polaris_console_attach_t)

# read /tmp/myhostname file
polaris_hm_tmp_read(polaris_console_attach_t)

telnet_use_ptys(polaris_console_attach_t)

allow polaris_console_attach_t self:capability sys_resource;
allow polaris_console_attach_t self:process setrlimit;

# getty starts /usr/binos/conf/iosd_console_attach.sh through brelay
gen_require(
    type getty_t;
)
polaris_bconsole_domtrans(getty_t)

# console_attach.sh start btelnet.sh over chvrf and bexecute
gen_require(
    type polaris_bexecute_t;
)
allow polaris_bexecute_t polaris_console_attach_t:process sigchld;
corenet_tcp_connect_telnetd_port(polaris_bexecute_t)

# handling /usr/binos/conf/unifiedfs/unifiedfs_helper.sh

polaris_utility_domain_template(ufs_helper)

corecmd_exec_bin(polaris_ufs_helper_t)

```

```

auth_use_nsswitch(polaris_ufs_helper_t)

# rsync calls unifiedfs_helper.sh
gen_require(
    type rsync_t;
)
polaris_ufs_helper_domtrans(rsync_t);

# unifiedfs_helper.sh calls mount to handle nfs directories
mount_domtrans(polaris_ufs_helper_t)

# creates files under /tmp/udev/etc/udev/
polaris_udev_tmp_manage(polaris_ufs_helper_t)

polaris_disk_bootflash_search(polaris_ufs_helper_t)
polaris_ncd_tmp_manage(polaris_ufs_helper_t)
polaris_ncd_etc_read(polaris_ufs_helper_t)

# stat over /tmp/ufs/crashinfo/10.1.1.1
polaris_disk_crashinfo_getattr(polaris_ufs_helper_t)

# unifiedfs_helper.sh creates /tmp/unifiedfs and manages underlying dirs
type polaris_ufs_tmp_t;
files_tmp_file(polaris_ufs_tmp_t)
files_tmp_filetrans(polaris_ufs_helper_t, polaris_ufs_tmp_t, { file dir })
manage_dirs_pattern(polaris_ufs_helper_t, polaris_ufs_tmp_t, polaris_ufs_tmp_t)
manage_files_pattern(polaris_ufs_helper_t, polaris_ufs_tmp_t, polaris_ufs_tmp_t)
manage_lnk_files_pattern(polaris_ufs_helper_t, polaris_ufs_tmp_t, polaris_ufs_tmp_t)

# Required for /tmp/unifiedfs access on vWLC
#ifdef(^vwlc_platform',`
files_tmp_filetrans(unconfined_service_t, polaris_ufs_tmp_t, dir, "unifiedfs")
)

polaris_ncd_rpcinfo_net(polaris_ufs_helper_t)

polaris_persistent_getattr(polaris_ufs_helper_t)

# rm from coreutils-8.30 wants to know filesystem type
fs_getattr_tmpfs(polaris_ufs_helper_t)

# ncd.sh read,search,open, creates, add_name and writes to /proc/hanet/tun_local_ip
gen_require(
    type polaris_hanet_proc_t;
    type proc_t;
)
manage_files_pattern(polaris_ncd_t, polaris_hanet_proc_t, polaris_hanet_proc_t)
allow polaris_hanet_proc_t proc_t:filesystem associate;

```

allow polaris\_ufs\_helper\_t self:capability sys\_resource;

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisncd.te

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dnl

dnl May 2018, Manohar Hungund

dnl

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dnl Starfleet Platform Max Bay Limits

max\_bay\_map\_set(rp, `per\_bay', 0)

max\_bay\_map\_set(cc, `per\_bay', 5)

max\_bay\_map\_set(fp, `per\_bay', 5)

min\_bay\_ripc\_map\_set(rp, `per\_bay', 0)

min\_bay\_ripc\_map\_set(cc, `per\_bay', 1)

min\_bay\_ripc\_map\_set(fp, `per\_bay', 0)

max\_bay\_ripc\_map\_set(rp, `per\_bay', 2)

max\_bay\_ripc\_map\_set(cc, `per\_bay', 6)

max\_bay\_ripc\_map\_set(fp, `per\_bay', 1)

min\_bay\_ripc\_map\_set(rp, `global', 0)

min\_bay\_ripc\_map\_set(cc, `global', 1)

min\_bay\_ripc\_map\_set(fp, `global', 0)

max\_bay\_ripc\_map\_set(rp, `global', 2)

max\_bay\_ripc\_map\_set(cc, `global', 6)

max\_bay\_ripc\_map\_set(fp, `global', 1)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(rp, `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(cc, `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(fp, `elasitc', BPROC\_ODM, 0)

max\_elastic\_map\_set(rp, `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(cc, `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(fp, `elastic', BPROC\_WNCD, 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/starfleetmaps.m4

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#

```
# November 2020, Christine Hwang
#
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#

# Map BBU TTY to correct device context
/dev/ttyS2          -c gen_context(system_u:object_r:polaris_bbu_device_t,s0)
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbbu.fc
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```

```
#
# February 2018, Manohar Hungund
#
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#
```

```
## <summary>Polaris ACT2 Chip Device Access Policy Rules.</summary>
```

```
#####
# ACT2 Chip Driver policy
#####
```

```
#####
```

```
## <summary>
##   Work (read, write, ioctl) with /dev/act2
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```
interface(`polaris_act2_dev_use`,`
gen_require(`
    type device_t;
    type polaris_act2_device_t;
`)
    read_chr_files_pattern($1, device_t, polaris_act2_device_t)
    write_chr_files_pattern($1, device_t, polaris_act2_device_t)
')
```

```
#####
## <summary>
##   Create /tmp/hw_entropy file. Certain platforms save
```



```

## entropy from main board ACT-2 chip in this file.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_hw_entropy_create`,`
    gen_require(
        type polaris_hw_entropy_t;
        type tmp_t;
    )

    files_tmp_filetrans($1, polaris_hw_entropy_t, file, "hw_entropy")
    manage_files_pattern($1, tmp_t, polaris_hw_entropy_t)
)

#####
## <summary>
## Use /tmp/hw_entropy file. For some reason, iosd opens file in rw mode,
## not clear why it couldn't just read it.
## Certain platforms save entropy from main board ACT-2 chip in this file.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_hw_entropy_use`,`
    gen_require(
        type polaris_hw_entropy_t;
        type tmp_t;
    )

    rw_files_pattern($1, tmp_t, polaris_hw_entropy_t)
)

#####
## <summary>
## Read /tmp/hw_entropy file.
## Certain platforms save entropy from main board ACT-2 chip in this file.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>

```

```
## </param>
#
interface(`polaris_hw_entropy_read`,`
    gen_require(`
        type polaris_hw_entropy_t;
    `)

    read_files_pattern($1, tmp_t, polaris_hw_entropy_t)
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisact2.if
No license file was found, but licenses were detected in source scan.
```

```
#
# April 2017, Victor Kamensky
#
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#

policy_module(polarisdmindbmand, 1.0);

gen_require(`
    type polaris_dmi_ndbmand_t;
`)
```

polaris\_btrace\_data\_manage(polaris\_dmi\_ndbmand\_t)  
polaris\_crft\_data\_manage(polaris\_dmi\_ndbmand\_t)  
polaris\_chasfs\_manage(polaris\_dmi\_ndbmand\_t)  
polaris\_tdlresolve\_read(polaris\_dmi\_ndbmand\_t)  
polaris\_tdlldb\_list\_dirs(polaris\_dmi\_ndbmand\_t)  
polaris\_cpld\_read(polaris\_dmi\_ndbmand\_t)  
polaris\_flashlib\_read(polaris\_dmi\_ndbmand\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_dmi\_ndbmand\_t)

polaris\_db\_tdlldb\_dir\_use(polaris\_dmi\_ndbmand\_t)

```
# work with NDBLOAD_LOCK_PATH
type polaris_dmi_ndbutil_lock_t;
files_tmp_file(polaris_dmi_ndbutil_lock_t)
polaris_ndbload_lock_use(polaris_dmi_ndbmand_t)

optional_policy(`
# deals with /dev/shm/confd setup (schema and pid)
polaris_confd_shm_setup(polaris_dmi_ndbmand_t)
# and allow read shared schema
```

```

polaris_confd_shared_schema_read(polaris_dmi_ndbmand_t)
# read /proc/confd_pid/exe file
polaris_confd_read(polaris_dmi_ndbmand_t)
')

allow polaris_dmi_ndbmand_t self:capability { dac_override dac_read_search sys_resource };

logging_send_syslog_msg(polaris_dmi_ndbmand_t)

# create ndbutil directory under /var/lock
polaris_confd_ndbutil_create(polaris_dmi_ndbmand_t)

polaris_ndbutil_lock_template(polaris_dmi_ndbmand_t, ndbmand, ".l.schema_use.ndbmand")

polaris_confd_shared_schema_watch(polaris_dmi_ndbmand_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmindbmand.te
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#
# February 2020, Victor Kamensky
#
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#

policy_module(polarisomp, 1.0);

gen_require(^
    type polaris_omp_t;
)
polaris_chasfs_manage(polaris_omp_t)
polaris_cpld_read(polaris_omp_t)
polaris_flashlib_read(polaris_omp_t)
polaris_tdlresolve_read(polaris_omp_t)

polaris_ripc_sman_ui_serv_connect(polaris_omp_t)

polaris_db_tdlldb_dir_use(polaris_omp_t)

logging_send_syslog_msg(polaris_omp_t)

# vconfd_load_shared_schemas
polaris_confd_shared_schema_read(polaris_omp_t)

# omp_daemon_init calls posix_sysconf
dev_read_sysfs(polaris_omp_t)

```

```

# reads /sys/fs/cgroup/cpuset/iosxe_control_processes/cpuset.cpus
fs_read_cgroup_files(polaris_omp_t)

# vip_util_set_fd_limits set files limits
allow polaris_omp_t self:process setrlimit;

# omp connects to omp listener tcp port 17900
corenet_tcp_connect_polaris_omp_port(polaris_omp_t)
# vip_util_reset_ns opens /proc/1/ns/net
polaris_cedge_reset_ns(polaris_omp_t)
# vip_util_set_ns opens /var/run/netns/*
polaris_cedge_set_ns(polaris_omp_t)

#omp_peer_active_connect() binds to OMP address
corenet_tcp_bind_generic_node(polaris_omp_t)
allow polaris_omp_t self:tcp_socket { bind connect create getopt setopt };

# omp starts worker thread under CPU affinity
allow polaris_omp_t self:process setsched;

# connects to ttm unix domain socket in msgq_connect_timer
polaris_ttm_var_sock_write(polaris_omp_t)
# connects to ftm unix domain socket in msgq_connect_timer
polaris_ftm_var_sock_write(polaris_omp_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisomp.te
No license file was found, but licenses were detected in source scan.

#
# July 2020, Victor Kamensky
#
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#

## <summary>Polaris htx Policy Rules.</summary>

#####
## <summary>
##   Manage polaris_htx_iox_tmp_t in /tmp/HTX-IOX.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>

```

```

interface(`polaris_htx_iox_tmp_manage`,`
    gen_require(`
        type polaris_htx_iox_tmp_t;

    `)
    manage_files_pattern($1, polaris_htx_iox_tmp_t, polaris_htx_iox_tmp_t)
    manage_sock_files_pattern($1, polaris_htx_iox_tmp_t, polaris_htx_iox_tmp_t)
    manage_dirs_pattern($1, polaris_htx_iox_tmp_t, polaris_htx_iox_tmp_t)

    allow $1 polaris_htx_iox_tmp_t:dir watch;

    allow $1 polaris_htx_iox_tmp_t:file map;
)

```

```
#####
```

```

## <summary>
## Send messages to htx unix datagram sockets.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_htx_dgram_send`,`
    gen_require(`
        type polaris_htx_t;
    `)

```

```

    allow $1 polaris_htx_t:unix_dgram_socket sendto;
)

```

```
#####
```

```

## <summary>
## Work (read, write, ioctl) with /dev/sppi_memif device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_sppi_memif_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_sppi_memif_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_sppi_memif_device_t)

```

```

    read_chr_files_pattern($1, device_t, polaris_sppi_memif_device_t)
)

#####
## <summary>
##   Work with /tmp/HTX-IOX/.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_htx_use_client_socket`,`
    gen_require(`
        type polaris_htx_t;
    `)
    allow $1 polaris_htx_t:unix_stream_socket connectto;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarishtx.if

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```

#
# July 2017, Victor Kamensky
#
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#

policy_module(polarisesgtamcfg, 1.0);

gen_require(`
    type polaris_esg_tam_cfg_t;
`)

polaris_btrace_data_manage(polaris_esg_tam_cfg_t)
polaris_chasfs_manage(polaris_esg_tam_cfg_t)
polaris_tdlresolve_read(polaris_esg_tam_cfg_t)
polaris_tdlldb_list_dirs(polaris_esg_tam_cfg_t)
polaris_flashlib_read(polaris_esg_tam_cfg_t)

polaris_cpld_read(polaris_esg_tam_cfg_t)
allow polaris_esg_tam_cfg_t self:capability net_admin;

# handle /tmp/tam_cfg_done
type polaris_tam_tmp_t;

```

```
files_tmp_file(polaris_tam_tmp_t)
files_tmp_filetrans(polaris_esg_tam_cfg_t, polaris_tam_tmp_t, dir, "tam_cfg_done")
manage_files_pattern(polaris_esg_tam_cfg_t, polaris_tam_tmp_t, polaris_tam_tmp_t)
gen_require(
    type tmp_t;
)
manage_dirs_pattern(polaris_esg_tam_cfg_t, tmp_t, polaris_tam_tmp_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisesgtamcfg.te

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisfmanfp, 1.0);
```

```
gen_require(
    type polaris_fman_fp_t;
)
```

```
polaris_btrace_data_manage(polaris_fman_fp_t)
polaris_crft_data_manage(polaris_fman_fp_t)
polaris_chasfs_manage(polaris_fman_fp_t)
polaris_tdlresolve_read(polaris_fman_fp_t)
polaris_tdlldb_list_dirs(polaris_fman_fp_t)
polaris_cpld_read(polaris_fman_fp_t)
polaris_lua_read(polaris_fman_fp_t)
polaris_flashlib_read(polaris_fman_fp_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_fman_fp_t)
```

```
# allow to send message to /dev/log
logging_send_syslog_msg(polaris_fman_fp_t)
```

```
#####
```

```
# mqipc manual, one that missing in platform tdl file
```

```
#####
```

```
# mq.-iosd-thr-fmanrp-R0:0
# mq.-iosd-thr-fmanrp-1:R0:0
type polaris_iosd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_iosd_thr_fmanrp_mqipc_t)
```

```
# mq.-mobilityd-thr-fmanrp-1:R0:0
type polaris_mobilityd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_mobilityd_thr_fmanrp_mqipc_t)
```

```
# mq.-smd-thr-fmanrp-1:R0:0
type polaris_smd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_smd_thr_fmanrp_mqipc_t)
```

```
# mq.-wncd_0-thr-fmanrp-1:R0:0
type polaris_wncd_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_wncd_thr_fmanrp_mqipc_t)
```

```
# mq.-wncmgrp_0-thr-fmanrp-1:R0:0
type polaris_wncmgrp_thr_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_wncmgrp_thr_fmanrp_mqipc_t)
```

```
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-3:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-4:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-5:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-6:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-7:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-8:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-R1:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-1:R1:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-2:R1:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-3:R1:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-4:R1:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-5:R1:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-6:R1:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-7:R1:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_iosd_thr_fmanrp_mqipc_t, iosd-thr-fmanrp-8:R1:0)
```

```
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_mobilityd_thr_fmanrp_mqipc_t, mobilityd-thr-fmanrp-
R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_mobilityd_thr_fmanrp_mqipc_t, mobilityd-thr-fmanrp-
1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_mobilityd_thr_fmanrp_mqipc_t, mobilityd-thr-fmanrp-
2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_mobilityd_thr_fmanrp_mqipc_t, mobilityd-thr-fmanrp-
3:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_mobilityd_thr_fmanrp_mqipc_t, mobilityd-thr-fmanrp-
4:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_mobilityd_thr_fmanrp_mqipc_t, mobilityd-thr-fmanrp-
5:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_mobilityd_thr_fmanrp_mqipc_t, mobilityd-thr-fmanrp-
```



6:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_mobilityd\_thr\_fmanrp\_mqipc\_t, mobilityd-thr-fmanrp-

7:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_mobilityd\_thr\_fmanrp\_mqipc\_t, mobilityd-thr-fmanrp-

8:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_mobilityd\_thr\_fmanrp\_mqipc\_t, mobilityd-thr-fmanrp-

R1:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-1:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-2:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-3:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-4:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-5:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-6:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-7:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-8:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_smd\_thr\_fmanrp\_mqipc\_t, smd-thr-fmanrp-R1:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-1:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-2:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-3:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-4:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-5:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-6:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-7:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-8:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncmgrd\_thr\_fmanrp\_mqipc\_t, wncmgrd-thr-fmanrp-R1:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncd\_thr\_fmanrp\_mqipc\_t, wncd\_0-thr-fmanrp-R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncd\_thr\_fmanrp\_mqipc\_t, wncd\_0-thr-fmanrp-1:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncd\_thr\_fmanrp\_mqipc\_t, wncd\_0-thr-fmanrp-2:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncd\_thr\_fmanrp\_mqipc\_t, wncd\_0-thr-fmanrp-3:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncd\_thr\_fmanrp\_mqipc\_t, wncd\_0-thr-fmanrp-4:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncd\_thr\_fmanrp\_mqipc\_t, wncd\_0-thr-fmanrp-5:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncd\_thr\_fmanrp\_mqipc\_t, wncd\_0-thr-fmanrp-6:R0:0)

polaris\_mqipc\_create\_name(polaris\_fman\_fp\_t, polaris\_wncd\_thr\_fmanrp\_mqipc\_t, wncd\_0-thr-fmanrp-7:R0:0)

```

polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-8:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_0-thr-fmanrp-R1:0)

optional_policy(`
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_1-thr-fmanrp-R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_1-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_1-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_2-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_2-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_3-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_3-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_4-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_4-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_5-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_5-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_6-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_6-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_7-thr-fmanrp-1:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_7-thr-fmanrp-2:R0:0)
polaris_mqipc_create_name(polaris_fman_fp_t, polaris_wncd_thr_fmanrp_mqipc_t, wncd_1-thr-fmanrp-R1:0)
`)
polaris_cpld_dev_use(polaris_fman_fp_t)

# cpp bleeds into switching platforms through fman_fp and fed
# apparently even on nyquist fed creates /tmp/cpp_anon_db
polaris_cpp_process(polaris_fman_fp_t)
polaris_cpp_tmp_files_use(polaris_fman_fp_t)

optional_policy(`
polaris_cpp_dev_use(polaris_fman_fp_t)
polaris_cpp_cavium_sdk_ipc_use(polaris_fman_fp_t)
`)
polaris_persistent_manage(polaris_fman_fp_t)

polaris_icc_broken_relocations(polaris_fman_fp_t)

allow polaris_fman_fp_t self:capability dac_override;
allow polaris_fman_fp_t self:capability2 block_suspend;

# when /bootflash or /harddisk are 100% full
allow polaris_fman_fp_t self:capability sys_resource;

# write to devices like this /proc/bus/pci/04/00.0
kernel_read_system_state(polaris_fman_fp_t)
kernel_write_proc_files(polaris_fman_fp_t)

ifdef(`mcp_family',`
polaris_cm_fp_tmp_filetrans(polaris_fman_fp_t)

```

```

polaris_cm_fp_tmp_manage(polaris_fman_fp_t)
')

# LOOK AT ME: raw memory write access
#ifdef(^mcp_family',`
polaris_dev_mem_use(polaris_fman_fp_t)
')

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(^crankshaft_family',`
polaris_dev_mem_use(polaris_fman_fp_t)
')

polaris_dyncfg_tmp_read(polaris_fman_fp_t)

# /dev/qaemem device access on overlord
optional_policy(`
polaris_qae_dev_use(polaris_fman_fp_t)
')

# access to /dev/icp_XXX device on crankshaft platforms
optional_policy(`
    polaris_icp_dev_use(polaris_fman_fp_t)
')

# on qwlc work with /tmp/octeon-remote-lock-pci:0
#ifdef(^qwlc_platform',`
polaris_cm_fp_tmp_manage(polaris_fman_fp_t)
')

#ifdef(^katar_platform',`
polaris_cm_fp_tmp_manage(polaris_fman_fp_t)
')

optional_policy(`
#fman-fp creates tmp files in acl-mgmt workflow.
polaris_fman_acl_iptbl_tmp_file(polaris_fman_fp_t)
')

polaris_iosd_vcpu_read(polaris_fman_fp_t)

# allow open/read/search cgroup files like /sys/fs/cgroup/cpu,cpuacct/machine
fs_read_cgroup_files(polaris_fman_fp_t)
fs_search_cgroup_dirs(polaris_fman_fp_t)

optional_policy(`
# Access /dev/cbdma

```

```
polaris_cbdma_dev_use(polaris_fman_fp_t)
```

```
# Access /dev/n2_device
```

```
polaris_n2_dev_use(polaris_fman_fp_t)
```

```
)
```

```
polaris_cpp_tmpfs_manage(polaris_fman_fp_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmanfp.te
```

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```
#
```

```
# August 2017, Shawn Lu
```

```
#
```

```
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```

```
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```

```
#
```

```
## <summary>Polaris wncmgrd Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Read access to /bootflash/NACert.pem
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_read_icap_cert_file`,`
```

```
gen_require(`
```

```
type polaris_icap_cert_t;
```

```
`)
```

```
allow $1 polaris_icap_cert_t:file read_file_perms;
```

```
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswncmgrd.if
```

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```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

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```
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```

```
#
```

# polariskeyman file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariskeyman.fc

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#

# polarisnvram file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnvram.fc

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#

# /3pa staff

/3pa/usr/(.\*)?lib64/(.\*)? -- gen\_context(system\_u:object\_r:lib\_t,s0)

/3pa/usr/(.\*)?lib/(.\*)? -- gen\_context(system\_u:object\_r:lib\_t,s0)

/3pa/(.\*)?lib64/(.\*)? -- gen\_context(system\_u:object\_r:lib\_t,s0)

/3pa/(.\*)?lib/(.\*)? -- gen\_context(system\_u:object\_r:lib\_t,s0)

/3pa/usr/(.\*)?sbin/(.\*)? -- gen\_context(system\_u:object\_r:bin\_t,s0)

/3pa/usr/(.\*)?bin/(.\*)? -- gen\_context(system\_u:object\_r:bin\_t,s0)

/3pa/usr/sbin/libvirt\_lxc -- gen\_context(system\_u:object\_r:virt\_lxc\_exec\_t,s0)

/usr/lib/libvirt/libvirt\_lxc -- gen\_context(system\_u:object\_r:virt\_lxc\_exec\_t,s0)

/usr/sbin/libvirt\_lxc -- gen\_context(system\_u:object\_r:virt\_lxc\_exec\_t,s0)

/3pa/usr/sbin/libvirtd -- gen\_context(system\_u:object\_r:virtd\_exec\_t,s0)

/3pa/usr/sbin/virtlogd -- gen\_context(system\_u:object\_r:virtlogd\_exec\_t,s0)

/3pa/usr/bin/virsh -- gen\_context(system\_u:object\_r:virsh\_exec\_t,s0)

/3pa/usr/bin/qemu.\* -- gen\_context(system\_u:object\_r:qemu\_exec\_t,s0)

/usr/binos/conf/libvirtd.sh -- gen\_context(system\_u:object\_r:virtd\_initrc\_exec\_t,s0)

/3pa/etc/libvirt/(.\*)? -- gen\_context(system\_u:object\_r:virt\_etc\_t,s0)

/3pa/etc/logrotate.d/(.\*)? -- gen\_context(system\_u:object\_r:etc\_t,s0)

# should go into contrib/telnet.fc?

/usr/binos/sbin/in.telnetd -- gen\_context(system\_u:object\_r:telnetd\_exec\_t,s0)

# load\_crash\_kernel.sh loads crash kernel - it should be executable

```

/crashkernel/load_crash_kernel.sh -- gen_context(system_u:object_r:bin_t,s0)

# /etc/lablogin.sh is executed during telnet login over management port
# it should be executable. Also having shell_exec_t label will allow it
# to transition into unconfined domain
/etc/lablogin.sh -- gen_context(system_u:object_r:shell_exec_t,s0)

# /etc/init.d/*functions files should be actually in bin_t domain, the same
# as /etc/init.d/functions. Note using /etc/rc\.\d\init\.\d/ instead of
# /etc/init\.\d/ because we have substitution rule in file_contexts.subs_dist
/etc/rc\.\d\init\.\d\binos_functions -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\.\d\init\.\d\binos_functions-pd -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\.\d\init\.\d\chasxml_functions -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\.\d\init\.\d\common-utility-functions -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc\.\d\init\.\d\rh-functions -- gen_context(system_u:object_r:bin_t,s0)

# tftp directories
/tftp -d gen_context(system_u:object_r:tftpd_rw_t,s0)
/tftp/. * gen_context(system_u:object_r:tftpd_rw_t,s0)

# /tmp/sw
/tmp/sw -d gen_context(system_u:object_r:tmp_t,s0)
/tmp/rp -d gen_context(system_u:object_r:tmp_t,s0)
/tmp/fp -d gen_context(system_u:object_r:tmp_t,s0)
/tmp/cc -d gen_context(system_u:object_r:tmp_t,s0)

# /tmp/etc
/tmp/etc -d gen_context(system_u:object_r:polaris_etc_t,s0)

# /tmp/sv
/tmp/sv -d gen_context(system_u:object_r:polaris_sv_tmp_t,s0)

# firmware files
/firmware(/.*)? gen_context(system_u:object_r:polaris_firmware_t,s0)
/upgrade(/.*)? gen_context(system_u:object_r:polaris_firmware_t,s0)
/golden(/.*)? gen_context(system_u:object_r:polaris_firmware_t,s0)
# CC card fpd files mark it as usr_t for now
/fpd(/.*)? -- gen_context(system_u:object_r:polaris_firmware_t,s0)

/tmp/debug\.\conf -l gen_context(system_u:object_r:polaris_debug_conf_t,s0)

/var/ODM/ios_core.p7b -- gen_context(system_u:object_r:etc_t,s0)

/dev/DDR -c gen_context(system_u:object_r:polaris_ddd_device_t,s0)
/dev/i2c-[0-9]* -c gen_context(system_u:object_r:polaris_i2c_device_t,s0)

/(.*)?\.\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/bin/(.*)?\.\ebf(/.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)

```

```

/wbin/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/lib/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/lib64/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/bin/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/sbin/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/lib/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/lib64/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/bin/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/sbin/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/lib/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/usr/binos/lib64/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)
/opt/confd/lib/confd/lib/core/confd/priv/(.*)?\ebf/(.*)? gen_context(system_u:object_r:polaris_ebf_t,s0)

# interpreter for CRDL 32bit IOSD setup proper memory map
/usr/binos/bin/crdl_mini_loader gen_context(system_u:object_r:ld_so_t,s0)

#firmware package mount point on asr1k platforms
/mnt/firmware/(.*)? gen_context(system_u:object_r:polaris_firmware_t,s0)

/bootflash/.USWAP/(.*)? gen_context(system_u:object_r:polaris_uswap_files_t,s0)

#Nutella EFI folder
/bootflash/EFI/(.*)? gen_context(system_u:object_r:polaris_efi_files_t,s0)

#for cat9k platform
/mnt/sd3/user/.USWAP/(.*)? gen_context(system_u:object_r:polaris_uswap_files_t,s0)

/tmp/rsync_log_dir/(.*)? gen_context(system_u:object_r:polaris_rsync_tmp_t,s0)

#for wlc awips feature
/bootflash/awips.json gen_context(system_u:object_r:polaris_awips_signature_file_t,s0)

# for wlc iot-gw feature to access /bootflash/certs dir
/bootflash/certs -d gen_context(system_u:object_r:polaris_ap_cert_file_t,s0)

#for curl - and allowing ip netns exec X curl
/usr/bin/curl -- gen_context(system_u:object_r:polaris_curl_exec_t,s0)

# Katar WLC needs access to /tmp/ldwm_envelope
/tmp/ldwm_envelope -- gen_context(system_u:object_r:polaris_ldwm_envelope_tmp_t,s0)

# CLI: show platform software tech-support
/usr/binos/conf/platform_tech_support.sh -- gen_context(system_u:object_r:polaris_tech_support_exec_t,s0)

# Tamlib debug file
/bootflash/tamlib_dbg_log -- gen_context(system_u:object_r:polaris_tamlib_dbg_file_t,s0)

```

```
# cryptsetup - some platforms copy cryptsetup in /bin
/bin/cryptsetup -- gen_context(system_u:object_r:lvm_exec_t,s0)
/usr/bin/cryptsetup -- gen_context(system_u:object_r:lvm_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscommon.fc
```

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

```
define(^polaris_process',`)dnl
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_process_if.m4
```

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#

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#

```
policy_module(polarisiptbl, 1.0);
```

```
#####
```

```
# iptbl.sh manual
```

```
#####
```

```
polaris_process_domain_template(iptbl)
```

```
corecmd_exec_bin(polaris_iptbl_t)
```

```
# allow to read /proc/meminfo
```

```
kernel_read_system_state(polaris_iptbl_t)
```

```
# allow read of /etc/passwd
```

```
auth_use_nsswitch(polaris_iptbl_t)
```

```
# run ldd, which in turns execve "ld.so --verify"
```

```
libs_exec_ld_so(polaris_iptbl_t)
```

```
# work with /tmp files
```



```

type polaris_iptbl_tmp_t;
files_tmp_file(polaris_iptbl_tmp_t)
manage_dirs_pattern(polaris_iptbl_t, tmp_t, polaris_iptbl_tmp_t)
manage_files_pattern(polaris_iptbl_t, polaris_iptbl_tmp_t, polaris_iptbl_tmp_t)
manage_fifo_files_pattern(polaris_iptbl_t, polaris_iptbl_tmp_t, polaris_iptbl_tmp_t)
files_tmp_filetrans(polaris_iptbl_t, polaris_iptbl_tmp_t, { file dir })

allow polaris_iptbl_t self:capability sys_resource;
allow polaris_iptbl_t self:process setpgid;

polaris_btrace_data_manage(polaris_iptbl_t)
polaris_cpld_read(polaris_iptbl_t)
polaris_chasfs_manage(polaris_iptbl_t)
polaris_boot_tmp_read(polaris_iptbl_t)
polaris_rmonbifo_tmp_read(polaris_iptbl_t)
polaris_proc_rmonbifo_getattr(polaris_iptbl_t)
polaris_proc_rmonbifo_read(polaris_iptbl_t)
polaris_disk_crashinfo_getattr(polaris_iptbl_t)

# execute /etc/init.d/iptables in its own domain
iptables_initrc_domtrans(polaris_iptbl_t)

# LOOK AT ME iptbl.sh puts symbolic links into /sbin directory
# need to fix manifest instead, so it will be static
gen_require(`
    type bin_t;
`)
manage_lnk_files_pattern(polaris_iptbl_t, bin_t, bin_t)

modutils_domtrans_insmod(polaris_iptbl_t)
iptables_domtrans(polaris_iptbl_t)

# iptbl.sh calls /etc/init.d/iptables restart and that needs
# read /proc/pid/net/ip_tables_names file
kernel_read_network_state(polaris_iptbl_t)
# creates /var/lock/subsys/iptables
type polaris_iptables_lock_t;
files_lock_file(polaris_iptables_lock_t)
manage_files_pattern(polaris_iptbl_t, polaris_iptables_lock_t, polaris_iptables_lock_t)
files_lock_filetrans(polaris_iptbl_t, polaris_iptables_lock_t, file)

# needs access to /run/netns as part of chvrf invocation
fs_read_nsfs_files(polaris_iptbl_t)
# iptbl.sh invokes iptable command which runs in iptables_t label and needs
# access to meta files created by iptbl.sh with label polaris_iptbl_tmp_t
allow iptables_t polaris_iptbl_tmp_t:fifo_file read_file_perms;
allow iptables_t polaris_iptbl_tmp_t:file read_file_perms;

```

```
# Allow /tmp/ufs/bootflash & /tmp/ufs/harddisk read access
ifdef(`vwlc_platform',`
optional_policy(`
polaris_ncd_tmp_read(polaris_iptbl_t)
')
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisiptbl.te
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```

```
#
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#
```

```
/usr/bin/bhytoolsd -- gen_context(system_u:object_r:polaris_bhytoolsd_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbhytoolsd.fc
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```

```
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#
```

```
policy_module(polarisautoupgrade, 1.0);
```

```
gen_require(`
    type polaris_autoupgrade_t;
')
```

```
corecmd_exec_bin(polaris_autoupgrade_t)
corecmd_exec_shell(polaris_autoupgrade_t)
```

```
# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_autoupgrade_t)
```

```
# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_autoupgrade_t)
```

```
# allow to read /proc/meminfo
kernel_read_system_state(polaris_autoupgrade_t)
```

```

allow polaris_autoupgrade_t self:capability { sys_resource dac_override };
allow polaris_autoupgrade_t self:process setpgid;

polaris_tdldb_list_dirs(polaris_autoupgrade_t)

polaris_btrace_data_manage(polaris_autoupgrade_t)
polaris_chasfs_manage(polaris_autoupgrade_t)
polaris_cpld_read(polaris_autoupgrade_t)
polaris_proc_rmonbifo_read(polaris_autoupgrade_t)
polaris_rmonbifo_tmp_read(polaris_autoupgrade_t)
polaris_boot_tmp_manage(polaris_autoupgrade_t)
polaris_read_debug_conf(polaris_autoupgrade_t)
polaris_disk_crashinfo_getattr(polaris_autoupgrade_t)

type polaris_autoupgrade_tmp_t;
files_tmp_file(polaris_autoupgrade_tmp_t)
# /tmp/etc/installer
gen_require(^
    type polaris_etc_t;
)
filetrans_pattern(polaris_autoupgrade_t, polaris_etc_t, polaris_autoupgrade_tmp_t, dir, "installer")
manage_fifo_files_pattern(polaris_autoupgrade_t, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)
manage_dirs_pattern(polaris_autoupgrade_t, polaris_etc_t, polaris_autoupgrade_tmp_t)
manage_files_pattern(polaris_autoupgrade_t, polaris_autoupgrade_tmp_t, polaris_autoupgrade_tmp_t)

# Allow access to bootflash
polaris_bootflash_read(polaris_autoupgrade_t)

# Allow access to packages.conf
polaris_read_packages_conf(polaris_autoupgrade_t)

# needs to run pidof
dev_read_sysfs(polaris_autoupgrade_t)
kernel_read_system_state(polaris_autoupgrade_t)
domain_read_all_domains_state(polaris_autoupgrade_t)

# send syslog
logging_send_syslog_msg(polaris_autoupgrade_t)

# script starts rsync with mcp_chvrf.sh
polaris_chvrf_domtrans(polaris_autoupgrade_t)
gen_require(^
    type rsync_t;
)
allow rsync_t polaris_autoupgrade_t:process sigchld;

# /tmp/ufs/crashinfo access

```

```

optional_policy(
polaris_ncd_tmp_read(polaris_autoupgrade_t)
')

# autoupgrade script in case of HA setup invokes breloy to trigger install of stand-by
polaris_bexecute_domtrans(polaris_autoupgrade_t)

polaris_flashlib_lock(polaris_autoupgrade_t)
polaris_flashlib_read(polaris_autoupgrade_t)
polaris_disk_install_read(polaris_autoupgrade_t)
polaris_install_engine_domtrans(polaris_autoupgrade_t)

#add transition to create /var/installer by autoupgrade
type polaris_autoupgrade_var_t;
files_tmp_file(polaris_autoupgrade_var_t)
files_var_filetrans(polaris_autoupgrade_t, polaris_autoupgrade_var_t, {file dir})
gen_require(
    type polaris_autoupgrade_exec_t;
)

#add transition to create /var/installer/auto_upgrade_helper.sh by autoupgrade
filetrans_pattern(polaris_autoupgrade_t,polaris_autoupgrade_var_t, polaris_autoupgrade_exec_t, file,
"auto_upgrade_helper.sh")
manage_files_pattern(polaris_autoupgrade_t, polaris_autoupgrade_var_t, polaris_autoupgrade_var_t)
manage_dirs_pattern(polaris_autoupgrade_t, polaris_autoupgrade_var_t, polaris_autoupgrade_var_t)

#add transition to create files/dir in /tmp
files_tmp_filetrans(polaris_autoupgrade_t, polaris_autoupgrade_tmp_t, {file dir})

# access to /tmp/installer
polaris_install_tmp_manage(polaris_autoupgrade_t)

fs_getattr_tmpfs(polaris_autoupgrade_t)

# access to /tmp/rsync_log_dir
polaris_manage_rsync_tmplog_dir(polaris_autoupgrade_t)

# access to /harddisk link (accessed by flashutil and rotee call)
polaris_disk_harddisk_read_lnk(polaris_autoupgrade_t)

rsync_entry_domtrans(polaris_chvrf_t, rsync_t)

gen_require(
    type polaris_autoupgrade_t;
    type polaris_autoupgrade_exec_t;
)
rsync_entry_domtrans(polaris_autoupgrade_t, rsync_t)
polaris_bexecute_domain(polaris_autoupgrade_t, polaris_autoupgrade_exec_t)

```

```

fs_getattr_xattr_fs(polaris_autoupgrade_t)

# auto_upgrade_helper.sh creates /var/installer/auto_upgrade_helper.sh
allow polaris_autoupgrade_t polaris_autoupgrade_exec_t:file { create setattr write };

# rsync operations for members and standby rps on autoupgrade
gen_require(
    type rsync_port_t;
)
allow polaris_autoupgrade_t rsync_port_t:tcp_socket name_connect;

# rsync requires to relabel /var/installer/auto_upgrade_helper.sh on standby
gen_require(
    type var_t;
)
allow rsync_t var_t:file relabelfrom;
allow rsync_t polaris_autoupgrade_exec_t:file relabelto;

# access to /vol/harddisk/*.pkg
polaris_getattr_file_harddisk(polaris_autoupgrade_t)

# access to /cdrom0/ when *ova image is booted during
# first instance of vwlc on ucs server
polaris_removable_read(polaris_autoupgrade_t)

polaris_getattr_file_harddisk(polaris_autoupgrade_t)

# auto_upgrade_client.sh access to "/tmp/sw/rp/0/0/rp_base/mount/bin/cut"
polaris_issu_tmp_files_read(polaris_autoupgrade_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisautoupgrade.te
No license file was found, but licenses were detected in source scan.

#
# June 2017, Victor Kamensky
#
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#

/usr/binos/conf/run_ioxn_caf.sh -- gen_context(system_u:object_r:polaris_caf_exec_t,s0)
/usr/binos/conf/iox_reset.sh -- gen_context(system_u:object_r:polaris_caf_exec_t,s0)

ifdef(`nyquist_platform',`
/usr/binos/conf/standby_ioxcfg.sh -- gen_context(system_u:object_r:polaris_sioxcd_rp_exec_t,s0)
/tmp/app_host(/.*)? gen_context(system_u:object_r:polaris_sioxcd_rp_tmp_t,s0)

```

```

/mnt/sd3/iox_alt_hdd.dsk      gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir(/.*)?      gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/iox(/.*)?   gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/caf(/.*)?   gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/iox_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/guest_share(/.*)?
gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/mnt/sd3/user/gscript/sss(/.*)? gen_context(system_u:object_r:polaris_iox_ss_disk_t,s0)
)

```

```

ifdef(`passport_platform',`

```

```

/flash1/iox_alt_hdd.dsk      gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
/flash1/iox_alt_hdd_mount_dir(/.*)?      gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
/flash1/iox_alt_hdd_mount_dir/iox(/.*)?   gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox_alt_hdd_mount_dir/caf(/.*)?   gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/flash1/iox_alt_hdd_mount_dir/iox_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox_alt_hdd_mount_dir/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox_alt_hdd_mount_dir/guest_share(/.*)?
gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/flash1/user/gscript/sss(/.*)? gen_context(system_u:object_r:polaris_iox_ss_disk_t,s0)
/usr/bin/os/conf/standby_ioxcfg.sh gen_context(system_u:object_r:polaris_sioxcd_rp_exec_t,s0)
/tmp/app_host(/.*)?      gen_context(system_u:object_r:polaris_sioxcd_rp_tmp_t,s0)
)

```

```

#All possible accesses from /bootflash/iox_alt_hdd_mount_dir (iox_polaris.conf)

```

```

/bootflash/iox_alt_hdd.dsk      gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir(/.*)?
gen_context(system_u:object_r:polaris_iox_alt_hdd_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/iox(/.*)?      gen_context(system_u:object_r:polaris_iox_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/caf(/.*)?      gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/iox_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/iox_host_data_share(/.*)?
gen_context(system_u:object_r:polaris_iox_files_t,s0)
/bootflash/iox_alt_hdd_mount_dir/guest_share(/.*)?
gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/bootflash/user/gscript/sss(/.*)? gen_context(system_u:object_r:polaris_iox_ss_disk_t,s0)

```

```

#All the possible IOX guestshell_dir from iox_polaris.conf

```

```

/guestshell(/.*)?(.*)\.sh      gen_context(system_u:object_r:polaris_guestshell_exec_t,s0)
/guestshell(/.*)?      gen_context(system_u:object_r:polaris_guestshell_t,s0)

```

```

#All the possible IOX flash_dir/harddisk_dir from iox_polaris.conf

```

```

/bootflash/iox(/.*)?      gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox(/.*)?      gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox(/.*)?      gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash11/iox(/.*)?      gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/harddisk/iox(/.*)?      gen_context(system_u:object_r:polaris_iox_files_t,s0)

```

```

/vol/disk0/iox(/.*)?          gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/usb1/iox(/.*)?          gen_context(system_u:object_r:polaris_iox_files_t,s0)

/bootflash/iox_data_share(/.*)?  gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox_data_share(/.*)?    gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox_data_share(/.*)?     gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash11/iox_data_share(/.*)?    gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/harddisk/iox_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/disk0/iox_data_share(/.*)?   gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/usb1/iox_data_share(/.*)?   gen_context(system_u:object_r:polaris_iox_files_t,s0)

/bootflash/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/mnt/sd3/iox_host_data_share(/.*)?  gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash1/iox_host_data_share(/.*)?   gen_context(system_u:object_r:polaris_iox_files_t,s0)
/flash11/iox_host_data_share(/.*)?  gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/harddisk/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/disk0/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)
/vol/usb1/iox_host_data_share(/.*)? gen_context(system_u:object_r:polaris_iox_files_t,s0)

/opt/cisco/caf/scripts(/.*)?(.*)\.sh gen_context(system_u:object_r:polaris_caf_exec_t,s0)
/opt/cisco/caf(/.*)?(.*)             gen_context(system_u:object_r:polaris_caf_files_t,s0)
/opt/cisco/caf                       -d gen_context(system_u:object_r:polaris_caf_files_t,s0)

/var/log/caf(/.*)?                  gen_context(system_u:object_r:polaris_caf_log_t,s0)

/etc/guestshell_rsa_key\.pub        gen_context(system_u:object_r:polaris_guestshell_ssh_key_t,s0)
/etc/guestshell_rsa_key             gen_context(system_u:object_r:polaris_guestshell_ssh_key_t,s0)

/tmp/caf(/.*)?                      gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/bootflash/caf(/.*)?                gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/mnt/sd3/caf(/.*)?                  gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/flash1/caf(/.*)?                   gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/flash11/caf(/.*)?                  gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/vol/harddisk/caf(/.*)?              gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/vol/disk0/caf(/.*)?                gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)
/vol/usb1/caf(/.*)?                 gen_context(system_u:object_r:polaris_caf_tmp_files_t,s0)

/var/run/netns/guestshell            gen_context(system_u:object_r:polaris_guestshell_var_run_t,s0)
/var/run/cisco_cli(/.*)?             gen_context(system_u:object_r:polaris_caf_var_run_t,s0)

/tmp/ttyF(/.*)/(.*)                 gen_context(system_u:object_r:fifo_var_run_t,s0)

# All the possible IOX bootflash/guest-share directory. This directory is shared between IOS and IOX
/bootflash/guest-share(/.*)?         gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/mnt/sd3/guest-share(/.*)?           gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/flash1/guest-share(/.*)?            gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/flash11/guest-share(/.*)?           gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)

```

```
/vol/harddisk/guest-share(/.*)?    gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/vol/disk0/guest-share(/.*)?      gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
/vol/usb1/guest-share(/.*)?      gen_context(system_u:object_r:polaris_iox_shared_files_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscaf.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# December 2019, Victor Kamensky
#
# Copyright (c) 2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
# polarisfnfagg file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfnfagg.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris cmm Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmm.if
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

```
# polarisplagd file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplagd.fc
```

No license file was found, but licenses were detected in source scan.

```
dnl
```



```
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
divert(-1)
```

```
include(`polaris_process.m4')
include(`polaris_process_if.m4')

include(`polaris_ipc_mqipc.m4')
include(`polaris_ipc_mqipc_if.m4')
```

```
include(`polaris_ipc_ripc.m4')
include(`polaris_ipc_ripc_if.m4')
```

```
include(`polaris_ipc_lipc.m4')
include(`polaris_ipc_lipc_if.m4')
```

```
dnl Stub out non existent one
define(`polaris_websocket_service_server',`)
define(`polaris_cipc_service_server',`')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#
## <summary>Polaris Platform IPC Policy Rules.</summary>
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_if.m4
No license file was found, but licenses were detected in source scan.
```

```
#
# April 2017, Victor Kamensky
#
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#
```

```
/tmp/.1.ndbutil-load gen_context(system_u:object_r:polaris_dmi_ndbutil_lock_t,s0)
/tmp/.1.ndbutil-use gen_context(system_u:object_r:polaris_dmi_ndbutil_lock_t,s0)
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmindbmand.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#

/dev/cpp_vxe_rsrc -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/cpp_dev_info -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/cpp -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/cpp_kipc -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
# on 1ng box
/dev/octeon_device -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/cpp_pdma -c gen_context(system_u:object_r:polaris_cpp_device_t,s0)
/dev/i95_[0-9]* -c gen_context(system_u:object_r:polaris_i95_device_t,s0)

/dev/shm/cpp_.* -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/sem\,cpp_.* -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/sem\,CPP_.* -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/sem\,CGM_SHM_SEM -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/cpp_ucose_dram -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)
/dev/shm/cpp_sbs_shm -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)

/mnt/huge/cpp_ucose_dram -- gen_context(system_u:object_r:polaris_cpp_tmpfs_t,s0)

/tmp/cpp_ifdev_rep -p gen_context(system_u:object_r:polaris_cpp_tmp_t,s0)
/tmp/cpp_ifdev_req -p gen_context(system_u:object_r:polaris_cpp_tmp_t,s0)
/tmp/cpp_anon_db -- gen_context(system_u:object_r:polaris_cpp_tmp_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpp.fc

No license file was found, but licenses were detected in source scan.

```
#
# December 2019, Victor Kamensky
#
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#
```

policy\_module(polarisservicemgr, 1.0);

```
gen_require(
    type polaris_service_mgr_t;
)
```

```
polaris_btrace_data_manage(polaris_service_mgr_t)
polaris_crft_data_manage(polaris_service_mgr_t)
polaris_chasfs_manage(polaris_service_mgr_t)
polaris_cpld_read(polaris_service_mgr_t)
polaris_flashlib_read(polaris_service_mgr_t)
polaris_lua_read(polaris_service_mgr_t)
polaris_tdlresolve_read(polaris_service_mgr_t)

polaris_ripc_sman_ui_serv_connect(polaris_service_mgr_t)

polaris_db_tlddb_dir_use(polaris_service_mgr_t)

# Use REPM MQIPC for replication
polaris_repm_peer_mqipc_manage(polaris_service_mgr_t)

#watches of /tmp/[rp|fp|cc]/pvp/process_state directory
polaris_process_state_watch(polaris_service_mgr_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisservicemgr.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

policy_module(polarispvp, 1.0);

polaris_process_domain_template(pvp)

# transition to pman domain, once pman is invoked by pvp
polaris_pman_domtrans(polaris_pvp_t)

corecmd_exec_bin(polaris_pvp_t)
corecmd_exec_shell(polaris_pvp_t)
# can execute hostname in pvp domain
hostname_exec(polaris_pvp_t)
# can execute process in polaris domain
polaris_exec(polaris_pvp_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_pvp_t)

# allow to get getattr of /proc file system during find over it
kernel_getattr_proc(polaris_pvp_t)
```

```

# allow read of /etc/passwd
auth_use_nsswitch(polaris_pvp_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_pvp_t)

# all to read sysctl files in /proc directory
kernel_read_all_sysctls(polaris_pvp_t)

# work with /tmp files
type polaris_pvp_tmp_t;
files_tmp_file(polaris_pvp_tmp_t)
manage_dirs_pattern(polaris_pvp_t, tmp_t, polaris_pvp_tmp_t)
manage_files_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
manage_fifo_files_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
files_tmp_filetrans(polaris_pvp_t, polaris_pvp_tmp_t, { file dir })
filetrans_pattern(domain, tmp_t, polaris_pvp_tmp_t, dir, "pvp")

# /tmp/silent_roll_select.log handling on Macallan
filetrans_pattern(domain, tmp_t, polaris_pvp_tmp_t, file, "silent_roll_select.log")

# work with /tmp/[rp|fp|cc]/pvp/process_state files
type polaris_process_state_t;
files_tmp_file(polaris_process_state_t)
manage_dirs_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_process_state_t)
manage_files_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_process_state_t)
filetrans_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_process_state_t, dir, "process_state")

# LOOK AT ME now all polaris process can change each other process
# state. Need to fix it with more process specific labels in case
# when polaris_domain_process becomes template.
gen_require(
    attribute polaris_domain;
)
polaris_pvp_manage_process_state_files(polaris_domain)

allow polaris_pvp_t self:capability sys_resource;

# readlink access to /proc/<pid>/fd/0 triggers sys_ptrace capability need
allow polaris_pvp_t self:capability { sys_ptrace };

dmidecode_domtrans(polaris_pvp_t)

#on some ngwc pvp has to code-sign-verify silent roll packages
ifdef(^ngwc_family',`
polaris_code_verify_domtrans(polaris_pvp_t)
)`
)

```

```

polaris_btrace_data_manage_all(polaris_pvp_t)
polaris_chasfs_manage(polaris_pvp_t)
polaris_cpld_read(polaris_pvp_t)
polaris_cpld_write(polaris_pvp_t)
polaris_proc_rmonbifo_read(polaris_pvp_t)
polaris_rmonbifo_tmp_read(polaris_pvp_t)
polaris_tdldb_list_dirs(polaris_pvp_t)
polaris_boot_tmp_read(polaris_pvp_t)
polaris_read_debug_conf(polaris_pvp_t)

# LOOK AT ME pvp.sh runs find over /proc. Needs access
# to state of all processes
domain_read_all_domains_state(polaris_pvp_t)

# pvp.sh can call logger command
logging_send_syslog_msg(polaris_pvp_t)

# should it not be moved to dmidecode module or better
# change script to call dmidecode with stdin redirected
# from /dev/null (i.e dmidecode < /dev/null)
gen_require(
    type dmidecode_t;
)
polaris_pvp_stdin_read(dmidecode_t)

# read pman tmp files
polaris_pman_read_tmp_files(polaris_pvp_t)

#allow polaris_pvp_t polaris_udev_tmp_files_t:dir { getattr search };
polaris_udev_tmp_list_dirs(polaris_pvp_t)

gen_require(
    type initrc_t;
    type init_t;
)
#init_script_tmp_filetrans(initrc_t, polaris_pvp_tmp_t, file, "iosd_memory_share")
files_tmp_filetrans({ initrc_t init_t }, polaris_pvp_tmp_t, file, "iosd_memory_share")

polaris_systemd_tmpfiles_tmp_filetrans(polaris_pvp_tmp_t, dir, "max_elastic_bays")

# direct access to serial TTY devices like /dev/ttyS1
term_write_unallocated_ttys(polaris_pvp_t)

# For Cabo, allow access to GNSS device
#ifdef(^cabo_platform',`
polaris_cabo_gnss_dev_use(polaris_pvp_t)
)

```

```

# on ultra pvp calls hv_ttyprobe utility to figure out what terminal
# to use as console, and this one need read access to terminal. There is
# no separate macro for read only. But since we granting write to everyone
# let use 'use' which means read/write
ifdef(`vxe_family',`
term_use_unallocated_ttys(polaris_pvp_t)
')
ifdef(`wlc_family',`
term_use_unallocated_ttys(polaris_pvp_t)
')
# pvp's linux_iods_image_env.sh will check /dev/ttyUSB* ports with hv_ttyprobe too.
term_use_usb_ttys(polaris_pvp_t)

# allow access and modify files in /tftp directory, cannot use tftp_manage_rw_content
# since it does not cover link files
gen_require(`
    type tftpd_dir_rw_t;
')
manage_dirs_pattern(polaris_pvp_t, tftpd_dir_rw_t, tftpd_dir_rw_t)
manage_files_pattern(polaris_pvp_t, tftpd_dir_rw_t, tftpd_dir_rw_t)
manage_lnk_files_pattern(polaris_pvp_t, tftpd_dir_rw_t, tftpd_dir_rw_t)

# ASR1K modular platforms create /tftp/inv/inventory_$fru_$slot.bin
# /tftp/inv is not a softlink but a directory for asr1k Modular platforms.
# So it needs a file transition to polaris_chasfs_t for accessing it.
ifdef(`mcp_family',`
filetrans_pattern(domain, tftpd_dir_rw_t, polaris_chasfs_t, dir, "inv")
')
# on ultra platform hv_ttyprobe utility that runs under polaris_pvp_t label
# checks for existence of /boot/ttyS0_ignore file; and since /boot is symlink
# to /varied it need dir search permission over polaris_disk_varied_t
ifdef(`vxe_family',`
polaris_disk_varied_search(polaris_pvp_t)
')
ifdef(`wlc_family',`
polaris_disk_varied_search(polaris_pvp_t)
')

# pvp.sh calls cp utility with -a option that should preserve files
# attributes as result cp needs to perform set_process_security_ctx call
# which in turns calls setfscreatecon
allow polaris_pvp_t self:process setfscreate;

# pvp.sh calls pidof utility and it needs read access to sysfs_t
#
# When resetting a partner, pvp writes to the PCIe switch global
# reset register using the i2c driver, which is also sysfs_t

```

```

# LOOK AT ME should we create a new type for the PCIe switch reg
dev_rw_sysfs(polaris_pvp_t)

# wants to execute /bin/dmesg
dmesg_domtrans(polaris_pvp_t)

# wants to read from /tmp/rp/pvp/work/inot_fifo
gen_require(
    type dmesg_t;
)
rw_fifo_files_pattern(dmesg_t, polaris_pvp_tmp_t, polaris_pvp_tmp_t)

# wants to write into /bootflash/.prst_sync
polaris_persistent_manage(polaris_pvp_t)

# pvp tried to find all execept hman polaris process with
# 'find /tmp/rp/process -name *.pid ! -name *hman* -printf %p' command
# should be able to read pman tmp files
polaris_pman_read_tmp_files(polaris_pvp_t)

# on way down pvp.sh call 'workon.sh rp 0 rotate force' so we
# need to transition and run it in btrace_rotate domain
polaris_btrace_rotate_domtrans(polaris_pvp_t)

# on way down pvp.sh checks for *.TEMP_IN_PROGRESS in /misc/scratch/core
# need to be able read /misc/scratch link
polaris_disk_bootflash_read_lnk(polaris_pvp_t)

# implode.sh things, should we run them in its own domain?

# removes /etc/exports, create a new empty one and runs 'exportfs -ua'
# this action also needs kernel_rw_rpc_sysctls to flush
files_manage_etc_files(polaris_pvp_t)
gen_require(
    type exports_t;
)
allow polaris_pvp_t exports_t:file delete_file_perms;
rpc_write_exports(polaris_pvp_t)
rpc_manage_nfs_state_data(polaris_pvp_t)
kernel_rw_rpc_sysctls(polaris_pvp_t)

# calls 'systemctl reboot'
systemd_start_power_services(polaris_pvp_t)

# pvp on lmg attempts to rm readonly fpd firmware file, not sure why
polaris_firmware_getattr(polaris_pvp_t)

# pvp reads /tmp/iosd_level

```

```

polaris_lm_tmp_read(polaris_pvp_t)
allow polaris_pvp_t self:capability dac_override;

# in some image pvp needs to monut /tmp/rp/tlldb, in other images
# it got mount by chasfs_boottime.sh systemd unit
polaris_tlldb_manage_dirs(polaris_pvp_t)
mount_domtrans(polaris_pvp_t)

# in some cases pvp script creates /tmp/xx/process directory
polaris_pman_tmp_filetrans(polaris_pvp_t, dir, "process")
polaris_pman_manage_tmp_files(polaris_pvp_t)

# on ngwc pvp creates /flash1/NVRAM directory
gen_require(
    type polaris_nvram_file_t;
    type root_t;
)
filetrans_pattern(polaris_pvp_t, root_t, polaris_nvram_file_t, dir, "flash1")
manage_dirs_pattern(polaris_pvp_t, polaris_nvram_file_t, polaris_nvram_file_t)

# obtain access to rommon vars which live in flashlib
polaris_flashlib_read(polaris_pvp_t)
polaris_flashlib_write(polaris_pvp_t)

# on ngwc platforms pvp creates a /obfl_cc directory and soft links it
# to the correct vbd device
ifdef(^ngwc_family',`
gen_require(
    type polaris_obfl_data_t;
    type root_t;
)
filetrans_pattern(polaris_pvp_t, root_t, polaris_obfl_data_t, dir, "obfl_cc")
)

# on ngwc platforms pvp needs to be able to determine if the the vbd devices
# exist. The types may be slightly different depending on whether the cc's
# device node is managed by udev or not
ifdef(^ngwc_family',`
dev_getattr_generic_blk_files(polaris_pvp_t)
storage_getattr_fixed_disk_dev(polaris_pvp_t)
udev_read_db(polaris_pvp_t)
)

# on ngwc platforms pvp soft links the /tmp/sw/cc_srdriver/<slot> directory
# to the correct silent roll software package via vbd_sr_app_init()
ifdef(^ngwc_family',`
polaris_sw_data_manage(polaris_pvp_t)
)

```



```

# on blackheart pvp creates /blackheart_config directory
ifdef(^blackheart_platform',`
gen_require(`
    type polaris_nvram_file_t;
    type root_t;
`)
filetrans_pattern(polaris_pvp_t, root_t, polaris_nvram_file_t, dir, "blackheart_config")
manage_dirs_pattern(polaris_pvp_t, polaris_nvram_file_t, polaris_nvram_file_t)
`)

# on sparrow pvp creates /sparrow_config directory
ifdef(^sparrow_platform',`
gen_require(`
    type polaris_nvram_file_t;
    type root_t;
`)
filetrans_pattern(polaris_pvp_t, root_t, polaris_nvram_file_t, dir, "sparrow_config")
manage_dirs_pattern(polaris_pvp_t, polaris_nvram_file_t, polaris_nvram_file_t)
`)

# on Aventus pvp creates /aventus_config directory
ifdef(^aventus_platform',`
gen_require(`
    type polaris_nvram_file_t;
    type root_t;
`)
filetrans_pattern(polaris_pvp_t, root_t, polaris_nvram_file_t, dir, "aventus_config")
manage_dirs_pattern(polaris_pvp_t, polaris_nvram_file_t, polaris_nvram_file_t)
fs_manage_configfs_files(polaris_pvp_t)
`)

# on utah for cc and on 1ng cyan_init.sh is executed by pvp
polaris_dyncfg_domtrans(polaris_pvp_t)
# should it not be moved to cyan module or better
# change script to call cyan_init.sh with stdin redirected
# from /dev/null (i.e cyan_init.sh < /dev/null)
gen_require(`
    type polaris_dyncfg_t;
`)
polaris_pvp_stdin_read(polaris_dyncfg_t)

# mktmpfd checks /tmp file system attributes
fs_getattr_tmpfs(polaris_pvp_t)

optional_policy(`
# pvp on nyquist ls /tmp/ufs/crashinfo
polaris_ncd_tmp_read(polaris_pvp_t)
`)

```

```

# transition to polaris_load_usbnet_t, once load_usbnet.sh is invoked by pvp
# crankshaft platforms need access to configs
ifdef(`crankshaft_family',`
polaris_load_usbnet_domtrans(polaris_pvp_t)
gen_require(`
    type configs_t;
`)
allow polaris_pvp_t configs_t:dir getattr;
`)

# runs rsync -ptgoDLq /bootflash/.installer/issu_crash/fru_crash rsync://rp0-0/bootflash/.installer/...
rsync_entry_type(polaris_pvp_t)

ifdef(`ngwc_family',`
polaris_chvrf_domtrans(polaris_pvp_t)
gen_require(`
    type rsync_t;
`)
allow rsync_t polaris_pvp_t:process sigchld;

# pvp_tmp file descriptor leaks into mcp_chvrf.sh
gen_require(`
    type polaris_chvrf_t;
    type polaris_pvp_tmp_t;
`)
allow polaris_chvrf_t polaris_pvp_tmp_t:fifo_file { ioctl read };
`)

# statfs64 over /tmp
fs_getattr_xattr_fs(polaris_pvp_t)

polaris_tdlresolve_read(polaris_pvp_t)

corenet_tcp_connect_rsync_port(polaris_pvp_t)

#runs over /proc/<pid>/net/arp
kernel_read_network_state(polaris_pvp_t)

#runs over /proc/
kernel_read_network_state_symlinks(polaris_pvp_t)

# work with mounts
mount_domtrans(polaris_pvp_t)

optional_policy(`
# pvp.sh may mark or clear bits in /proc/exiting_bays
polaris_rw_exiting_bays(polaris_pvp_t)

```

```

)

optional_policy(
container_runtime_domtrans(polaris_pvp_t)
)

# LOOK AT ME /usr/binos/conf/dockerd_env.sh not only sets environment
# it also does quite a bit of action in context of pvp when it got
# sourced before dockerd start
optional_policy(
fs_getattr_all_fs(polaris_pvp_t)
files_getattr_all_dirs(polaris_pvp_t)
fs_read_nsf_files(polaris_pvp_t)
container_manage_config_files(polaris_pvp_t)
polaris_caf_files_read(polaris_pvp_t)
# creates /var/log/docker/docker.log
logging_manage_generic_logs(polaris_pvp_t)
gen_require(
    type var_log_t;
)
allow polaris_pvp_t var_log_t:dir create;
)

# support uswap feature.
# pvp script create and deletes
# the /bootflash/.uswap/... folder.
type polaris_uswap_files_t;
files_type(polaris_uswap_files_t)
polaris_pfile_type(polaris_uswap_files_t)
filetrans_pattern(polaris_pvp_t, polaris_disk_bootflash_t, polaris_uswap_files_t, dir, ".USWAP")
manage_dirs_pattern(polaris_pvp_t, polaris_uswap_files_t, polaris_uswap_files_t)
manage_files_pattern(polaris_pvp_t, polaris_uswap_files_t, polaris_uswap_files_t)
manage_lnk_files_pattern(polaris_pvp_t, polaris_uswap_files_t, polaris_uswap_files_t)

# support for pvp to create /harddisk/.CRFT directory
filetrans_pattern(polaris_pvp_t, polaris_disk_bootflash_t, polaris_crft_data_t, dir, ".CRFT")

# Support SAI
type polaris_pvp_sai_t;
files_tmp_file(polaris_pvp_sai_t)
filetrans_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_sai_t, dir, "sai_process")
manage_dirs_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_sai_t)
manage_files_pattern(polaris_pvp_t, polaris_pvp_tmp_t, polaris_pvp_sai_t)
# all processes controlled by pchort require access to sai files
gen_require(
    attribute polaris_domain;
)
polaris_pvp_read_sai_files(polaris_domain)

```

```

ifdef(`ngwc_family`,`
# ngmod_vbd_handle_mount@.service started by pvp on macallan
systemd_config_generic_services(polaris_pvp_t)
')

type polaris_pvp_var_run_t;
files_pid_file(polaris_pvp_var_run_t)
gen_require(
    type var_run_t;
)
manage_files_pattern(polaris_pvp_t, var_run_t, polaris_pvp_var_run_t)
files_pid_filetrans(polaris_pvp_t, polaris_pvp_var_run_t, file, ".uswap_clr_rp")
files_pid_filetrans(polaris_pvp_t, polaris_pvp_var_run_t, file, ".uswap_clr_fp")
files_pid_filetrans(polaris_pvp_t, polaris_pvp_var_run_t, file, ".uswap_clr_cc")

# watch over /tmp/rp/pvp/control
allow polaris_pvp_t polaris_pvp_tmp_t:dir watch;

## permissions required during shutdown

# implode.sh 'systemctl reboot' uses dbus
dbus_system_bus_client(polaris_pvp_t)

# and checks reboot.target
systemd_status_power_services(polaris_pvp_t)

# writes sysctrl_i2c.lck file
gen_require(
    type polaris_cm_rp_tmp_t;
)
files_tmp_filetrans(polaris_pvp_t, polaris_cm_rp_tmp_t, file, "sysctrl_i2c.lck")
polaris_cm_rp_tmp_manage(polaris_pvp_t)

# journalctl and ifconfig are used when gathering logs during a punt-inject
# crash
journalctl_domtrans(polaris_pvp_t)
sysnet_domtrans_ifconfig(polaris_pvp_t)
# and allow it to write to our shutdownlog
gen_require(
    type ifconfig_t;
)
polaris_btrace_data_manage_all(ifconfig_t)

# implode.sh checks ip interfaces before ifconfig
polaris_socketat_nsfs_read(polaris_pvp_t)

# cedge uses logrotate

```

```

polaris_ripc_confd_ipc_connect(polaris_pvp_t)
# logrotate perms
polaris_confd_var_log_manage(polaris_pvp_t)
allow polaris_pvp_t self:capability { chown fowner };
# var_lib stuff
files_manage_urandom_seed(polaris_pvp_t)

# vconfd_script_admin_tech.sh is invoked by pvp.sh. This requires a domain
# transition from pvp to admin tech context.
polaris_admin_tech_domtrans(polaris_pvp_t)

## systemreport related permissions
# pd_info collection when triggering systemreport
# fdisk permissions
storage_raw_read_fixed_disk( polaris_pvp_t );
fstools_manage_entry_files( polaris_pvp_t);
fstools_exec( polaris_pvp_t );
polaris_rommon_device_read(polaris_pvp_t)
# dmesg writes to pd_info path
write_files_pattern(dmesg_t, polaris_disk_bootflash_t, polaris_disk_bootflash_t )
gen_require(
    type admin_home_t;
)
# top creates/writes dir /.config
allow polaris_pvp_t admin_home_t:dir { add_name create write };
# drop-caches
kernel_rw_vm_sysctls( polaris_pvp_t );

# systemreport collection reads all sorts of files
# but also deletes those files afterwards...
logging_manage_audit_log(polaris_pvp_t)

# report collects maroon data
polaris_maroon_data_manage_all(polaris_pvp_t);
polaris_tdlresolve_manage(polaris_pvp_t);

# collect udev log
polaris_udev_tmp_manage(polaris_pvp_t)

init_status(polaris_pvp_t);

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispvp.te
No license file was found, but licenses were detected in source scan.

dnl

```

dnl April 2018, Victor Kamensky

dnl

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dnl

```
define(^ripc_stem', `translit(patsubst($1, `-rip$', ``), `-', `_''))
```

```
define(^ripc_label', `format(^polaris_%s_rip_port_t', ripc_stem($1)))
```

dnl Ripc Type Map: track that type declations unique

```
define(^ripc_type_map', `defn(format(`^ripc_type_map[%s]', ` $1'))')
```

```
define(^ripc_type_map_set', `define(format(`^ripc_type_map[%s]', ` $1'), ` $2'))
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_rip.m4

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#

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#

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#

```
policy_module(polarisquack, 1.0);
```

```
#####
```

```
# Quack Driver policy
```

```
#####
```

```
type polaris_quack_device_t;
```

```
dev_node(polaris_quack_device_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisquack.te

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#

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#

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#

# Polaris lua files

```
/lua/(.*)?(.*)\.lua -- gen_context(system_u:object_r:polaris_lua_file_t,s0)
```

```
/usr/binos/conf/(.*)?(.*)\.lua -- gen_context(system_u:object_r:polaris_lua_file_t,s0)
```

```
/lua/(.*)?(.*)\.so -- gen_context(system_u:object_r:lib_t,s0)
```

```
/lua/(.*)?(.*) --d gen_context(system_u:object_r:usr_t,s0)
```

```
/lua -d gen_context(system_u:object_r:usr_t,s0)

#Polaris nginx lua files
/var/scripts/lua(/.*)? -d gen_context(system_u:object_r:polaris_lua_file_t,s0)
/var/scripts/lua(/.*)? -- gen_context(system_u:object_r:polaris_lua_file_t,s0)

# why did we put .so libraries in /var directory?
/var/LibLua/LuaXML_lib\so -- gen_context(system_u:object_r:lib_t,s0)
/var/LibLua/cjson\so -- gen_context(system_u:object_r:lib_t,s0)
/var/LibLua/(.*)\lua -- gen_context(system_u:object_r:polaris_lua_file_t,s0)

#/lua -- gen_context(system_u:object_r:polaris_lua_file_t,s0)
/lua(/.*)? -- gen_context(system_u:object_r:polaris_lua_file_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislua.fc
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```

```
#
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#
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#
```

```
/tmp/sw/cfg(/.*)? gen_context(system_u:object_r:polaris_cfg_data_t,s0)
/usr/binos/conf/cfg_sync.sh -- gen_context(system_u:object_r:polaris_cfg_sync_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscfg.fc
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
/var/log/dmi(/.*)? gen_context(system_u:object_r:polaris_dmi_var_log_t,s0)
/tmp/stream-parsers(/.*)? gen_context(system_u:object_r:polaris_dmi_parser_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiopdatamgrd.fc
No license file was found, but licenses were detected in source scan.
```

```
#
```

```

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#

## <summary>Polaris container Policy Rules.</summary>

#####
## <summary>
## Creates types and rules for a basic
## polaris container process domain.
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_container_t
## </summary>
## </param>
#
template(`polaris_container_domain_template`,`
gen_require(`
    type svirt_sandbox_file_t;
    type virt_lxc_var_run_t;
    attribute sandbox_net_domain;
    attribute svirt_sandbox_domain;
    bool virt_sandbox_use_sys_admin;
    bool virt_sandbox_use_mknod;
    bool virt_sandbox_use_all_caps;
    bool virt_sandbox_use_netlink;
`)

type polaris_$1_container_t, svirt_sandbox_domain;
domain_type(polaris_$1_container_t)
domain_user_exemption_target(polaris_$1_container_t)
mls_rangetrans_target(polaris_$1_container_t)
mcs_constrained(polaris_$1_container_t)
role system_r types polaris_$1_container_t;

logging_send_syslog_msg(polaris_$1_container_t)

kernel_read_system_state(polaris_$1_container_t)
kernel_read_all_proc(polaris_$1_container_t)

virt_default_capabilities(polaris_$1_container_t)
typeattribute polaris_$1_container_t sandbox_net_domain;
donaudit polaris_$1_container_t self:capability fsetid;
donaudit polaris_$1_container_t self:capability2 block_suspend ;
allow polaris_$1_container_t self:process { execstack execmem };

```



```

manage_chr_files_pattern(polaris_${1}_container_t, virt_sandbox_file_t, virt_sandbox_file_t)
kernel_load_module(polaris_${1}_container_t)

tunable_policy(`virt_sandbox_use_sys_admin`,`
    allow polaris_${1}_container_t self:capability sys_admin;
`)

tunable_policy(`virt_sandbox_use_mknod`,`
    allow polaris_${1}_container_t self:capability mknod;
`)

tunable_policy(`virt_sandbox_use_all_caps`,`
    allow polaris_${1}_container_t self:capability all_capability_perms;
    allow polaris_${1}_container_t self:capability2 all_capability2_perms;
`)

tunable_policy(`virt_sandbox_use_netlink`,`
    allow polaris_${1}_container_t self:netlink_socket create_socket_perms;
    allow polaris_${1}_container_t self:netlink_tcpdiag_socket create_netlink_socket_perms;
    allow polaris_${1}_container_t self:netlink_kobject_uevent_socket create_socket_perms;
`,`
    logging_dontaudit_send_audit_msgs(polaris_${1}_container_t)
`)

allow polaris_${1}_container_t virt_lxc_var_run_t:dir list_dir_perms;
allow polaris_${1}_container_t virt_lxc_var_run_t:file read_file_perms;

kernel_read_irq_sysctls(polaris_${1}_container_t)
kernel_read_messages(polaris_${1}_container_t)

dev_read_sysfs(polaris_${1}_container_t)
dev_read_mtrr(polaris_${1}_container_t)
dev_read_rand(polaris_${1}_container_t)
dev_read_urand(polaris_${1}_container_t)

files_read_kernel_modules(polaris_${1}_container_t)

# Do we actually need these?
fs_mount_cgroup(polaris_${1}_container_t)
fs_manage_cgroup_dirs(polaris_${1}_container_t)
fs_manage_cgroup_files(polaris_${1}_container_t)
# Needed for docker
fs_unmount_xattr_fs(polaris_${1}_container_t)

auth_use_nsswitch(polaris_${1}_container_t)

optional_policy(`
rpm_read_db(polaris_${1}_container_t)

```

```

)

logging_send_syslog_msg(polaris_$1_container_t)

tunable_policy(`virt_sandbox_use_audit`,`
    logging_send_audit_msgs(polaris_$1_container_t)
`)

userdom_use_user_ptys(polaris_$1_container_t)

optional_policy(`
    # allow vman to kill lxc container process
    # on shutdown where vman destroys container-related
    # stuff after a timeout period
    polaris_vman_kill_process(polaris_$1_container_t)
`)

# copied from polariscommon.if. If the label is added in
# in permissive map, the below interface will make permissive
ifelse(permissive_domain(polaris_$1_container_t), polaris_$1_container_t,
`polaris_permissive_domain_setup(polaris_$1_container_t),
    confined_domain(polaris_$1_container_t), polaris_$1_container_t, `,
    `polaris_domain_maybe_unconfined(polaris_$1_container_t)`)

)

#####
## <summary>
## Creates types and rules for a basic
## polaris KVM container process domain.
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_container_t
## </summary>
## </param>
#
template(`polaris_kvm_domain_template`,`
gen_require(`
    attribute virt_domain;
    type svirt_image_t;
`)

# for now, things are same as polaris_container_domain_template
polaris_container_domain_template($1)

typeattribute polaris_$1_container_t virt_domain;
# allow {map} of svirt_image_t needed by VWAAS similar to svirt

```

```

    allow polaris_${1}_container_t svirt_image_t:{ file blk_file } map;
)
#####
## <summary>
##   Read Sandbox Files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sandbox_file_read`,`
    gen_require(`
        type svirt_sandbox_file_t;
    `)
    read_files_pattern($1, svirt_sandbox_file_t, svirt_sandbox_file_t)
    read_lnk_files_pattern($1, svirt_sandbox_file_t, svirt_sandbox_file_t)
    list_dirs_pattern($1, svirt_sandbox_file_t, svirt_sandbox_file_t)
)

#####
## <summary>
##   Read Sandbox Files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sandbox_file_dir_list`,`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type svirt_sandbox_file_t;
    `)
    list_dirs_pattern($1, { svirt_sandbox_file_t polaris_disk_bootflash_t polaris_disk_harddisk_t },
svirt_sandbox_file_t)
    optional_policy(`
        gen_require(`
            type polaris_iox_alt_hdd_files_t;
        `)
        list_dirs_pattern($1, polaris_iox_alt_hdd_files_t , svirt_sandbox_file_t)
    `)
)
)

```

```
#####
## <summary>
##   Getattr of Sandbox Files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sandbox_file_getattr`,`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type svirt_sandbox_file_t;
    `)
    setattr_files_pattern($1, { svirt_sandbox_file_t polaris_disk_bootflash_t polaris_disk_harddisk_t },
svirt_sandbox_file_t)
    optional_policy(`
        gen_require(`
            type polaris_iox_alt_hdd_files_t;
        `)
        setattr_files_pattern($1, polaris_iox_alt_hdd_files_t, svirt_sandbox_file_t)
    `)
)

```

```
#####
## <summary>
##   Normal restricted permission to execute utd (snort) container
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_utd_container`,`
    allow $1 self:netlink_generic_socket client_stream_socket_perms;
)

```

```
#####
## <summary>
##   Allow domain transition
## </summary>
## <param name="domain">
##   <summary>

```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_iox_container_domtrans`,`
    gen_require(`
        type polaris_iox_container_t;
        type container_file_t;
    `)
    domain_transition_pattern($1, container_file_t, polaris_iox_container_t)
`)

```

```
#####
```

```

## <summary>
## Allow watch on container files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_iox_container_watch`,`
    gen_require(`
        type tmpfs_t;
        type container_file_t;
    `)
    allow $1 container_file_t:{ dir file lnk_file} watch;
    allow $1 tmpfs_t:{ dir file lnk_file} watch;
`)

```

```
#####
```

```

## <summary>
## Send messages to utdl container unix datagram sockets.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_utdl_container_dgram_send`,`
    gen_require(`
        type polaris_utdl_container_t;
    `)
    allow $1 polaris_utdl_container_t:unix_dgram_socket sendto;
`)

```

```
#####
## <summary>
##   Allow unix stream socket connect
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_waas_stream_connect`,`
    gen_require(`
        type polaris_waas_container_t;
    `)
    allow $1 polaris_waas_container_t:unix_stream_socket connectto;
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscontainer.if
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
/tmp/\.flashlock      -- gen_context(system_u:object_r:polaris_flashlib_lock_t,s0)
/tmp/flashdev.log     -- gen_context(system_u:object_r:polaris_flashlib_log_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisflashlib.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# Oct 2020, Xin Xiang
#
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#
```

```
# dma map devices
/dev/dmappmap -c gen_context(system_u:object_r:polaris_dmammap_device_t,s0)
```

```
# /dev/dma_nw is introduced by Nightwatch switch module on ESG routing platform
/dev/dma_nw -c gen_context(system_u:object_r:polaris_dmammap_device_t,s0)
```

```

# dplr interrupt devices
/dev/dplr_intrpt -c gen_context(system_u:object_r:polaris_dplr_device_t,s0)

# /dev/dplr_nw is introduced by Nightwatch switch module on ESG routing platform
/dev/dplr_nw -c gen_context(system_u:object_r:polaris_dplr_device_t,s0)

# e.g., /dev/msi/Slot8/Doppler0/Group0
/dev/msi/Slot[0-9]*/Doppler[0-9]* -c gen_context(system_u:object_r:polaris_dplr_device_t,s0)
/dev/msi/Slot[0-9]*/Doppler[0-9]*/(.*)? -c gen_context(system_u:object_r:polaris_dplr_device_t,s0)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdoppler.fc
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```

```

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#

```

```

## <summary>Polaris ncd Policy Rules.</summary>

```

```

#####

```

```

## <summary>
##   Make the specified domain able to manage tmp file created by
##   ncd.sh like /tmp/etc/ncd_work_dir
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_ncd_tmp_manage`,`
    gen_require(`
        type polaris_ncd_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
    manage_files_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
    manage_lnk_files_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
`)

```

```

#####

```

```

## <summary>
##   Make the specified domain able to read tmp file created by
##   ncd.sh like /tmp/ufs/crashinfo

```

```

## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ncd_tmp_read`,`
    gen_require(`
        type polaris_ncd_tmp_t;
    `)
    list_dirs_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
    read_files_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
    read_lnk_files_pattern($1, polaris_ncd_tmp_t, polaris_ncd_tmp_t)
`)

```

```

#####
## <summary>
##   Make the specified domain able to read etc file created by
##   ncd.sh like /etc/conf/unifiedfs/mount_data
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ncd_etc_read`,`
    gen_require(`
        type polaris_ncd_etc_t;
    `)
    read_files_pattern($1, polaris_ncd_etc_t, polaris_ncd_etc_t)
`)

```

```

#####
## <summary>
##   Execute a domain transition to run ncd.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ncd_domtrans`,`
    gen_require(`
        type polaris_ncd_t, polaris_ncd_exec_t;
    `)

```



```

        domtrans_pattern($1, polaris_ncd_exec_t, polaris_ncd_t)
    ')

#####
## <summary>
##   Execute a domain transition to run unifiedfs_helper.sh.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ufs_helper_domtrans',`
    gen_require(`
        type polaris_ufs_helper_t, polaris_ufs_helper_exec_t;
    ')

    domtrans_pattern($1, polaris_ufs_helper_exec_t, polaris_ufs_helper_t)
')

#####
## <summary>
##   Run rpcinfo in a domain, grant proper network permissions.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ncd_rpcinfo_net',`
    corenet_tcp_bind_generic_node($1)
    corenet_tcp_bind_all_rpc_ports($1)
    corenet_tcp_connect_all_rpc_ports($1)
    corenet_tcp_connect_unreserved_ports($1)
    allow $1 self:tcp_socket { bind connect create getattr getopt setopt };

    corenet_udp_bind_generic_node($1)
    corenet_udp_bind_all_rpc_ports($1)
    allow $1 self:udp_socket { bind create getattr getopt setopt };

    corenet_tcp_connect_portmap_port($1)

ifdef(`passport_platform',`
    # invoked rpcinfo which connects to port 2049 (nfs server)

```

```
# port is incorrectly labelled due to falling in range of TDL define
# of IOSd gold rpc service
polaris_ripc_iosd_gold_connect($1)
')
```

```
ifdef(`starfleet_platform',`
# invoked rpcinfo which connects to port 2049 (nfs server)
# port is incorrectly labelled due to falling in range of TDL define
# of IOSd gold rpc service
polaris_ripc_iosd_gold_connect($1)
')
```

```
ifdef(`bigbang_platform',`
#nfs server port 2049 is labelled as rpc-emd_ui_port_t based on TDL define
polaris_ripc_emd_ui_connect($1)
')
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisncd.if
No license file was found, but licenses were detected in source scan.
```

```
#
# July 2017, Victor Kamensky
#
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#
```

```
policy_module(polariscppcdm, 1.0);
```

```
gen_require(`
type polaris_cpp_cdm_t;
')
```

```
polaris_btrace_data_manage(polaris_cpp_cdm_t)
polaris_crft_data_manage(polaris_cpp_cdm_t)
polaris_chasfs_manage(polaris_cpp_cdm_t)
polaris_tdlresolve_read(polaris_cpp_cdm_t)
polaris_tdlldb_list_dirs(polaris_cpp_cdm_t)
polaris_cpld_read(polaris_cpp_cdm_t)
polaris_flashlib_read(polaris_cpp_cdm_t)
```

```
polaris_cpp_tmp_files_use(polaris_cpp_cdm_t)
# works with /dev/cpp_dev_info and /dev/cpp_kipc
polaris_cpp_dev_use(polaris_cpp_cdm_t)
polaris_cpp_tmpfs_ifdev_rw(polaris_cpp_cdm_t)
```

```

polaris_icc_broken_relocations(polaris_cpp_cdm_t)

allow polaris_cpp_cdm_t self:capability net_admin;

# get attributes of /dev/shm from glibc where_is_shmfs function
fs_getattr_tmpfs(polaris_cpp_cdm_t)

polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_cdm_t)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(`crankshaft_family',`
polaris_dev_mem_use(polaris_cpp_cdm_t)
')

# overlord/neptune access /sys/bus/pci/devices/0000:01:00.0/resource0
# when initializing the CPP DMAP library.
optional_policy(`
polaris_cpp_cavium_dma_map(polaris_cpp_cdm_t)
')

optional_policy(`
polaris_cbdma_dev_use(polaris_cpp_cdm_t)
')
polaris_cpld_dev_use(polaris_cpp_cdm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppcdm.te
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#

## <summary>Polaris bsm Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbsm.if
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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```

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#

/obfl -l gen\_context(system\_u:object\_r:polaris\_obfl\_data\_t,s0)

/obfl0 -l gen\_context(system\_u:object\_r:polaris\_obfl\_data\_t,s0)

/tmp/obfl(/.\*)? gen\_context(system\_u:object\_r:polaris\_obfl\_data\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisobfl.fc

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

/dev/cpld -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

/dev/cpld-ha -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

/dev/cpld-misc-int -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

/dev/cpld-virtual-fp -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

/dev/cpld-virtual-cc -c gen\_context(system\_u:object\_r:polaris\_cpld\_device\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpld.fc

No license file was found, but licenses were detected in source scan.

dnl

dnl January 2021, Vaibhav Lade

dnl

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dnl

dnl VPCGW Platform Max Bay Limits

max\_bay\_map\_set(rp, `per\_bay', 0)

max\_bay\_map\_set(cc, `per\_bay', 0)

max\_bay\_map\_set(fp, `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(rp, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_map\_set(cc, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_map\_set(fp, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_ripc\_map\_set(rp, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_ripc\_map\_set(cc, `elastic', BPROC\_UEMGR, 7)

max\_elastic\_ripc\_map\_set(fp, `elastic', BPROC\_UEMGR, 7)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/vpcgwmaps.m4

No license file was found, but licenses were detected in source scan.

#

# July 2017, Victor Kamensky

#

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#

## <summary>Polaris gsd\_rp Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgsdrp.if

No license file was found, but licenses were detected in source scan.

#

# January 2018, Manohar Hungund

#

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#

policy\_module(polarisoctdplogrp, 1.0);

gen\_require(`

    type polaris\_oct\_dp\_log\_rp\_t;

`)

polaris\_btrace\_data\_manage(polaris\_oct\_dp\_log\_rp\_t)

polaris\_chasfs\_manage(polaris\_oct\_dp\_log\_rp\_t)

polaris\_tdlresolve\_read(polaris\_oct\_dp\_log\_rp\_t)

polaris\_tdlldb\_list\_dirs(polaris\_oct\_dp\_log\_rp\_t)

polaris\_cpld\_read(polaris\_oct\_dp\_log\_rp\_t)

polaris\_flashlib\_read(polaris\_oct\_dp\_log\_rp\_t)

polaris\_rpc\_sman\_ui\_serv\_connect(polaris\_oct\_dp\_log\_rp\_t)

# direct access to serial TTY devices

# (octeon\_dp\_logger needs to acces /dev/ttyDASH7)

term\_open\_unallocated\_ttys(polaris\_oct\_dp\_log\_rp\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisoctdplogrp.te

No license file was found, but licenses were detected in source scan.

```

#
# June 2020, Manu Roy
#
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#

## <summary>Polaris iotswitch Policy Rules.</summary>
#
#
#####
## <summary>
##   Work (read, write, ioctl) with /dev/petra-fpga device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iots_fpga_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_iots_fpga_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_fpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_fpga_device_t)
    allow $1 polaris_iots_fpga_device_t:chr_file map;
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/tm
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iots_tm_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_iots_tm_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_tm_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_tm_device_t)
    allow $1 polaris_iots_tm_device_t:chr_file map;
`)

```

)

#####

```
## <summary>
## Allow access to semaphore with type polaris_cm_rp_t
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
## Domain allowed access.
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_cm_rp_sem_use`,`
    gen_require(`
        type polaris_cm_rp_t;
    `)
    allow $1 polaris_cm_rp_t:sem rw_sem_perms;
)
```

)

#####

```
## <summary>
## Allow access to semaphore with type polaris_iots_mvDmaDrv_device_t
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
## Domain allowed access.
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_mvDmaDrv_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_iots_mvDmaDrv_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_mvDmaDrv_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_mvDmaDrv_device_t)
    allow $1 polaris_iots_mvDmaDrv_device_t:chr_file map;
)
```

)

#####

```
## <summary>
## Allow access to semaphore with type polaris_iots_mvIntDrv_device_t
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
## Domain allowed access.
## </summary>
```

```
## </param>
```

```

#
interface(`polaris_mvIntDrv_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_iots_mvIntDrv_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_mvIntDrv_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_mvIntDrv_device_t)
`)

#####
## <summary>
##   Manage iots swipedrive files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_swipedrive_file_manage`,`
    gen_require(`
        type polaris_iots_swipedrive_file_t;
    `)
    manage_files_pattern($1, polaris_iots_swipedrive_file_t, polaris_iots_swipedrive_file_t)
    manage_lnk_files_pattern($1, polaris_iots_swipedrive_file_t, polaris_iots_swipedrive_file_t)
    manage_dirs_pattern($1, polaris_iots_swipedrive_file_t, polaris_iots_swipedrive_file_t)
`)

#####
## <summary>
##   Get the attributes of an swipe drive
##   filesystem.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_getattr_swipedrive`,`
    gen_require(`
        type polaris_iots_swipedrive_file_t;
    `)

    allow $1 polaris_iots_swipedrive_file_t:filesystem getattr;
`)

```



```
#####
## <summary>
##   Allow access to semaphore with type polaris_iots_led_device_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_led_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_iots_led_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_iots_led_device_t)
    read_chr_files_pattern($1, device_t, polaris_iots_led_device_t)
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiotswitch.if  
 No license file was found, but licenses were detected in source scan.

```
#
# December 2019, Victor Kamensky
#
# Copyright (c) 2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
## <summary>Polaris fnf_agg Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfnfagg.if  
 No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2020 by Cisco Systems, Inc.
# All rights reserved
#
```

```
## <summary>Polaris TDLResolve Policy Rules.</summary>
```

```
#####
# TDLresolve policy
#####
```

```
#####
## <summary>
##   Open tdlresolve files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_tdlresolve_read`,`
  gen_require(`
    type polaris_tdlresolve_t;
  `)
  read_files_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  read_lnk_files_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  list_dirs_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  allow $1 polaris_tdlresolve_t:file map;
  gen_require(`
    type polaris_global_service_t;
  `)
  read_files_pattern($1, polaris_global_service_t, polaris_global_service_t)
  allow $1 polaris_global_service_t:file map;
`)
```

```
#####
## <summary>
##   Manage tdlresolve files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_tdlresolve_manage`,`
  gen_require(`
    type polaris_tdlresolve_t;
  `)
  manage_files_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  manage_lnk_files_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  manage_dirs_pattern($1, polaris_tdlresolve_t, polaris_tdlresolve_t)
  allow $1 polaris_tdlresolve_t:file map;
  gen_require(`
    type polaris_global_service_t;
  `)
```

```
)
    manage_files_pattern($1, polaris_global_service_t, polaris_global_service_t)
    allow $1 polaris_global_service_t:file map;
)
```

```
#####
```

```
## <summary>
##   Watch tdlresolve directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_tdlresolve_watch`,`
    gen_require(`
        type polaris_tdlresolve_t;
    `)
    allow $1 polaris_tdlresolve_t:dir watch;
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristdlresolve.if

No license file was found, but licenses were detected in source scan.

```
#
# September 2018, Anubha Balani
#
# Copyright (c) 2018-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
/tmp/maroon_stats -d gen_context(system_u:object_r:polaris_maroon_base_t,s0)
# zram devices
/dev/zram[0-9]*      -b gen_context(system_u:object_r:polaris_zram_device_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismemory.fc

No license file was found, but licenses were detected in source scan.

```
#
# July 2020, Victor Kamensky
#
# Copyright (c) 2020 by Cisco Systems, Inc.
# All rights reserved
#
```

```

policy_module(polarishtx, 1.0);

gen_require(
    type polaris_htx_t;
)
polaris_chasfs_read(polaris_htx_t)
polaris_cpld_read(polaris_htx_t)
polaris_tdlresolve_read(polaris_htx_t)

polaris_ripc_sman_ui_serv_connect(polaris_htx_t)

logging_send_syslog_msg(polaris_htx_t)

# LOOK AT ME uses shell and mkdir just to create /tmp/HTX-IOX directory
# should be single mkdir system call, in fact even this may not
# be needed since it is created by system-tempfiles
corecmd_exec_shell(polaris_htx_t)
corecmd_exec_bin(polaris_htx_t)
auth_use_nsswitch(polaris_htx_t)

# call posix_sysconf that opens /sys/devices/system/cpu/online
dev_read_sysfs(polaris_htx_t)

# create threads
allow polaris_htx_t self:process setsched;
allow polaris_htx_t self:capability sys_nice;

optional_policy(
    polaris_qfp_dgram_send(polaris_htx_t)
)

# vconfd_load_shared_schemas
polaris_confid_shared_schema_read(polaris_htx_t)

type polaris_htx_iox_tmp_t;
files_tmp_file(polaris_htx_iox_tmp_t)
polaris_htx_iox_tmp_manage(polaris_htx_t)

# htx logs files like /tmp/nwaas_log_sslproxy.log
type polaris_htx_tmp_t;
files_tmp_file(polaris_htx_tmp_t)
files_tmp_filetrans(polaris_htx_t, polaris_htx_tmp_t, file)
manage_files_pattern(polaris_htx_t, polaris_htx_tmp_t, polaris_htx_tmp_t)

# handle /dev/shm/tcpproxy_debug_shm
type polaris_htx_tmpfs_t;
files_tmpfs_file(polaris_htx_tmpfs_t)

```

```

fs_tmpfs_filetrans(polaris_htx_t, polaris_htx_tmpfs_t, file)
fs_getattr_tmpfs(polaris_htx_t)
gen_require(
    type tmpfs_t;

)
manage_files_pattern(polaris_htx_t, tmpfs_t, polaris_htx_tmpfs_t)
allow polaris_htx_t polaris_htx_tmpfs_t:file map;

# work with /tmp/memif
optional_policy(
    polaris_qfp_memif_manage(polaris_htx_t)
)

# sppi_memif
type polaris_sppi_memif_device_t;
dev_node(polaris_sppi_memif_device_t)
polaris_sppi_memif_dev_use(polaris_htx_t)

# packet_socket uinet_if_sppi_channel_init
allow polaris_htx_t self:packet_socket { create_socket_perms recv_msg send_msg};
allow polaris_htx_t self:capability net_raw;

# read and write /bootflash/cacert-ssl.pem
polaris_bootflash_manage(polaris_htx_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarishtx.te

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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# All rights reserved
#

## <summary>Polaris nginx Policy Rules.</summary>

#####
## <summary>
##   Allow domain to be started by nginx with
##   transition into specific service domain.
## </summary>
## <param name="domain">
##   <summary>
##     Type to be used to run utility.
##   </summary>

```

```

## </param>
## <param name="entry_point">
##   <summary>
##     Type of the program to be used as an entry point to this domain.
##   </summary>
## </param>
interface(`polaris_nginx_exec_domain`,`
  gen_require(`
    type polaris_nginx_t;
  `)

  domtrans_pattern(polaris_nginx_t, $2, $1)
`)

#####
## <summary>
##   Execute mcp_trace_filter script in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_trace_filter_domtrans`,`
  gen_require(`
    type polaris_trace_filter_t, polaris_trace_filter_exec_t;
  `)

  domtrans_pattern($1, polaris_trace_filter_exec_t, polaris_trace_filter_t)
`)

#####
## <summary>
##   Execute file transfer client in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_file_transfer_client_domtrans`,`
  gen_require(`
    type polaris_file_transfer_client_t, polaris_file_transfer_client_exec_t;
  `)

  domtrans_pattern($1, polaris_file_transfer_client_exec_t, polaris_file_transfer_client_t)
`)

```

```

)

#####
## <summary>
##   Allow others to perform pipe operations on nginx files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to perform the operation
##   </summary>
## </param>
#
interface(`polaris_nginx_manage_fifo_files`,`
    gen_require(`
        type polaris_nginx_t;
        type $1;
    `)

    manage_fifo_files_pattern($1, polaris_nginx_t, polaris_nginx_t)
)

#####
## <summary>
##   Allow the specified domain to manage polaris_nginx_tmp_t files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_nginx_tmp_manage`,`
    gen_require(`
        type polaris_nginx_tmp_t;
    `)

    manage_files_pattern($1, polaris_nginx_tmp_t, polaris_nginx_tmp_t)
    files_tmp_filetrans($1, polaris_nginx_tmp_t, file, "ca.cert")
)

#####
## <summary>
##   Manage polaris_fts_client_tmp_t in /tmp/fts_client.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>

```

```

## </param>
interface(`polaris_fts_client_tmp_manage`,`
    gen_require(`
        type polaris_fts_client_tmp_t;

    `)
    manage_files_pattern($1, polaris_fts_client_tmp_t, polaris_fts_client_tmp_t)
    manage_dirs_pattern($1, polaris_fts_client_tmp_t, polaris_fts_client_tmp_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnginx.if  
No license file was found, but licenses were detected in source scan.

```

#
# February 2020, Victor Kamensky
#
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#

## <summary>Polaris cedge tanman Policy Rules.</summary>

```

```

#####
## <summary>
##   Read cedge tanman files and fifo_file. I.e
## /tmp/tan/tan_evt_fifo
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cedge_tanman_tmp_manage`,`
    gen_require(`
        type polaris_cedge_tanman_tmp_t;

    `)
    read_files_pattern($1, polaris_cedge_tanman_tmp_t, polaris_cedge_tanman_tmp_t)
    read_fifo_files_pattern($1, polaris_cedge_tanman_tmp_t, polaris_cedge_tanman_tmp_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedgetanman.if  
No license file was found, but licenses were detected in source scan.

```

#
# November 2017, Victor Kamensky

```



```
#
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#

# polarisgnmib file contexts place holder
/flash1/gNOI_iosxe_.* gen_context(system_u:object_r:polaris_gnmib_gnoi_images_t,s0)
/bootflash/gNOI_iosxe_.* gen_context(system_u:object_r:polaris_gnmib_gnoi_images_t,s0)
/mnt/sd3/user/gNOI_iosxe_.* gen_context(system_u:object_r:polaris_gnmib_gnoi_images_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisgnmib.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# November 2020, Christine Hwang
#
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# All rights reserved
#
```

```
## <summary>Polaris bbu Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/ttyS2
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_bbu_dev_use`,
    gen_require(`
        type device_t;
        type polaris_bbu_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_bbu_device_t)
    read_chr_files_pattern($1, device_t, polaris_bbu_device_t)
    allow $1 polaris_bbu_device_t:chr_file map;
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbbu.if
No license file was found, but licenses were detected in source scan.
```

```
#
```

```

# March 2017, Victor Kamensky
#
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#

## <summary>Polaris polarisrollbacktimer Policy Rules.</summary>

#####
## <summary>
##   Manage rbtimer file on bootflash (i.e /bootflash/.rollback_timer)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_rbtimer_bootflash_manage`,`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_rbtimer_bootflash_t;
    `)
    manage_dirs_pattern($1, polaris_disk_bootflash_t, polaris_rbtimer_bootflash_t)
    manage_files_pattern($1, polaris_rbtimer_bootflash_t, polaris_rbtimer_bootflash_t)
    filetrans_pattern($1, polaris_disk_bootflash_t, polaris_rbtimer_bootflash_t, dir, ".rollback_timer")
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrollbacktimer.if

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris keyman Policy Rules.</summary>

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariskeyman.if

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#

```

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#

## <summary>Polaris polarisoom Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisoom.if

No license file was found, but licenses were detected in source scan.

#

# July 2017, Victor Kamensky

#

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#

/usr/binos/conf/install\_engine.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/install\_assist.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/install\_helper.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/sw\_pload\_svc.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/provision.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/issu\_helper.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/issu/issu\_check.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/packtool.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/install\_boottime.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/bin/vconfd\_script\_upgrade\sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/issu\_client\_comp.py -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/install\_selinux.sh -- gen\_context(system\_u:object\_r:polaris\_install\_selinux\_exec\_t,s0)

/usr/binos/conf/install\_show.sh -- gen\_context(system\_u:object\_r:polaris\_install\_show\_exec\_t,s0)

/usr/binos/conf/install\_issu\_show.py -- gen\_context(system\_u:object\_r:polaris\_install\_show\_exec\_t,s0)

/usr/bin/vconfd\_script\_show\_installerfs.sh -- gen\_context(system\_u:object\_r:polaris\_install\_show\_exec\_t,s0)

/usr/binos/conf/calcsha.sh -- gen\_context(system\_u:object\_r:polaris\_install\_engine\_exec\_t,s0)

/usr/binos/conf/C9800-Wireless\_startup\_script.sh --

gen\_context(system\_u:object\_r:polaris\_install\_wireless\_exec\_t,s0)

/usr/binos/conf/C9800-Wireless\_stop\_script.sh --

gen\_context(system\_u:object\_r:polaris\_install\_wireless\_exec\_t,s0)

/bootflash/.issu\_loc\_lock gen\_context(system\_u:object\_r:polaris\_issu\_files\_t,s0)

/tmp/issu(/.\*)? gen\_context(system\_u:object\_r:polaris\_issu\_tmp\_files\_t,s0)

/bootflash/.installer(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_install\_t,s0)

```

/bootflash/.images(/.*)? gen_context(system_u:object_r:polaris_install_images_t,s0)
/tmp/installer_tmplog(/.*)? gen_context(system_u:object_r:polaris_install_tmp_log_t,s0)
/tmp/installer(/.*)? gen_context(system_u:object_r:polaris_install_tmp_t,s0)
/bootflash/.sdwaninstaller(/.*)? gen_context(system_u:object_r:polaris_disk_install_t,s0)
/flash1/.sdwaninstaller(/.*)? gen_context(system_u:object_r:polaris_disk_install_t,s0)

/tmp/install_all_trans_log gen_context(system_u:object_r:polaris_install_tmp_t,s0)
/tmp/show_install_output.txt gen_context(system_u:object_r:polaris_install_show_tmp_t,s0)

/tmp/sw/rp(/.*)? gen_context(system_u:object_r:polaris_sw_data_t,s0)
/tmp/sw/fp(/.*)? gen_context(system_u:object_r:polaris_sw_data_t,s0)
/tmp/sw/cc(/.*)? gen_context(system_u:object_r:polaris_sw_data_t,s0)
/tmp/sw/mount(/.*)? gen_context(system_u:object_r:polaris_sw_data_t,s0)

/tmp/patch gen_context(system_u:object_r:polaris_patch_data_t,s0)
/tmp/patch/rp(/.*)? gen_context(system_u:object_r:polaris_patch_data_t,s0)
/tmp/patch/fp(/.*)? gen_context(system_u:object_r:polaris_patch_data_t,s0)
/tmp/patch/cc(/.*)? gen_context(system_u:object_r:polaris_patch_data_t,s0)
/tmp/patch/smus(/.*)? gen_context(system_u:object_r:polaris_patch_data_t,s0)

# The following labels are specific to hot patch a SMUs shared objects
# using .so files). For cold patch files, the patch is subset of a package
# (it has the same structure) and therefore regular labeling rules will
# be in effect.
#
# The SMU hot patch directory hierarchy should look as follows:
#
# /RP.<ARCH>/<process>/patch(s)
# /FP.<ARCH>/<process>/patch(s)
# /CC.<ARCH>/<process>/patch(s)
#
/RP\[^\]*\[^\]*(/.*)? gen_context(system_u:object_r:lib_t,s0)
/FP\[^\]*\[^\]*(/.*)? gen_context(system_u:object_r:lib_t,s0)
/CP\[^\]*\[^\]*(/.*)? gen_context(system_u:object_r:lib_t,s0)

# bundlee image/subpkg labeling
/packages.conf -- gen_context(system_u:object_r:polaris_packages_conf_t,s0)
\.*.pkginfo -- gen_context(system_u:object_r:polaris_sw_data_t,s0)
/(.*)\.pkg -- gen_context(system_u:object_r:polaris_sw_data_t,s0)

/tmp/pkg_cs_debug(/.*)? gen_context(system_u:object_r:polaris_pkg_cs_debug_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisinstall.fc
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky

```

```

#
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
# All rights reserved
#

policy_module(polarisepcwsliaison, 1.0);

gen_require(
    type polaris_epc_ws_liaison_t;
)

polaris_btrace_data_manage(polaris_epc_ws_liaison_t)
polaris_crft_data_manage(polaris_epc_ws_liaison_t)
polaris_chasfs_manage(polaris_epc_ws_liaison_t)
polaris_tdlresolve_read(polaris_epc_ws_liaison_t)
polaris_tdlldb_list_dirs(polaris_epc_ws_liaison_t)
polaris_cpld_read(polaris_epc_ws_liaison_t)
polaris_flashlib_read(polaris_epc_ws_liaison_t)

polaris_ripc_sman_ui_serv_connect(polaris_epc_ws_liaison_t)

allow polaris_epc_ws_liaison_t self:capability { dac_override };

# tshark invoked by epc_ws_liaison needs to map /etc/passwd file.
auth_map_passwd(polaris_epc_ws_liaison_t)

# access to execute /sbin/tshark
corecmd_exec_bin(polaris_epc_ws_liaison_t)

# dumpcap needs access to net dir in sysfs
dev_read_sysfs(polaris_epc_ws_liaison_t)

# comm="dumpcap" kmod="net-pf-16-proto-12"
kernel_dontaudit_request_load_module(polaris_epc_ws_liaison_t)

# write pcap files to /bootflash
polaris_bootflash_manage(polaris_epc_ws_liaison_t)

# epc_ws_liaison and ngwc-fed pipe interaction
polaris_fed_shm_file_read(polaris_epc_ws_liaison_t)

# for pluggable FS, allow epc liaison to access files on them.
polaris_removable_manage(polaris_epc_ws_liaison_t)

# tshark and dumpcap runtime requirements
allow polaris_epc_ws_liaison_t self:capability { net_raw setgid setuid };
allow polaris_epc_ws_liaison_t self:netlink_netfilter_socket create;
allow polaris_epc_ws_liaison_t self:netlink_route_socket { bind create getattr nlmmsg_read };

```

```

allow polaris_epc_ws_liaison_t self:packet_socket { bind create getopt ioctl map setopt };
allow polaris_epc_ws_liaison_t self:process setcap;
allow polaris_epc_ws_liaison_t self:unix_dgram_socket { create ioctl };
allow polaris_epc_ws_liaison_t self:udp_socket { create ioctl };

# /tmp/lstn.log and /tmp/epc_ws (WS_TMP_FOLDER)
type polaris_epc_ws_liaison_tmp_t;
files_tmp_file(polaris_epc_ws_liaison_tmp_t)
files_tmp_filetrans(polaris_epc_ws_liaison_t, polaris_epc_ws_liaison_tmp_t, { file dir })
manage_dirs_pattern(polaris_epc_ws_liaison_t, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
manage_files_pattern(polaris_epc_ws_liaison_t, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
manage_fifo_files_pattern(polaris_epc_ws_liaison_t, polaris_epc_ws_liaison_tmp_t,
polaris_epc_ws_liaison_tmp_t)

#####
# CLI: show platform software wireshark show
#####
polaris_utility_domain_template(wireshark_show)
polaris_bexecute_domain(polaris_wireshark_show_t, polaris_wireshark_show_exec_t)

polaris_chasfs_manage(polaris_wireshark_show_t)
corecmd_exec_bin(polaris_wireshark_show_t)

# map /etc/passwd
auth_map_passwd(polaris_wireshark_show_t)

# open, read, getattr pcap files
polaris_bootflash_read(polaris_wireshark_show_t)

# write into pipe that smand created for us with popen
polaris_smand_use_fifo(polaris_wireshark_show_t)

corecmd_exec_shell(polaris_wireshark_show_t)

# sys file /sys/devices/system/cpu/online
dev_read_sysfs(polaris_wireshark_show_t)

# tshark and dumpcap runtime requirements
allow polaris_wireshark_show_t self:capability { setgid setuid net_admin };
allow polaris_wireshark_show_t self:netlink_netfilter_socket create;
allow polaris_wireshark_show_t self:netlink_route_socket { bind create getattr nlmsg_read };
allow polaris_wireshark_show_t self:process setcap;
allow polaris_wireshark_show_t self:udp_socket { create ioctl };
allow polaris_wireshark_show_t self:unix_dgram_socket { create ioctl };

#dumpcap needs access "/tmp/epc_ws/wif_to_ts_pipe" fifo file
polaris_epc_ws_liaison_fifo_read(polaris_wireshark_show_t)

```

```
# comm="dumpcap" kmod="net-pf-16-proto-12"  
kernel_request_load_module(polaris_wireshark_show_t)
```

```
# /tmp/*.pcapng  
type polaris_wireshark_show_tmp_t;  
files_tmp_file(polaris_wireshark_show_tmp_t)  
files_tmp_filetrans(polaris_wireshark_show_t, polaris_wireshark_show_tmp_t, file)  
polaris_wireshark_show_tmp_manage(polaris_wireshark_show_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisepcwsliaison.te
```

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```
#  
# June 2020 , Manu Roy  
#  
# Copyright (c) 2020 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
policy_module(polarisiotsswitch, 1.0);
```

```
# petra fpga device (/dev/petra-fpga)  
type polaris_iots_fpga_device_t;  
dev_node(polaris_iots_fpga_device_t)
```

```
# petra DMA ASIC driver (/dev/mvDmaDrv)  
type polaris_iots_mvDmaDrv_device_t;  
dev_node(polaris_iots_mvDmaDrv_device_t)
```

```
# petra Interrupt Asic driver (/dev/mvIntDrv)  
type polaris_iots_mvIntDrv_device_t;  
dev_node(polaris_iots_mvIntDrv_device_t)
```

```
# petra tm device (/dev/tm)  
type polaris_iots_tm_device_t;  
dev_node(polaris_iots_tm_device_t)
```

```
# petra tm device (/dev/mmcblk1p1)  
type polaris_iots_swipedrive_device_t;  
dev_node(polaris_iots_swipedrive_device_t)
```

```
type polaris_iots_swipedrive_file_t;  
files_type(polaris_iots_swipedrive_file_t)  
dev_associate(polaris_iots_swipedrive_file_t)
```

```
# LED device (/dev//dev/spidev0.0)
```

```
type polaris_iots_led_device_t;
dev_node(polaris_iots_led_device_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiotswitch.te

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```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2020 by Cisco Systems, Inc.
# All rights reserved
#
## <summary>Polaris psd Policy Rules.</summary>
```

```
#####
## <summary>
##   Read polaris_restconf_t files, effectively files
## under /tmp/restconf
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_restconf_read`,`
    gen_require(`
        type polaris_restconf_t;
    `)
    read_files_pattern($1, polaris_restconf_t, polaris_restconf_t)
    read_lnk_files_pattern($1, polaris_restconf_t, polaris_restconf_t)
    list_dirs_pattern($1, polaris_restconf_t, polaris_restconf_t)
`)
```

```
#####
## <summary>
##   Manage polaris_restconf_t files, effectively files
## under /tmp/restconf
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_restconf_manage`,`
```



```

gen_require(
    type polaris_restconf_t;
)
manage_files_pattern($1, polaris_restconf_t, polaris_restconf_t)
manage_lnk_files_pattern($1, polaris_restconf_t, polaris_restconf_t)
manage_dirs_pattern($1, polaris_restconf_t, polaris_restconf_t)
)

#####
## <summary>
##   Manage polaris_ncsshd_keys_t files, effectively files
## under /tmp/.ncsshd_authorized_keys
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ncsshd_keys_manage`,`
    gen_require(
        type polaris_ncsshd_keys_t;
    )
    manage_files_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)
    manage_lnk_files_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)
    manage_dirs_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)
)

#####
## <summary>
##   Read polaris_psd_tmp_t files, effectively access
## /tmp/dmi.ds_config created by psd and read by confd startup
## script
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_psd_tmp_read`,`
    gen_require(
        type polaris_psd_tmp_t;
    )
    read_files_pattern($1, polaris_psd_tmp_t, polaris_psd_tmp_t)
)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispsd.if
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris smd Policy Rules.</summary>
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissmd.if
```

```
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```

```
dnl
```

```
dnl April 2018, Victor Kamensky
```

```
dnl
```

```
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
```

```
dnl All rights reserved
```

```
dnl
```

```
define(`polaris_process_aux_full',`
```

```
polaris_process_domain_template($1)
```

```
")
```

```
define(`polaris_process_aux',`
```

```
ifelse(process_type_map($1), `', `polaris_process_aux_full($1)')
```

```
process_type_map_set($1, 1)
```

```
')
```

```
define(`polaris_process',`
```

```
polaris_process_aux(process_stem($1))
```

```
')
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_process_te.m4
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# April 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2017-2021 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisdmincshdmgmt, 1.0);
```

```

gen_require(
    type polaris_dmi_ncsshd_mgmt_t;
)

polaris_btrace_data_manage(polaris_dmi_ncsshd_mgmt_t)
polaris_chasfs_manage(polaris_dmi_ncsshd_mgmt_t)
polaris_tdlresolve_read(polaris_dmi_ncsshd_mgmt_t)
polaris_tdlldb_list_dirs(polaris_dmi_ncsshd_mgmt_t)
polaris_flashlib_read(polaris_dmi_ncsshd_mgmt_t)

corenet_tcp_bind_generic_node(polaris_dmi_ncsshd_mgmt_t)
allow polaris_dmi_ncsshd_mgmt_t self:tcp_socket { getattr getopt setopt bind create listen accept connect read write
};
allow polaris_dmi_ncsshd_mgmt_t self:udp_socket { getattr create connect read write };
allow polaris_dmi_ncsshd_mgmt_t self:cap_usersns { sys_admin net_bind_service };

type polaris_dmi_ncsshd_mgmt_var_run_t;
files_pid_file(polaris_dmi_ncsshd_mgmt_var_run_t)
manage_dirs_pattern(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_run_t,
polaris_dmi_ncsshd_mgmt_var_run_t)
manage_files_pattern(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_run_t,
polaris_dmi_ncsshd_mgmt_var_run_t)
files_pid_filetrans(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_run_t, { file dir })

# access /var/log/lastlog, /var/log/btmp
type polaris_dmi_ncsshd_mgmt_var_log_t;
logging_log_file(polaris_dmi_ncsshd_mgmt_var_log_t)
manage_files_pattern(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_log_t,
polaris_dmi_ncsshd_mgmt_var_log_t)
logging_log_filetrans(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_log_t, file, "lastlog")
logging_log_filetrans(polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_var_log_t, file, "btmp")

polaris_dmi_ncsshd_fwd_dgram_send(polaris_dmi_ncsshd_mgmt_t)

corenet_tcp_bind_polaris_dmi_ncsshd_mgmt_port(polaris_dmi_ncsshd_mgmt_t)
# ncsshd allows user-defined port with: netconf-yang ssh port <port_no>
corenet_tcp_bind_all_ports(polaris_dmi_ncsshd_mgmt_t)

auth_use_nsswitch(polaris_dmi_ncsshd_mgmt_t)
# assign following capabilities needed by sshd
allow polaris_dmi_ncsshd_mgmt_t self:capability { net_admin setgid sys_resource setuid sys_chroot kill };
allow polaris_dmi_ncsshd_mgmt_t self:process setrlimit;

# ncsshd requests pseudo terminal when netconf session is set up without
# explicitly specifying the subsystem name, such as netconf.
allow polaris_dmi_ncsshd_mgmt_t self:capability { chown fowner fsetid };
term_setattr_generic_ptys(polaris_dmi_ncsshd_mgmt_t)

```

```

term_getattr_pty_fs(polaris_dmi_ncsshd_mgmt_t)
term_use_generic_ptys(polaris_dmi_ncsshd_mgmt_t)
term_use_ptmx(polaris_dmi_ncsshd_mgmt_t)

#enable to read cpld file "/sys/devices/platform/cpld/board_vtype"
polaris_cpld_read(polaris_dmi_ncsshd_mgmt_t)
#for sshd needs access network interface resource
allow polaris_dmi_ncsshd_mgmt_t self:netlink_route_socket r_netlink_socket_perms;

# calls socketat server_listen at mgmt/dmi/ncsshd/src/sshd.c
polaris_socketat_nsfs_read(polaris_dmi_ncsshd_mgmt_t)
polaris_lfts_dev_use(polaris_dmi_ncsshd_mgmt_t)

corecmd_exec_bin(polaris_dmi_ncsshd_mgmt_t)

logging_send_syslog_msg(polaris_dmi_ncsshd_mgmt_t)
# TODO : revisit below statement when addressing initrc_exec_t denial
polaris_rmonbifo_tmp_read(polaris_dmi_ncsshd_mgmt_t)

# allow access to /tmp/sw/cfg and /tmp/sw/boot
polaris_boot_tmp_read(polaris_dmi_ncsshd_mgmt_t)
polaris_cfg_data_manage(polaris_dmi_ncsshd_mgmt_t)

polaris_dmi_dmiauthd_dgram_send(polaris_dmi_ncsshd_mgmt_t)

corenet_tcp_connect_polaris_netconf_interceptor_port(polaris_dmi_ncsshd_mgmt_t);
# This fixes runin.sh related denials. Refer to auth.c file which invokes bshell.
polaris_bexecute_domtrans(polaris_dmi_ncsshd_mgmt_t);

# This fixes authorized keys access related denials.
polaris_ncsshd_authorized_keys_read(polaris_dmi_ncsshd_mgmt_t);

# This fixes denials related to interceptor files.
polaris_interceptor_manage(polaris_dmi_ncsshd_mgmt_t);

# This fixes denials related to netconf_callhome executable
gen_require(
    type polaris_confd_t;
)
allow polaris_dmi_ncsshd_mgmt_t polaris_confd_t:tcp_socket { getattr getopt setopt };

# This fixes denials related to route, scp, chvrf command executables
# { read open getattr } operations are allowed on route command
# { search open } operations are allowed on scp command
# { read open execute execute_no_trans } operations are allowed on chvrf command
kernel_read_network_state(polaris_dmi_ncsshd_mgmt_t)

optional_policy(

```

```

# allows access to /tmp/xml/Intf dir and files
polaris_cedge_tmp_manage(polaris_dmi_ncsshd_mgmt_t)
polaris_cedge_xml_tmp_manage(polaris_dmi_ncsshd_mgmt_t)
')
# This fixes denials related to ifconfig executable
# { execute read open execute_no_trans map getattr } operations are allowed
sysnet_domtrans_ifconfig(polaris_dmi_ncsshd_mgmt_t)

# This fixes access denials related to confd checking ncsshd_mgmt proc info
# /proc/<ncsshd pid>/
read_files_pattern(polaris_confid_t, polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_t)
read_lnk_files_pattern(polaris_confid_t, polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_t)

# allows access for admin-tech generation from vManage
polaris_admin_tech_data_manage(polaris_dmi_ncsshd_mgmt_t)
polaris_bootflash_manage(polaris_dmi_ncsshd_mgmt_t)

# allow access to polaris_cfg_data_t
polaris_cfg_data_manage(polaris_dmi_ncsshd_mgmt_t)

# allow access to polaris_boot_tmp_t
polaris_boot_tmp_read(polaris_dmi_ncsshd_mgmt_t)

# allow to watch /var/run/netns and list dir
polaris_watch_netns(polaris_dmi_ncsshd_mgmt_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmincsshdmgmt.te

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```

#
# March 2017, Victor Kamensky
#
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#
## <summary>Polaris polarispman Policy Rules.</summary>

```

```

#####
## <summary>
##   Make the specified program domain accessible
##   from the pman.
## </summary>
## <param name="domain">
##   <summary>
##     The type of the process to transition to.
##   </summary>

```

```

## </param>
## <param name="entrypoint">
##   <summary>
##     The type of the file used as an entrypoint to this domain.
##   </summary>
## </param>
#
interface(`polaris_pman_entry`,`
    gen_require(`
        type polaris_pman_t;
        type polaris_gdb_t;
    `)

    domtrans_pattern(polaris_pman_t, $2, $1)
    domtrans_pattern(polaris_gdb_t, $2, $1)

    allow polaris_gdb_t $1:process { ptrace signal sigstop };
)

#####
## <summary>
##   Execute a domain transition to run pman.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_pman_domtrans`,`
    gen_require(`
        type polaris_pman_t, polaris_pman_exec_t;
    `)

    domtrans_pattern($1, polaris_pman_exec_t, polaris_pman_t)
)

#####
## <summary>
##   Read pman temporary files and directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pman_read_tmp_files`,`

```

```

gen_require(
    type polaris_pman_tmp_t;
)

read_files_pattern($1, polaris_pman_tmp_t, polaris_pman_tmp_t)
list_dirs_pattern($1, polaris_pman_tmp_t, polaris_pman_tmp_t)
)

#####
## <summary>
##   Manage pman temporary files and directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pman_manage_tmp_files`,`
    gen_require(
        type polaris_pman_tmp_t;
    )

    manage_files_pattern($1, polaris_pman_tmp_t, polaris_pman_tmp_t)
    manage_dirs_pattern($1, polaris_pman_tmp_t, polaris_pman_tmp_t)
)

#####
## <summary>
## Create an object in the polaris_pman_tmp directories.
## </summary>
## <param name="domain">
## <summary>
##   Domain allowed access.
## </summary>
## </param>
## <param name="object">
## <summary>
##   The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
##   The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_pman_tmp_filetrans`,`

```

```

gen_require(`
    type polaris_pman_tmp_t;
`)

files_tmp_filetrans($1, polaris_pman_tmp_t, $2, $3)
`)

#####
## <summary>
##   Check existence (getattr) of pman btrace file (i.e
## polaris_pman_bt_t)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pman_bt_getattr`,`
    gen_require(`
        type polaris_pman_bt_t;
        type polaris_btrace_base_t;
    `)
    getattr_files_pattern($1, polaris_btrace_base_t, polaris_pman_bt_t)
`)

#####
## <summary>
##   Read and write to pmanlite fifo file, used as
##   stdout/stderr.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_use_pman_fifo`,`
    gen_require(`
        type polaris_pman_t;
    `)

    allow $1 polaris_pman_t:fifo_file { rw_fifo_file_perms };
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispman.if



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```
#
# August 2017, Shawn Lu
#
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#

policy_module(polariswncmgrd, 1.0);

gen_require(
    type polaris_wncmgrd_t;
)

polaris_btrace_data_manage(polaris_wncmgrd_t)
polaris_chasfs_manage(polaris_wncmgrd_t)
polaris_tdlresolve_read(polaris_wncmgrd_t)
polaris_tdlldb_list_dirs(polaris_wncmgrd_t)
polaris_cpld_read(polaris_wncmgrd_t)
polaris_lua_read(polaris_wncmgrd_t)
polaris_flashlib_read(polaris_wncmgrd_t)

polaris_ripc_sman_ui_serv_connect(polaris_wncmgrd_t)

polaris_db_tdlldb_dir_use(polaris_wncmgrd_t)

#allow setrlimit
allow polaris_wncmgrd_t self:process setrlimit;
allow polaris_wncmgrd_t self:capability sys_resource;
allow polaris_wncmgrd_t self:capability dac_override;

allow polaris_wncmgrd_t self:tcp_socket { shutdown };

#allow wncmgrd UDP socket operations
allow polaris_wncmgrd_t self:udp_socket { bind getattr setopt };
corenet_udp_bind_generic_node(polaris_wncmgrd_t)

#allow wncmgrd module to do ioctl,open,read,write operations on char file
polaris_lfts_dev_use(polaris_wncmgrd_t)

# it use tcp port 9090 and9091(polaris_wnc_mgrd_port)
corenet_tcp_bind_polaris_wnc_mgrd_port(polaris_wncmgrd_t)
#####
# For ewlc, wncd and wncmgrd needs access to files under /mnt/images/...these
# are related to AccessPoint images
#####
# wncmgrd calls ewlc_get_ap_sw_version() to open/read
```

```

# /tmp/sw/rp/0/0/rp_wlc/mount/mnt/images/ap.pri/version.info
# call-chain: main -> ewlc_app_context_init -> wncd_evlib_app_init_cb ->
# ewlc_capwapac_lib_init -> capwapac_init_default_config -> ewlc_get_ap_sw_version
polaris_wlc_ap_images_read(polaris_wncmgrd_t)

polaris_odm_clnt2svr_mqipc_create(polaris_wncmgrd_t)

polaris_tdlbpbersist_setup(polaris_wncmgrd_t)

polaris_tmp_tdlb_persist_setup(polaris_wncmgrd_t)

logging_send_syslog_msg(polaris_wncmgrd_t)

# bind CAPWAP control and data
corenet_udp_bind_polaris_capwap_ctr_port(polaris_wncmgrd_t)
corenet_udp_bind_polaris_capwap_data_port(polaris_wncmgrd_t)

# wncmgrd accessing NA certificate to push to AP
type polaris_icap_cert_t;
polaris_pfile_type(polaris_icap_cert_t)

#wncmgrd receives the certificate file from IOSd via IPC
#and writes to /bootflash for ICap feature
#and hence requires access.
gen_require(
type polaris_icap_cert_t;
')
filetrans_pattern(polaris_wncmgrd_t, polaris_disk_bootflash_t, polaris_icap_cert_t, file, "NACert.pem")
allow polaris_wncmgrd_t polaris_icap_cert_t:file { write create read open getattr unlink };

#allow tcp connection from http port for awips file download
#from DNAC
corenet_tcp_connect_http_port(polaris_wncmgrd_t)

#allow read/write/mmap access to awips file
gen_require(
type polaris_awips_signature_file_t;
')
filetrans_pattern(polaris_wncmgrd_t, polaris_disk_bootflash_t, polaris_awips_signature_file_t, file, "awips.json")
allow polaris_wncmgrd_t polaris_awips_signature_file_t:file { map write create read open getattr unlink };

#allow read access to resolv.conf
sysnet_read_config(polaris_wncmgrd_t)

#ewlc_capwap_dgram_srvr_create_raw_send_socket () creates a socket
#creates sll.sll_family = AF_PACKET;
#sll.sll_ifindex = dgram_io_desc->lfts_ifindex;

```

```

#sll.sll_protocol = htons(ETH_P_ALL);

allow polaris_wncmgrp_t self:packet_socket { create_socket_perms setopt };
allow polaris_wncmgrp_t self:rawip_socket { create_socket_perms setopt ioctl };

allow polaris_wncmgrp_t self:capability net_raw;
corenet_raw_bind_generic_node(polaris_wncmgrp_t)

gen_require(
    type port_t;
)
allow polaris_wncmgrp_t port_t:rawip_socket name_bind;

# allow tmp symlinks
fs_read_tmpfs_symlinks(polaris_wncmgrp_t)
# allow tmp file read
polaris_install_tmp_read(polaris_wncmgrp_t)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswncmgrp.te
```

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2020 by Cisco Systems, Inc.
# All rights reserved
#

```

```
## <summary>Polaris NVRAM Policy Rules.</summary>
```

```

#####
# NVRAM policy
#####

```

```

#####
## <summary>
##   Manage nvram files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#

```

```

interface(`polaris_nvram_manage',`
    gen_require(

```

```

type polaris_nvram_file_t;
    type device_t;
)

manage_blk_files_pattern($1, device_t, polaris_nvram_file_t)
manage_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
manage_lnk_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
)

```

```
#####
```

```

## <summary>
##   Read nvram files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_nvram_read',`
gen_require(
type polaris_nvram_file_t;
type device_t;
)

```

```

read_blk_files_pattern($1, device_t, polaris_nvram_file_t)
read_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
read_lnk_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
)

```

```
#####
```

```

## <summary>
##   getattr for nvram files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_nvram_getattr',`
gen_require(
type polaris_nvram_file_t;
type device_t;
)

```

```
getattr_blk_files_pattern($1, device_t, polaris_nvram_file_t)
getattr_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
getattr_lnk_files_pattern($1, polaris_nvram_file_t, polaris_nvram_file_t)
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnvram.if
```

No license file was found, but licenses were detected in source scan.

```
#
# July 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
/usr/cpp/bin/cpp_stats_svr -- gen_context(system_u:object_r:polaris_cpp_stats_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppstats.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
policy_module(polarisoom, 1.0);
```

```
polaris_process_domain_template(oom)
```

```
corecmd_exec_bin(polaris_oom_t)
```

```
# allow to read /proc/meminfo
kernel_read_system_state(polaris_oom_t)
```

```
# allow read of /etc/passwd
auth_use_nsswitch(polaris_oom_t)
```

```
# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_oom_t)
```

```
allow polaris_oom_t self:capability sys_resource;
allow polaris_oom_t self:process setpgid;
```

```
polaris_btrace_data_manage(polaris_oom_t)
```

```
polaris_chasfs_manage(polaris_oom_t)
polaris_cpld_read(polaris_oom_t)
polaris_boot_tmp_read(polaris_oom_t)
polaris_read_debug_conf(polaris_oom_t)
polaris_disk_crashinfo_getattr(polaris_oom_t)
polaris_rmonbifo_tmp_read(polaris_oom_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisoom.te

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#

# /mnt/sd1 edison and nyquist
/mnt/sd1(/.*)?          gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
/mnt/sd1/tracelogs(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/mnt/sd1/system-report.*\tar\,gz  gen_context(system_u:object_r:polaris_system_report_t,s0)

# /mnt/sd3 edison and nyquist
/mnt/sd3(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/mnt/sd3/user/core(/.*)?  gen_context(system_u:object_r:polaris_core_file_t,s0)
/mnt/sd3/user/tracelogs(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/mnt/sd3/user/tan(/.*)?    gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/mnt/sd3/user/.ssh(/.*)?   gen_context(system_u:object_r:ssh_home_t,s0)
/mnt/sd3/user/.ssh/ssh_host.*_key\,pub  gen_context(system_u:object_r:sshd_key_t,s0)
/mnt/sd3/user/.ssh/ssh_host.*_key  gen_context(system_u:object_r:sshd_key_t,s0)
/mnt/sd3/user/nvram_config --  gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/mnt/sd3/user/debug.conf --  gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/mnt/sd3/user/packages.conf  gen_context(system_u:object_r:polaris_packages_conf_t,s0)
/mnt/sd3/user/.dbpersist(/.*)?  gen_context(system_u:object_r:polaris_disk_dbm_t,s0)
/mnt/sd3/user/.installer(/.*)?  gen_context(system_u:object_r:polaris_disk_install_t,s0)
/mnt/sd3/user/.rollback_timer(/.*)?  gen_context(system_u:object_r:polaris_rbtimer_bootflash_t,s0)
/mnt/sd3/user/kernel/core(/.*)?  gen_context(system_u:object_r:polaris_core_file_t,s0)
/mnt/sd3/user/sys_report(/.*)?  gen_context(system_u:object_r:polaris_chasync_files_t,s0)

# /mnt/sd4 nyquist
/mnt/sd4(/.*)?          gen_context(system_u:object_r:polaris_disk_license_t,s0)

# /mnt/sd5 edison and nyquist
/mnt/sd5(/.*)?          gen_context(system_u:object_r:polaris_disk_license_t,s0)

#ifdef(^edison_platform)`
# /mnt/sd6
```

```

/mnt/sd6(/.*)?          gen_context(system_u:object_r:polaris_disk_license_t,s0)

# /mnt/sd7
/mnt/sd7(/.*)?        gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /mnt/sd8
/mnt/sd8(/.*)?        gen_context(system_u:object_r:polaris_disk_ucose_t,s0)

# /mnt/sd9
/mnt/sd9(/.*)?        gen_context(system_u:object_r:polaris_disk_recovery_t,s0)
')

ifdef(^nyquist_platform',`
# /mnt/sd6
/mnt/sd6(/.*)?        gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /mnt/sd7
/mnt/sd7(/.*)?        gen_context(system_u:object_r:polaris_disk_ucose_t,s0)
#unmount script used ny Nyquist platform
/bin/cat9k_ssd_unmount.sh      gen_context(system_u:object_r:polaris_ssd_unmount_exec_t,s0)
')

ifdef(^quake_platform',`
# /mnt/sd6
/mnt/sd6(/.*)?        gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /mnt/sd7
/mnt/sd7(/.*)?        gen_context(system_u:object_r:polaris_disk_ucose_t,s0)
')

# /crashinfo is symbolic link to /mnt/sd1 created by systemd-tmpfiles
/crashinfo              gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
# /flash is symbolic link to /mnt/sd3/user
/flash                  gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /lic0 is symbolic link to /mnt/sd4
/lic0                    gen_context(system_u:object_r:polaris_disk_license_t,s0)
# /lic1 is symbolic link to /mnt/sd5
/lic1                    gen_context(system_u:object_r:polaris_disk_license_t,s0)
# /ngwc_config/nvram is symbolic link to /mnt/sd3/user
/ngwc_config/nvram      gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# /flash1 macallan
/flash1(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/flash1/user/core(/.*)?      gen_context(system_u:object_r:polaris_core_file_t,s0)
/flash1/user/tracelogs(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/flash1/user/.ssh(/.*)?      gen_context(system_u:object_r:ssh_home_t,s0)
/flash1/user/.ssh/ssh_host.*_key\
.pub gen_context(system_u:object_r:ssh_key_t,s0)
/flash1/user/.ssh/ssh_host.*_key  gen_context(system_u:object_r:ssh_key_t,s0)

```

```

/flash1/user/nvram_config --      gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/flash1/user/debug.conf --      gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/flash1/user/packages.conf      gen_context(system_u:object_r:polaris_packages_conf_t,s0)
/flash1/user/kernel/core(/.*)?  gen_context(system_u:object_r:polaris_core_file_t,s0)
/flash1/user/.rollback_timer(/.*)? gen_context(system_u:object_r:polaris_rbtimer_bootflash_t,s0)
/flash1/user/.installer(/.*)?   gen_context(system_u:object_r:polaris_disk_install_t,s0)
/flash1/user/.dbpersist(/.*)?   gen_context(system_u:object_r:polaris_disk_dbm_t,s0)
/flash1/user/tan(/.*)?          gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/flash1/user/sys_report(/.*)?   gen_context(system_u:object_r:polaris_chasync_files_t,s0)
/flash1/TEMPLATE(/.*)?         gen_context(system_u:object_r:polaris_chasync_files_t,s0)

# /flash2 macallan 9500h
/flash2(/.*)?                  gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
/flash2/CRASH(/.*)?           gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
/flash2/CRASH/tracelogs(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)

# /flash3 macallan
/flash3(/.*)?                  gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /flash4 macallan
/flash4(/.*)?                  gen_context(system_u:object_r:polaris_disk_license_t,s0)

# /flash5 macallan
/flash5(/.*)?                  gen_context(system_u:object_r:polaris_disk_license_t,s0)

# /flash6 macallan, used for silent roll in macallan
/flash6(/.*)?                  gen_context(system_u:object_r:polaris_disk_ucode_t,s0)

# /flash7 macallan, silent roll
/flash7(/.*)?                  gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# macallan silent roll link
/cc_srdv                        gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# macallan /ngmod_config/nvram link will be labeled by systemd-tmpfiles
/ngmod_config                    gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/ngmod_config/nvram              gen_context(system_u:object_r:polaris_nvram_file_t,s0)

# remap_mem0 device
/dev/remap_mem0 -c gen_context(system_u:object_r:polaris_remap_mem_device_t,s0)

# chdrvmmmap device (MMAP Driver for ASIC Memory mapping)
/dev/chdrvmmmap                  -c gen_context(system_u:object_r:polaris_chdrvmmmap_device_t,s0)

# gettysburg_dev1 device
/dev/gettysburg_dev[0-9]*       -c gen_context(system_u:object_r:polaris_gettysburg_fpga_device_t,s0)

# types that might be packages label by other policy

```



```

ifdef(`nyquist_platform',`
/usr/binos/bin/flash_check.sh -- gen_context(system_u:object_r:polaris_flashcheck_exec_t,s0)
/usr/binos/bin/cman_fp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
/usr/binos/bin/cmcc -- gen_context(system_u:object_r:polaris_cm_cc_exec_t,s0)
`)
ifdef(`passport_platform',`
/usr/binos/bin/platform_mgr -- gen_context(system_u:object_r:polaris_ngwc_plfm_mgr_exec_t,s0)
/usr/binos/bin/xcvr_test -- gen_context(system_u:object_r:polaris_xcvr_test_exec_t,s0)
/usr/binos/bin/sif_mgr -- gen_context(system_u:object_r:polaris_sif_mgr_exec_t,s0)
/usr/binos/bin/cmm -- gen_context(system_u:object_r:polaris_cmm_exec_t,s0)
/usr/binos/bin/bt_logger -- gen_context(system_u:object_r:polaris_bt_logger_exec_t,s0)
/usr/binos/bin/torchd -- gen_context(system_u:object_r:polaris_torch_exec_t,s0)
/usr/binos/bin/swift_sampled -- gen_context(system_u:object_r:polaris_faked_exec_t,s0)
`)

# PLEASE LOOK AT ME: why this file in /etc/init.d?
/etc/rc.d/init.d/cat9k_fpgahelper_funcs.sh -- gen_context(system_u:object_r:bin_t,s0)
/etc/rc.d/init.d/cat9k_kr_helper.sh -- gen_context(system_u:object_r:bin_t,s0)

# symbolic links in /platform-specific directory
/platform-specific/gryphon -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/gryphon_lite -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/prometheus -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/skyfox -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/vulcan -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/intrepid -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/martion -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/farscape -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/borg -l gen_context(system_u:object_r:root_t,s0)
/platform-specific/scorpion -l gen_context(system_u:object_r:root_t,s0)

# /dev/cisco/dplriomem device, Generic Memory map driver for mapping doppler IO memory to userspace
/dev/cisco/dplriomem -c gen_context(system_u:object_r:polaris_dplr_iomem_mmapdrv_device_t,s0)

/vol/disk0(/.*)? gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /appstore_hd is symbolic link to /vol/disk0
/appstore_hd -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /appstore_flash is symbolic link to /flash1
/appstore_flash -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /rp_srdv is symbolic link to /flash6/DPU
/rp_srdv -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /init is symbolic link to /lib/systemd/systemd
/init -l gen_context(system_u:object_r:init_exec_t,s0)
# /install is symbolic link to /flash1/INSTALL
/install -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /disk0 is symbolic link to /vol/disk0
/disk0 -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

```

```

# provide relabeling rules for /platform-specific/personality file
# otherwise, they cause conflicting specifications error during relabeling
/platform-specific/bigbang/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/nyquist/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/passport/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/starfleet/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/intrepid/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/martian/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/farscape/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/borg/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/scorpion/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/imperial/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)
/platform-specific/jura/lib/modules(/.*)?    gen_context(system_u:object_r:modules_object_t,s0)

/platform-specific/bigbang/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/nyquist/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/passport/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/starfleet/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/intrepid/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/martian/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/farscape/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/borg/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/scorpion/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/imperial/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/jura/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/quake1/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)
/platform-specific/quake2/lib/systemd/system(/.*)? gen_context(system_u:object_r:systemd_unit_file_t,s0)

/platform-specific/bigbang/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/nyquist/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/passport/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/starfleet/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/intrepid/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/martian/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/farscape/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/borg/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/scorpion/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/imperial/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)
/platform-specific/jura/usr/binos/conf(/.*)?    gen_context(system_u:object_r:usr_t,s0)

/platform-specific/bigbang/usr/binos/bin(/.*)?    gen_context(system_u:object_r:bin_t,s0)
/platform-specific/nyquist/usr/binos/bin(/.*)?    gen_context(system_u:object_r:bin_t,s0)
/platform-specific/passport/usr/binos/bin(/.*)?    gen_context(system_u:object_r:bin_t,s0)
/platform-specific/starfleet/usr/binos/bin(/.*)?    gen_context(system_u:object_r:bin_t,s0)
/platform-specific/intrepid/usr/binos/bin(/.*)?    gen_context(system_u:object_r:bin_t,s0)
/platform-specific/martian/usr/binos/bin(/.*)?    gen_context(system_u:object_r:bin_t,s0)
/platform-specific/farscape/usr/binos/bin(/.*)?    gen_context(system_u:object_r:bin_t,s0)
/platform-specific/borg/usr/binos/bin(/.*)?    gen_context(system_u:object_r:bin_t,s0)

```

```
/platform-specific/scorpion/usr/binos/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/imperial/usr/binos/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/jura/usr/binos/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
```

```
/platform-specific/bigbang/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/nyquist/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/passport/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/starfleet/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/intrepid/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/martian/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/farscape/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/borg/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/scorpion/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/imperial/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
/platform-specific/jura/bin(/.*)? gen_context(system_u:object_r:bin_t,s0)
```

```
/platform-specific/bigbang/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/nyquist/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/passport/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/starfleet/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/intrepid/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/martian/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/farscape/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/borg/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/scorpion/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/imperial/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/jura/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/quake1/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
/platform-specific/quake2/etc/selinux(/.*)? gen_context(system_u:object_r:selinux_config_t,s0)
```

# /objstore/.swtam for hybrid TAM access

```
/objstore(/.*)? gen_context(system_u:object_r:polaris_disk_objstore_t,s0)
```

```
/platform-specific/bigbang/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/nyquist/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/passport/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/starfleet/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/intrepid/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/martian/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/farscape/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/borg/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/scorpion/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/imperial/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/jura/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/quake1/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
/platform-specific/quake2/etc/selinux/([^\s]*)?contexts(/.*)? gen_context(system_u:object_r:default_context_t,s0)
```

```

/platform-specific/bigbang/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/nyquist/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/passport/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/starfleet/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/intrepid/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/martian/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/farscape/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/borg/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/scorpion/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/imperial/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)
/platform-specific/jura/etc/hosts[^]* -- gen_context(system_u:object_r:net_conf_t,s0)

/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/bigbang/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/nyquist/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/passport/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/starfleet/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/intrepid/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/martian/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/farscape/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/borg/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/scorpion/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/imperial/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)
/platform-specific/jura/verify_packages.sh -- gen_context(system_u:object_r:bin_t,s0)

/platform-specific/bigbang/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/nyquist/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/passport/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/starfleet/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/intrepid/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/martian/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/farscape/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/borg/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/scorpion/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/imperial/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)
/platform-specific/jura/etc/udev/rules.d(/.*)? gen_context(system_u:object_r:udev_rules_t,s0)

/dev/shm/sem\i2c_sem000 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem001 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem002 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem003 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem004 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem005 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem006 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\i2c_sem007 gen_context(system_u:object_r:polaris_quake_i2c_t,s0)
/dev/shm/sem\io_expander_semaphore gen_context(system_u:object_r:polaris_quake_i2c_t,s0)

```

```

# on pangea/bigbang platforms /dev/NVRAM block device is accessed
# by flashlib in iosd. It stores rommon vars
ifdef(`bigbang_platform',`
/dev/NVRAM -b gen_context(system_u:object_r:polaris_flashlib_device_t)
# /mnt/sd6
/mnt/sd6(/.*)? gen_context(system_u:object_r:polaris_obfl_data_t,s0)
')

/vol/usb1(/.*)? gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)

/mnt/vbd[a-j]2(/.*)? gen_context(system_u:object_r:polaris_obfl_data_t,s0)

/tmp/fpga_upgrade gen_context(system_u:object_r:polaris_fpga_upgrade_tmp_t,s0)

#/unicode0 9300 silent roll
/unicode0(/.*)? gen_context(system_u:object_r:polaris_disk_unicode0_t,s0)

#/dev/cisco/fpga_iomem device, Generic Memory map driver for mapping FPGA IO memory to userspace
/dev/cisco/fpga_iomem -c gen_context(system_u:object_r:polaris_fpga_iomem_mmapfpga_device_t,s0)

# nplum-power file is located in /bootflash and needs to be accessed by cman-rp/IOSd
/flash1/user/nplum-power gen_context(system_u:object_r:polaris_nplum_power_file_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwc.fc
No license file was found, but licenses were detected in source scan.

#
# June 2020, Cuiyan Ma
#
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#

/usr/binos/conf/issu_comp_check.sh -- gen_context(system_u:object_r:polaris_issu_comp_check_exec_t,s0)
/tmp/boottime_comp_check_tree_other_rp -d gen_context(system_u:object_r:polaris_issu_comp_check_tmp_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissucompcheck.fc
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#
# March 2017, Victor Kamensky
#
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#

```

```
## <summary>Polaris repm Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Manage /tmp/replications files.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_repm_tmp_manage`,`
```

```
gen_require(`
```

```
type polaris_repm_tmp_t;
```

```
`)
```

```
manage_files_pattern($1, polaris_repm_tmp_t, polaris_repm_tmp_t)
```

```
manage_dirs_pattern($1, polaris_repm_tmp_t, polaris_repm_tmp_t)
```

```
`)
```

```
#####
```

```
## <summary>
```

```
## Manage /dev/shm/mq.-repm_peer_mq/ files.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_repm_peer_mqipc_manage`,`
```

```
gen_require(`
```

```
type polaris_repm_peer_mqipc_t;
```

```
`)
```

```
manage_files_pattern($1, polaris_repm_peer_mqipc_t, polaris_repm_peer_mqipc_t)
```

```
allow $1 polaris_repm_peer_mqipc_t:file map;
```

```
polaris_mqipc_create_name_dir($1, polaris_repm_peer_mqipc_t, repm_peer_mq)
```

```
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrepm.if

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dnl

dnl April 2018, Victor Kamensky

dnl

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```

dnl
define(`mqipc_interface_map', `defn(format(`mqipc_interface_map[%s]', `$1'))')
define(`mqipc_interface_map_set', `define(format(`mqipc_interface_map[%s]', `$1'), `$2'))

define(`polaris_mqipc_service_server_many',
  `ifndef($3, `,
    polaris_mqipc_create_name(dollarstone, $1, $2),
    polaris_mqipc_create_name(dollarstone, $1, $2-b$3)
  `ifndef($3, 0, `polaris_mqipc_create_name(dollarstone, $1, $2)', `polaris_mqipc_service_server_many($1, $2,
eval($3 - 1))')')')

define(`polaris_mqipc_service_server_aux_full',`dnl
#####
## <summary>
## Create $2 mqipc chanell.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <infoflow type="none"/>
#
interface(`polaris_mqipc_$1_create_name",`
  gen_require(
    type $2;
  )
  $3
")

#####
## <summary>
## Use $2 mqipc chanell.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <infoflow type="none"/>
#
interface(`polaris_mqipc_$1_use",`
  gen_require(
    type $2;
  )

  polaris_mqipc_use(dollarstone, $2)

```

```
)  
)
```

```
define(`polaris_mqipc_service_server_aux',`  
ifelse(mqipc_interface_map($1), `', `polaris_mqipc_service_server_aux_full($1, $2, $3)')  
mqipc_interface_map_set($1, 1)  
)
```

```
define(`polaris_mqipc_service_server',`dnl  
polaris_mqipc_service_server_aux(mqipc_stem($1), mqipc_label($1),  
    polaris_mqipc_service_server_many(mqipc_label($1), $5, max_scope_map($3, $4, $2)))')
```

```
define(`polaris_mqipc_service_client',`')
```

```
define(`polaris_mqipc_service_server_elastic_client',`dnl  
polaris_mqipc_service_server_aux(mqipc_stem($1), mqipc_label($1),  
    polaris_mqipc_service_server_many(mqipc_label($1), $5, max_scope_map($4, elastic, $3)))')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_mqipc_if.m4  
No license file was found, but licenses were detected in source scan.
```

```
#  
# March 2017, Victor Kamensky  
#  
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#
```

```
/dev/lsmapi -c gen_context(system_u:object_r:polaris_lsmapi_device_t,s0)  
/dev/lsmapi_app0 -c gen_context(system_u:object_r:polaris_lsmapi_device_t,s0)  
/dev/lsmapi_app1 -c gen_context(system_u:object_r:polaris_lsmapi_device_t,s0)  
/dev/lsmapi_app2 -c gen_context(system_u:object_r:polaris_lsmapi_device_t,s0)
```

```
/tmp/pi(/.*)? gen_context(system_u:object_r:polaris_pi_uds_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislsmapi.fc  
No license file was found, but licenses were detected in source scan.
```

```
#  
# November 2020, Christine Hwang  
#  
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# All rights reserved  
#
```

```
policy_module(polarisbbu, 1.0);
```



```

gen_require(
    type polaris_bbu_t;
)

polaris_btrace_data_manage(polaris_bbu_t)
polaris_chasfs_manage(polaris_bbu_t)
polaris_tdlresolve_read(polaris_bbu_t)
polaris_cpld_read(polaris_bbu_t)

polaris_ripc_sman_ui_serv_connect(polaris_bbu_t)

# Allow I2C Usage
polaris_i2c_use(polaris_bbu_t)
polaris_i2c_sem_manage(polaris_bbu_t)

# Allow sysfs read for platform ID
dev_list_sysfs(polaris_bbu_t)

# Allow bbu to access NVRAM for /flash0/bbu
fs_getattr_tmpfs(polaris_bbu_t)
polaris_nvram_manage(polaris_bbu_t)

# Allow logger which is used for syslog messages
allow polaris_bbu_t self:unix_dgram_socket { connect create };
logging_send_syslog_msg(polaris_bbu_t)

# tty BBU device
type polaris_bbu_device_t;
dev_node(polaris_bbu_device_t)

polaris_bbu_dev_use(polaris_bbu_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbbu.te
No license file was found, but licenses were detected in source scan.

#
# February 2020, Victor Kamensky
#
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#

## <summary>Polaris dmi_ports_fetch Policy Rules.</summary>

#####

## <summary>

```

```

## Execute a domain transition to run dmi_ports_fetch.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_dmi_ports_fetch_domtrans`,`
    gen_require(`
        type polaris_dmi_ports_fetch_t, polaris_dmi_ports_fetch_exec_t;
    `)

    domtrans_pattern($1, polaris_dmi_ports_fetch_exec_t, polaris_dmi_ports_fetch_t)
`)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiportsfetch.if
No license file was found, but licenses were detected in source scan.

```

```

#
# March 2017, Victor Kamensky
#
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#

```

```

policy_module(polariscliagent, 1.0);

```

```

gen_require(`
    type polaris_cli_agent_t;
`)

```

```

polaris_btrace_data_manage(polaris_cli_agent_t)
polaris_crft_data_manage(polaris_cli_agent_t)
polaris_chasfs_manage(polaris_cli_agent_t)
polaris_tdlresolve_read(polaris_cli_agent_t)
polaris_tdlldb_list_dirs(polaris_cli_agent_t)
polaris_cpld_read(polaris_cli_agent_t)
polaris_flashlib_read(polaris_cli_agent_t)

```

```

polaris_ripc_sman_ui_serv_connect(polaris_cli_agent_t)

```

```

polaris_db_tdlldb_dir_use(polaris_cli_agent_t)

```

```

polaris_libeiutil_build_config_directory(polaris_cli_agent_t)

```

```

# cli_agent /var/run pid file

```

```

type polaris_cli_agent_var_run_t;
files_pid_file(polaris_cli_agent_var_run_t)
manage_files_pattern(polaris_cli_agent_t, polaris_cli_agent_var_run_t, polaris_cli_agent_var_run_t)
manage_dirs_pattern(polaris_cli_agent_t, polaris_cli_agent_var_run_t, polaris_cli_agent_var_run_t)
files_pid_filetrans(polaris_cli_agent_t, polaris_cli_agent_var_run_t, { file dir })

polaris_cfg_data_manage(polaris_cli_agent_t)

# Provide sys_resource capability as well for sys_pipe calls
allow polaris_cli_agent_t self:capability { dac_override sys_resource };

logging_send_syslog_msg(polaris_cli_agent_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_cli_agent_t)
polaris_tmp_tdlldb_persist_setup(polaris_cli_agent_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscliagent.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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# All rights reserved
#

policy_module(polarisflashlib, 1.0);

#####
# Flashlib policy (infra/flashlib)
#####
type polaris_flashlib_lock_t;
files_type(polaris_flashlib_lock_t)

gen_require(
    attribute polaris_extended_domain;
)

# /tmp/.flashlock file is used as flashlib lock
gen_require(
    type init_t;
)
files_tmp_filetrans({ init_t polaris_extended_domain }, polaris_flashlib_lock_t, file, ".flashlock")

type polaris_flashlib_log_t;
files_type(polaris_flashlib_log_t)

```

```

gen_require(
    attribute polaris_extended_domain;
)

# /tmp/flashdev.log file is used as flashlib to log
files_tmp_filetrans(polaris_extended_domain, polaris_flashlib_log_t, file, "flashdev.log")

# /dev/shm/flash_shm shared memory
type polaris_flash_shm_t;
files_type(polaris_flash_shm_t)

gen_require(
    attribute polaris_domain;
    type tmpfs_t;
)
filetrans_pattern(polaris_domain, tmpfs_t, polaris_flash_shm_t, file, "flash_shm")

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisflashlib.te

No license file was found, but licenses were detected in source scan.

```

#
# July 2017, Victor Kamensky
#
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#

```

```

## <summary>Polaris CPLD Policy Rules.</summary>

```

```

#####

```

```

# Quack Driver policy

```

```

#####

```

```

#####

```

```

## <summary>

```

```

##   Work (read, write, ioctl) with /dev/quack

```

```

## </summary>

```

```

## <param name="domain">

```

```

##   <summary>

```

```

##   Domain allowed access.

```

```

##   </summary>

```

```

## </param>

```

```

#

```

```

interface(`polaris_quack_dev_use`,`

```

```

    gen_require(

```

```

        type device_t;

```

```
type polaris_quack_device_t;
)
write_chr_files_pattern($1, device_t, polaris_quack_device_t)
read_chr_files_pattern($1, device_t, polaris_quack_device_t)
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisquack.if

No license file was found, but licenses were detected in source scan.

```
#
# October 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
## <summary>Polaris wstatsd Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswstatsd.if

No license file was found, but licenses were detected in source scan.

```
dnl
dnl Mar 2020, Manu Roy
dnl
dnl Copyright (c) 2020 by Cisco Systems, Inc.
dnl All rights reserved
dnl
dnl Petra Platform Max Bay Limits
max_bay_map_set(`rp', `per_bay', 0)
max_bay_map_set(`cc', `per_bay', 0)
max_bay_map_set(`fp', `per_bay', 0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/petramaps.m4

No license file was found, but licenses were detected in source scan.

```
#
# October 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polariswstatsd, 1.0);
```

```
gen_require(`
```

```

    type polaris_wstatsd_t;
)

polaris_btrace_data_manage(polaris_wstatsd_t)
polaris_crft_data_manage(polaris_wstatsd_t)
polaris_chasfs_manage(polaris_wstatsd_t)
polaris_tdlresolve_read(polaris_wstatsd_t)
polaris_tdlldb_list_dirs(polaris_wstatsd_t)
polaris_cpld_read(polaris_wstatsd_t)
polaris_lua_read(polaris_wstatsd_t)
polaris_flashlib_read(polaris_wstatsd_t)

polaris_ripc_sman_ui_serv_connect(polaris_wstatsd_t)

polaris_db_tdlldb_dir_use(polaris_wstatsd_t)

allow polaris_wstatsd_t self:capability dac_override;
allow polaris_wstatsd_t self:udp_socket { bind setopt getattr };
corenet_udp_bind_generic_node(polaris_wstatsd_t)
corenet_udp_bind_polaris_capwap_data_port(polaris_wstatsd_t)
polaris_socketat_nsfs_read(polaris_wstatsd_t)
polaris_lfts_dev_use(polaris_wstatsd_t)

polaris_tdlldbpersist_setup(polaris_wstatsd_t)

polaris_tmp_tdlldb_persist_setup(polaris_wstatsd_t)

logging_send_syslog_msg(polaris_wstatsd_t)

#allow to read /etc/passwd
auth_use_nsswitch(polaris_wstatsd_t)

#this is being given for process to execute tar
corecmd_exec_bin(polaris_wstatsd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswstatsd.te
No license file was found, but licenses were detected in source scan.

#
# December 2019, Victor Kamensky
#
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# All rights reserved
#

policy_module(polarisfnfagg, 1.0);

```

```

gen_require(
    type polaris_fnf_agg_t;
)

polaris_btrace_data_manage(polaris_fnf_agg_t)
polaris_crft_data_manage(polaris_fnf_agg_t)
polaris_chasfs_read(polaris_fnf_agg_t)
polaris_tdlresolve_read(polaris_fnf_agg_t)
polaris_lua_read(polaris_fnf_agg_t)
polaris_flashlib_read(polaris_fnf_agg_t)
polaris_cpld_read(polaris_fnf_agg_t)

polaris_ripc_sman_ui_serv_connect(polaris_fnf_agg_t)

polaris_db_tdlb_dir_use(polaris_fnf_agg_t)

allow polaris_fnf_agg_t self:capability { dac_override dac_read_search };

type polaris_fnf_agg_tmp_t;
files_tmp_file(polaris_fnf_agg_tmp_t)
files_tmp_filetrans(polaris_fnf_agg_t, polaris_fnf_agg_tmp_t, dir, "fnf_agg")
manage_files_pattern(polaris_fnf_agg_t, polaris_fnf_agg_tmp_t, polaris_fnf_agg_tmp_t)
manage_dirs_pattern(polaris_fnf_agg_t, polaris_fnf_agg_tmp_t, polaris_fnf_agg_tmp_t)

# allow sending files over HTTP
corenet_tcp_connect_http_port(polaris_fnf_agg_t)
sysnet_read_config(polaris_fnf_agg_t)

# allow UDP connection for punting fnf records
allow polaris_fnf_agg_t self:udp_socket { create_socket_perms recv_msg };
corenet_udp_bind_generic_node(polaris_fnf_agg_t)

# allow punting on routers/ewlc where lfts is being used
polaris_lfts_dev_use(polaris_fnf_agg_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfnfagg.te
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#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris VXE Platform Policy Rules.</summary>

```

```

interface(`polaris_objstore_sem_use`,`
    gen_require(`
        type polaris_objstore_sem_t;
    `)
    allow $1 polaris_objstore_sem_t:sem rw_sem_perms;
    mmap_files_pattern($1, polaris_objstore_sem_t, polaris_objstore_sem_t)
    manage_files_pattern($1, polaris_objstore_sem_t, polaris_objstore_sem_t)
`)

```

```

#####
## <summary>
## Work (read, write, ioctl) with /dev/vda1 device
## </summary>
## <param name="domain">
##     <summary>
##         Domain allowed access.
##     </summary>
## </param>
#

```

```

interface(`polaris_grub_efi_use`,`
    gen_require(`
        type polaris_grub_efi_t;
    `)
    write_chr_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
    read_chr_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

```

```

#####
## <summary>
## Search /dev/vda1 device the efi partition
## </summary>
## <param name="domain">
##     <summary>
##         Domain allowed access.
##     </summary>
## </param>
#

```

```

interface(`polaris_grub_efi_search`,`
    gen_require(`
        type polaris_grub_efi_t;
    `)
    search_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

```

```

#####
## <summary>
## Read VXE install info files
## </summary>

```



```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vxeinstall_info_read`,`
gen_require(`
type polaris_vxeinstall_info_t;
`)
read_files_pattern($1, polaris_vxeinstall_info_t, polaris_vxeinstall_info_t)
list_dirs_pattern($1, polaris_vxeinstall_info_t, polaris_vxeinstall_info_t)
`)

```

```
#####
```

```

## <summary>
## Read /dev/vda1 device the efi partition
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_grub_info_read`,`
gen_require(`
type polaris_grubver_t;
type polaris_grub_bios_t;
type polaris_grub_efi_t;
`)
read_files_pattern($1, polaris_grubver_t, polaris_grubver_t)
read_files_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
read_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
list_dirs_pattern($1, polaris_grubver_t, polaris_grubver_t)
list_dirs_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
list_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

```

```
#####
```

```

## <summary>
## Manage /dev/vda1 device the efi partition
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_grubcfg_manage',`
gen_require(`
type polaris_grub_bios_t;
type polaris_grub_efi_t;
`)
manage_files_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
manage_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
manage_dirs_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
manage_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

```

```

#####
## <summary>
## Manage regular files/directories under /varied/grub
## CSR manages files in legacy grub disk location
## also allow run readlink -f /dev/bootflash
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_legacy_grub_manage',`
gen_require(`
type boot_t;
type fixed_disk_device_t;
`)
manage_files_pattern($1, boot_t, boot_t)
manage_dirs_pattern($1, boot_t, boot_t)
storage_getattr_fixed_disk_dev($1)
`)

```

```

#####
## <summary>
## Work (read, write, ioctl) with /dev/hanet
# hanet driver used by vpcgw platform of VXE family
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

#ifdef(`vpcgw_platform',`
interface(`polaris_hanet_dev_use',`
gen_require(`
type device_t;

```

```

type polaris_hanet_device_t;
)
    write_chr_files_pattern($1, device_t, polaris_hanet_device_t)
    read_chr_files_pattern($1, device_t, polaris_hanet_device_t)
)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisvxe.if

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```

#
# March 2017, Victor Kamensky
#
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#

/usr/binos/conf/pman.sh -- gen_context(system_u:object_r:polaris_pman_exec_t,s0)
/usr/bin/pman          -- gen_context(system_u:object_r:polaris_pman_exec_t,s0)
/bin/gdbserver        -- gen_context(system_u:object_r:polaris_gdb_exec_t,s0)
/usr/bin/gdbserver    -- gen_context(system_u:object_r:polaris_gdb_exec_t,s0)
/tmp/pman_ports(/.*)?  gen_context(system_u:object_r:polaris_pman_tmp_t,s0)

/tmp/fp/process(/.*)?  gen_context(system_u:object_r:polaris_pman_tmp_t,s0)
/tmp/rp/process(/.*)?  gen_context(system_u:object_r:polaris_pman_tmp_t,s0)

/tmp/vxe_ucose_image   gen_context(system_u:object_r:polaris_pman_tmp_t,s0)
/tmp/wlc_ucose_image   gen_context(system_u:object_r:polaris_pman_tmp_t,s0)
/tmp/utah_ucose_image  gen_context(system_u:object_r:polaris_pman_tmp_t,s0)
/tmp/fugazi_ucose_image gen_context(system_u:object_r:polaris_pman_tmp_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispman.fc

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```

dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
dnl Macallan Platform Max Bay Limits
max_bay_map_set(`rp', `per_bay', 0)
max_bay_map_set(`cc', `per_bay', 9)
max_bay_map_set(`fp', `per_bay', 9)

min_bay_ripc_map_set(`rp', `per_bay', 0)

```

```
min_bay_ripc_map_set(`cc', `per_bay', 1)
```

```
min_bay_ripc_map_set(`fp', `per_bay', 0)
```

```
max_bay_ripc_map_set(`rp', `per_bay', 2)
```

```
max_bay_ripc_map_set(`cc', `per_bay', 10)
```

```
max_bay_ripc_map_set(`fp', `per_bay', 1)
```

```
min_bay_ripc_map_set(`rp', `global', 0)
```

```
min_bay_ripc_map_set(`cc', `global', 1)
```

```
min_bay_ripc_map_set(`fp', `global', 0)
```

```
max_bay_ripc_map_set(`rp', `global', 2)
```

```
max_bay_ripc_map_set(`cc', `global', 10)
```

```
max_bay_ripc_map_set(`fp', `global', 1)
```

```
dnl in elastic scope each process has its own value
```

```
max_elastic_map_set(`rp', `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(`cc', `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(`fp', `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(`rp', `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(`cc', `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(`fp', `elastic', BPROC_WNCD, 0)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/macallanmaps.m4
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisissustack, 1.0);
```

```
gen_require(`
```

```
    type polaris_issu_stack_t;
```

```
`)
```

```
corecmd_exec_bin(polaris_issu_stack_t)
```

```
corecmd_exec_shell(polaris_issu_stack_t)
```

```
# run ldd, which in turns execve "ld.so --verify"
```

```
libs_exec_ld_so(polaris_issu_stack_t)
```

```
# allow read of /etc/group and /etc/passwd
```

```

auth_use_nsswitch(polaris_issu_stack_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_issu_stack_t)

# work with /tmp files (/tmp/issu_stk)
type polaris_issu_stack_tmp_t;
files_tmp_file(polaris_issu_stack_tmp_t)
manage_dirs_pattern(polaris_issu_stack_t, tmp_t, polaris_issu_stack_tmp_t)
manage_files_pattern(polaris_issu_stack_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)
manage_fifo_files_pattern(polaris_issu_stack_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)
files_tmp_filetrans(polaris_issu_stack_t, polaris_issu_stack_tmp_t, file)
files_tmp_filetrans(polaris_issu_stack_t, polaris_issu_stack_tmp_t, dir, "issu_stk")

allow polaris_issu_stack_t self:capability sys_resource;

polaris_btrace_data_manage(polaris_issu_stack_t)
polaris_chasfs_manage(polaris_issu_stack_t)
polaris_cpld_read(polaris_issu_stack_t)
polaris_proc_rmonbifo_read(polaris_issu_stack_t)
polaris_rmonbifo_tmp_read(polaris_issu_stack_t)
polaris_boot_tmp_read(polaris_issu_stack_t)
polaris_tdlresolve_read(polaris_issu_stack_t)
polaris_disk_crashinfo_getattr(polaris_issu_stack_t)

allow polaris_issu_stack_t self:capability dac_override;

polaris_read_debug_conf(polaris_issu_stack_t)

polaris_flashlib_read(polaris_issu_stack_t)

allow polaris_issu_stack_t self:process setpgid;

# modify tdlresolve epoch
polaris_tdlresolve_manage(polaris_issu_stack_t)

#rsync_exec(polaris_issu_stack_t)
gen_require(^
    type rsync_t;
    ')
rsync_entry_domtrans(polaris_issu_stack_t, rsync_t)
allow rsync_t polaris_issu_stack_t:process sigchld;

# execute rsync over over eobc: /usr/binos/conf/mcp_chvrf.sh eobc rsync
polaris_chvrf_domtrans(polaris_issu_stack_t)
# from chvrf.sh code executes rsync command
gen_require(^
    type polaris_chvrf_t;

```

```

    )
rsync_entry_domtrans(polaris_chvrf_t, rsync_t)
# LOOK AT ME: issu_stack.sh leaks fd of /tmp/issu_stk/chassis_state_evt_fifo
# for now grant access, since changing script may not be trivial
manage_fifo_files_pattern(polaris_chvrf_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)
write_files_pattern(polaris_chvrf_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)

polaris_install_engine_domtrans(polaris_issu_stack_t)
# LOOK AT ME: isse_stack.sh leak fd of /tmp/issu_stk/chassis_state_evt_fifo
# for now grant access, since changing script may not be trivial
gen_require(
    type polaris_install_engine_t;
)
read_fifo_files_pattern(polaris_install_engine_t, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)

polaris_install_tmp_read(polaris_issu_stack_t)

# access /bootflash/.installer/install_issu_state
polaris_disk_install_read(polaris_issu_stack_t)

# rm from coreutils-8.30 wants to know filesystem type
fs_getattr_tmpfs(polaris_issu_stack_t)

# reads /tmp/remote_sw_verinfo.txt
gen_require(
    type rsync_tmp_t;
)
read_files_pattern(polaris_issu_stack_t, rsync_tmp_t, rsync_tmp_t)

# watch over /tmp/tdlresolve/work
polaris_tdlresolve_watch(polaris_issu_stack_t)

#issu_stack.sh access to epoch_merge.lua,epoch_endpoint_update.lua
polaris_lua_read(polaris_issu_stack_t)

#issu_stack.sh access to /tmp/rsync_log_dir
polaris_manage_rsync_tmpllog_dir(polaris_issu_stack_t)

#issu_stack.sh access to epoch_merge.lua which merges epoch files, local.epoch and inyterchassis/.epcioh file
#luajit/usr/binos/conf/epoch_merge.lua--base-file/tmp/tdlresolve/epoch_dir/local.epoch
#--merge-file/tmp/tdlresolve/work/inter
allow polaris_issu_stack_t self:process execmem;

#access to /tmp/installer/
polaris_install_tmp_manage(polaris_issu_stack_t)

#access to /tmp/ufs/harddisk

```

```
polaris_ncd_tmp_read(polaris_issu_stack_t)
```

```
# use of errmsg.sh
```

```
polaris_script_errmsg_use(polaris_issu_stack_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissustack.te
```

```
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```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarislsmpl, 1.0);
```

```
#####
```

```
# Polaris lsmpl
```

```
#####
```

```
type polaris_lsmpl_device_t;
```

```
dev_node(polaris_lsmpl_device_t)
```

```
# note polaris_sysfs_contdev_t is defined in kernel/devices.te, since genfscon statements
```

```
# could be only in base policy
```

```
# punt/inject working through unix domain sockets
```

```
type polaris_pi_uds_t;
```

```
files_tmp_file(polaris_pi_uds_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislsmpl.te
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# May 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris mdt_pubd Policy Rules.</summary>
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismdtpubd.if
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisemd, 1.0);

gen_require(
    type polaris_emd_t;
)

polaris_btrace_data_manage(polaris_emd_t)
polaris_crft_data_manage(polaris_emd_t)
polaris_chasfs_manage(polaris_emd_t)
polaris_tdlresolve_read(polaris_emd_t)
polaris_tdlldb_list_dirs(polaris_emd_t)
polaris_cpld_read(polaris_emd_t)
polaris_flashlib_read(polaris_emd_t)

polaris_ripc_sman_ui_serv_connect(polaris_emd_t)

polaris_cpld_dev_use(polaris_emd_t)
dev_read_sysfs(polaris_emd_t)
polaris_obfl_data_manage(polaris_emd_t)
polaris_persistent_read(polaris_emd_t)

allow polaris_emd_t self:capability dac_override;

ifdef(^mcp_family',`
polaris_scooby_dev_use(polaris_emd_t)
# read/write /sys/bus/i2c/drivers/pca9544/2-0077/reg_control and others
dev_getattr_sysfs_fs(polaris_emd_t)
dev_rw_sysfs(polaris_emd_t)
`)

logging_send_syslog_msg(polaris_emd_t)

ifdef(^qwlc_platform',`
# on qwlc read eeprom through i2c like /sys/devices/i2c-12/12-0050/eeprom
dev_rw_sysfs(polaris_emd_t)
dev_getattr_sysfs_fs(polaris_emd_t)
`)

#sparrow needs access to /dev/i2c*
```



```

ifdef(`sparrow_platform',`
gen_require(`
    type polaris_cm_cc_tmpfs_t;
`)
polaris_i2c_use(polaris_emd_t)
polaris_i2c_sem_manage(polaris_emd_t)
mmap_files_pattern(polaris_emd_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
`)

ifdef(`katar_platform',`
dev_rw_sysfs(polaris_emd_t)
dev_getattr_sysfs_fs(polaris_emd_t)
`)

# emd creates udp socket
allow polaris_emd_t self:udp_socket create_socket_perms;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisemd.te
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#
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#
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#

## <summary>Polaris polarisdroputil Policy Rules.</summary>

#####

## <summary>
##   Manage droputils temporary files and directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_droputil_manage_tmp_files',`
    gen_require(`
        type polaris_droputil_tmp_t;
    `)

    manage_files_pattern($1, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
    read_lnk_files_pattern($1, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
`)

```

```
#####
## <summary>
##   Watch droputil_tmp directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_droputil_tmp_watch`,`
gen_require(`
type polaris_droputil_tmp_t;
`)
allow $1 polaris_droputil_tmp_t:dir watch;
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdroputil.if
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```

```
#
# March 2017, Victor Kamensky
#
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#
```

```
/tmp/iosd_level -- gen_context(system_u:object_r:polaris_lm_tmp_t,s0)
/tmp/stack_apcount -- gen_context(system_u:object_r:polaris_lm_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislm.fc
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```

```
dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
define(`polaris_ripc_service_server`,`)
define(`polaris_ripc_service_client`,`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_ripc_if.m4
```

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_ripc\_fc.m4

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dnl

dnl December 2018, Victor Kamensky

dnl

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dnl

dnl Nyquist Platform Max Bay Limits

max\_bay\_map\_set(`rp', `per\_bay', 0)

max\_bay\_map\_set(`cc', `per\_bay', 0)

max\_bay\_map\_set(`fp', `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(`rp', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`fp', `elasitic', BPROC\_ODM, 0)

max\_elastic\_map\_set(`rp', `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(`cc', `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(`fp', `elastic', BPROC\_WNCD, 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/quake1maps.m4

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#

# Sep 2020, Sridhar C

#

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#

policy\_module(polaristlsd, 1.0);

gen\_require(`

type polaris\_tlscd\_t;

type net\_conf\_t;

`)

polaris\_btrace\_data\_manage(polaris\_tlscd\_t)

polaris\_chasfs\_manage(polaris\_tlscd\_t)

polaris\_tdlresolve\_read(polaris\_tlscd\_t)

polaris\_tdlldb\_list\_dirs(polaris\_tlscd\_t)

polaris\_lua\_read(polaris\_tlscd\_t)

polaris\_flashlib\_read(polaris\_tlscd\_t)

polaris\_chasfs\_read(polaris\_tlscd\_t)

```

polaris_cpuld_read(polaris_tlscd_t)
polaris_db_tdlldb_dir_use(polaris_tlscd_t)

# Related to vrf support of the socket
polaris_lfts_dev_use(polaris_tlscd_t)
polaris_socketat_nsfs_read(polaris_tlscd_t)
polaris_vrf_shm_manage(polaris_tlscd_t)

# TLSCd reads TCP/UDP ports open in VRF_GLOBAL for packet forwarding
# to IOSd or BinOS applications.
kernel_read_net_sysctls(polaris_tlscd_t)
kernel_read_network_state(polaris_tlscd_t)
kernel_search_network_sysctl(polaris_tlscd_t)
allow polaris_tlscd_t net_conf_t:dir search;
allow polaris_tlscd_t net_conf_t:file { getattr open read watch };

# UDS related sockets are:
# /tmp/tlscd/iosd_to_tlscd_0_socket
# /tmp/tlscd/tlscd_to_iosd_0_socket
# IOSd and TLSCd exchange packet over these UDS socket, allow create/bind
type polaris_tlscd_uds_t;
files_tmp_file(polaris_tlscd_uds_t)
polaris_tlscd_uds_manage(polaris_tlscd_t)
polaris_iosd_dgram_send(polaris_tlscd_t)
allow polaris_tlscd_t self:unix_dgram_socket { bind create };

# Tunnel and TLS TCP connection related related
corenet_rw_tun_tap_dev(polaris_tlscd_t)
allow polaris_tlscd_t self:tun_socket create;
corenet_tcp_connect_all_ports(polaris_tlscd_t)

# errmsg
logging_send_syslog_msg(polaris_tlscd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristlscd.te
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dnl
dnl April 2018, Victor Kamensky
dnl
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dnl
define(`polaris_database_aux',`dnl
type $1;
polaris_tdlldb_type($1)
`)

```

```
define(`polaris_database',`dnl
polaris_database_aux(database_label($1))
')
```

```
define(`polaris_database_process_aux_full',`dnl
gen_require(`
    type $2;
")
polaris_db_tdlb_$1_use($2)
')
```

```
define(`polaris_database_process_aux',`dnl
ifndef(database_use_map($1, $2), `', `polaris_database_process_aux_full($1, $2)')
database_use_map_set($1, $2, 1)
')
```

```
define(`polaris_database_process',`dnl
polaris_database_process_aux(database_stem($1), process_label($2))dnl
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_database\_db\_te.m4

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```
#
# January 2021, Gabriel Lee, Shawn Liu
#
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#
## <summary>Polaris ezmanage Policy Rules.</summary>
```

```
#####
```

```
## <summary>
## Transition to ezmanage
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
```

```
interface(`polaris_ezmanage_domtrans',`
gen_require(`
    type polaris_ezmanage_t, polaris_ezmanage_exec_t;
```

```

)

domtrans_pattern($1, polaris_ezmanage_exec_t, polaris_ezmanage_t)
)

#####
## <summary>
## Read files under polaris_ezmanage_file_t label
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_manage_ezmanage_files`,`
    gen_require(`
        type polaris_ezmanage_file_t;
    `)

    manage_files_pattern($1, polaris_ezmanage_file_t , polaris_ezmanage_file_t)
    read_lnk_files_pattern($1, polaris_ezmanage_file_t, polaris_ezmanage_file_t)
    manage_dirs_pattern($1, polaris_ezmanage_file_t , polaris_ezmanage_file_t)
)

#####
## <summary>
## Manage files under polaris_ezmanage_var_run_t label
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_manage_ezmanage_var_run_files`,`
    gen_require(`
        type polaris_ezmanage_var_run_t;
    `)

    manage_sock_files_pattern($1, polaris_ezmanage_var_run_t, polaris_ezmanage_var_run_t);
)

```

Found in path(s):  
\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisezmanage.if  
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```

#
# February 2020, Victor Kamensky
#
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#

policy_module(polariscedge, 1.0);

# /tmp/xml handling
type polaris_cedge_xml_tmp_t;
files_tmp_file(polaris_cedge_xml_tmp_t)

# PLEASE LOOK AT ME very strange choice of directory name
# /tmp/tmp/ handling
type polaris_cedge_tmp_t;
files_tmp_file(polaris_cedge_tmp_t)

# /etc/viptela handling
type polaris_cedge_etc_t;
files_config_file(polaris_cedge_etc_t)

# /dev/shm handling
type polaris_cedge_tmpfs_t;
files_tmpfs_file(polaris_cedge_tmpfs_t)

# /tmp/.econfd2sysmgr-ipc handling
type polaris_econfd2sysmgr_tmp_t;
files_tmp_file(polaris_econfd2sysmgr_tmp_t)

# vconfd_script_reboot.sh policy
polaris_vconfd_domain_template(vconfd_reboot)

# vconfd_script_if_reset.sh policy
polaris_vconfd_domain_template(vconfd_ifreset)

# vconfd_script_get_config.sh policy
polaris_vconfd_domain_template(vconfd_cfg)

#####
# vconfd_script_*_stats policy
polaris_vconfd_domain_template(vconfd_history)
corecmd_exec_bin(polaris_vconfd_history_t)

# performs 'rm /tmp/xml/Pfr/Pfr-1600801323.xml.gz'....but, do not know where
polaris_cedge_tmp_manage(polaris_vconfd_history_t)

# performs 'ls -rt /tmp/xml/UtdUrlf-IOX' etc.

```

```

polaris_cedge_xml_tmp_manage(polaris_vconfd_history_t)

# vconfd_script_manage_list_stats.sh performs operations on
# /tmp/vconfd/stats.XXXXXXX
polaris_vconfd_tmp_manage(polaris_vconfd_history_t)
#####
# software policy
polaris_vconfd_domain_template(vconfd_software)

# nms policy
polaris_vconfd_domain_template(vconfd_nms)

# device policy
polaris_vconfd_domain_template(vconfd_device)

# internal policy
polaris_vconfd_domain_template(vconfd_reset)

# cert policy
polaris_vconfd_domain_template(vconfd_cert)

#####
# csr policy
polaris_vconfd_domain_template(vconfd_csr)

# vconfd_script_show_csr.sh invokes vlog
# /bin/sh vlog ....
# vlog is implemented in viptela/utils/vlog using logger; that needs
# - ceate/connect unix_dgram_socket
# - read from devtmpfs of type devlog_t
# - write to sock_file of type devlog_t
# - sendto path="/run/systemd/journal/dev-log" of type unix_dgram_socket
logging_send_syslog_msg(polaris_vconfd_csr_t)
corecmd_exec_bin(polaris_vconfd_csr_t)

# reads /usr/share/viptela/server.csr
polaris_bootflash_read(polaris_vconfd_csr_t)
#####
# serial vsmart-upload vedge-upload policy
polaris_vconfd_domain_template(vconfd_serialnum)

# crash policy
polaris_vconfd_domain_template(vconfd_crash)

# aaa policy
polaris_vconfd_domain_template(vconfd_aaa)

# container policy

```



```

polaris_vconfd_domain_template(vconfd_contr)

# iox policy
polaris_vconfd_domain_template(vconfd_iox)

# utd policy
polaris_vconfd_domain_template(vconfd_utd)

# geo policy
polaris_vconfd_domain_template(vconfd_geo)

# vconfd_script_vnping.sh, vconfd_script_vping.sh, vconfd_script_vtraceroute.sh
# scripts policy
polaris_vconfd_domain_template(vconfd_net)

# runs ip command
sysnet_domtrans_ifconfig(polaris_vconfd_net_t)
# runs confd_cmd
corecmd_exec_bin(polaris_vconfd_net_t)

polaris_conf_d_connect(polaris_vconfd_net_t)

# /tmp/ polaris_vconfd_cert_t handling
type polaris_vconfd_cert_tmp_t;
files_tmp_file(polaris_vconfd_cert_tmp_t)
files_tmp_filetrans(polaris_vconfd_cert_t, polaris_vconfd_cert_tmp_t, { file dir })
polaris_vconfd_cert_tmp_manage(polaris_vconfd_cert_t)

# permit access to polaris_vconfd_cert_t
allow polaris_vconfd_cert_t self:capability { chown dac_override };

logging_send_syslog_msg(polaris_vconfd_cert_t)

corecmd_sbin_entry_type(polaris_vconfd_cert_t)
corecmd_shell_entry_type(polaris_vconfd_cert_t)

fs_read_nsfs_files(polaris_vconfd_cert_t)
logging_create_devlog_dev(polaris_vconfd_cert_t)

# to access the /bootflash: as the cert is stored in /bootflash:
# IOS cert related CLIs can create/store the certs in /bootflash with any
# file name(s), so allow generic access to bootflash.
polaris_bootflash_manage(polaris_vconfd_cert_t)

# manage /etc/viptela
polaris_cedge_etc_manage(polaris_vconfd_cert_t)
polaris_cedge_reset_ns(polaris_vconfd_cert_t)

```

```
# needed for accessing /tmp/chassis/local/rp/chasfs/midplane/chassis_model
polaris_chasfs_read(polaris_vconfd_cert_t)
```

```
#access to /etc/viptela
gen_require(
    type polaris_nginx_t;
)
polaris_cedge_etc_manage(polaris_nginx_t)
```

```
# For "confd_cmd", allow polaris_vconfd_cert_t, which is not a Binos process,
# to access polaris_confd_ipc_ripc_port_t.
polaris_ripc_confd_ipc_connect(polaris_vconfd_cert_t)
```

```
# permit to access /var/run/netns/default
sysnet_manage_ifconfig_run(polaris_vconfd_cert_t)
```

```
# vconfd_script_show_root_ca_cert.sh performs operations on
# /tmp/vconfd/root_cert.XXXXXXX
polaris_vconfd_tmp_manage(polaris_vconfd_cert_t)
fs_getattr_tmpfs(polaris_vconfd_cert_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscedge.te
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```

```
#
# March 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris CPLD Policy Rules.</summary>
```

```
#####
# CPLD Driver policy
#####
```

```
#####
```

```
## <summary>
##   Read cpld files in /sys directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
```

```

interface(`polaris_cpld_read`,`
gen_require(`
type polaris_sysfs_cpld_t;
    type sysfs_t;
`)
    read_files_pattern($1, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
    # genfscon statement specifically excludes symbolic links from
    # genfscon path specific entries. To workaround, let us allow
    # to follow sysfs_t symbolic links
    allow $1 sysfs_t:lnk_file { read getattr };
    list_dirs_pattern($1, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
`)

#####
## <summary>
##   Write cpld files in /sys directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpld_write`,`
gen_require(`
type polaris_sysfs_cpld_t;
    type sysfs_t;
`)
    manage_files_pattern($1, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
    manage_dirs_pattern($1, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)
    # genfscon statement specifically excludes symbolic links from
    # genfscon path specific entries. To workaround, let us allow
    # to follow sysfs_t symbolic links
    allow $1 sysfs_t:lnk_file { read getattr };
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/cpld
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpld_dev_use`,`

```

```

gen_require(`
    type device_t;
    type polaris_cpld_device_t;
`)
write_chr_files_pattern($1, device_t, polaris_cpld_device_t)
read_chr_files_pattern($1, device_t, polaris_cpld_device_t)
allow $1 polaris_cpld_device_t:chr_file map;
`)

```

```
#####
```

```

## <summary>
##   Work (read,iocctl) with /dev/cpld
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_cpld_dev_read`,`
gen_require(`
    type device_t;
    type polaris_cpld_device_t;
`)
read_chr_files_pattern($1, device_t, polaris_cpld_device_t)
`)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscpld.if
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```

```

#
# August 2017, Victor Kamensky
#
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#

```

```
policy_module(polariscrankshaft, 1.0);
```

```

# spa devices i.e sys_platform_module_1ng
type polaris_spa_device_t;
dev_node(polaris_spa_device_t)

```

```

# htdp device
type polaris_htdp_device_t;
dev_node(polaris_htdp_device_t)

```

```
# bde device (/dev/linux-user-bde)
type polaris_bde_device_t;
dev_node(polaris_bde_device_t)

# dash fpga device (/dev/dash_fpga)
type polaris_dash_device_t;
dev_node(polaris_dash_device_t)

# nios device (/dev/nios)
type polaris_nios_device_t;
dev_node(polaris_nios_device_t)

# qae device (/dev/qae_mem)
type polaris_qae_device_t;
dev_node(polaris_qae_device_t)

# moka fpga device (/dev/moka_fpga)
type polaris_mokafpga_device_t;
dev_node(polaris_mokafpga_device_t)

# sirius fpga device (/dev/sirius_fpga)
type polaris_siriusfpga_device_t;
dev_node(polaris_siriusfpga_device_t);

# moka nim device (/dev/nim_dm*)
type polaris_nim_dm_device_t;
dev_node(polaris_nim_dm_device_t)

# /dev/bp_async device on nanook platform
type polaris_bp_async_device_t;
dev_node(polaris_bp_async_device_t)

# /dev/sparrow_psu device on sparrow platform
type polaris_sparrow_psu_device_t;
dev_node(polaris_sparrow_psu_device_t)

# /dev/nutella_fpga device on nutella platform
type polaris_nutella_fpga_device_t;
dev_node(polaris_nutella_fpga_device_t)

# /dev/huron_fpga on Sumatra platform
type polaris_huron_device_t;
dev_node(polaris_huron_device_t)

# /dev/dplr_sumatra on Sumatra platform
type polaris_sumatra_doppler_device_t;
dev_node(polaris_sumatra_doppler_device_t)
```

```

# /tmp/sata_status for mSATA
type polaris_sata_status_tmp_t;
files_tmp_file(polaris_sata_status_tmp_t)

# TSN tsn_platform.tdl for IPCs and processes definition and it uses
# crankshaft_platform.tdl for databases definition. Unfortunately they are
# out of sync wrt BPROC_NGWC_FED - crankshaft_platform.tdl refers it but
# tsn_platform.tdl does not contain such definition.
ifdef(^tsn_platform',`
type polaris_ngwc_fed_t;
`)

# Supernova supernova_platform.tdl for IPCs and processes definition and it uses
# crankshaft_platform.tdl for databases definition. Unfortunately they are
# out of sync wrt BPROC_FM_RP - crankshaft_platform.tdl refers it but
# supernova_platform.tdl does not contain such definition.
ifdef(^supernova_platform',`
type polaris_fman_rp_t;
`)

# Nanook
# The Nanook platform does not support SDWAN and so the SDWAN processes are not
# defined in the nanook_platform.tdl. However, it uses the database_def's from
# the crankshaft_platform.tdl, which do have the SDWAN databases. So we need to
# add the processes to the SELinux policy
ifdef(^nanook_platform',`
type polaris_cfgmgr_t;
type polaris_cxp_t;
type polaris_dbgd_t;
type polaris_fpm_t;
type polaris_ftm_t;
type polaris_omp_t;
type polaris_sdavc_proxy_t;
type polaris_ttm_t;
type polaris_vdaemon_t;
type polaris_htx_t;
`)

#####
# load_usbnet policies start
#####
# /usr/bin/conf/load_usbnet.sh is invoked to load usb network driver module
# kernel/drivers/net/usb/usbnet.ko for TSN.
#####

polaris_process_domain_template(load_usbnet)

```

```

# allow polaris_load_usbnet_t access to execute programs in system bin dirs, load
# usbnet.ko for USB network interface for TSN and allow read access
# to /sys/class/net and /proc/cmdline
# LOOK AT ME: /tmp/rp/pvp/work/inot_fifo inotifywait fd leak to child
corecmd_exec_bin(polaris_load_usbnet_t)
modutils_exec_insmod(polaris_load_usbnet_t)
modutils_list_module_config(polaris_load_usbnet_t)
modutils_read_module_config(polaris_load_usbnet_t)
sysnet_manage_config_dirs(polaris_load_usbnet_t)
polaris_pvp_stdin_read(polaris_load_usbnet_t)
files_read_kernel_modules(polaris_load_usbnet_t)
dev_rw_sysfs(polaris_load_usbnet_t)
kernel_read_system_state(polaris_load_usbnet_t)

# stdout inherited from unconfined_service that might call it
polaris_unconfined_service_fifo_file_manage(polaris_load_usbnet_t)

# handle /tmp/load_usbnet_intf
type polaris_load_usbnet_tmp_t;
files_tmp_file(polaris_load_usbnet_tmp_t)
files_tmp_filetrans(polaris_load_usbnet_t, polaris_load_usbnet_tmp_t, file)
manage_files_pattern(polaris_load_usbnet_t, polaris_load_usbnet_tmp_t, polaris_load_usbnet_tmp_t)

# allow read of /etc/passwd
# allow map permission
# passwd_file_t:file { getattr open read };
auth_map_passwd(polaris_load_usbnet_t)

#####
# load_usbnet policies end
#####

#####
# CLI: show platform hardware msata <status/info>
#####
ifdef(^crankshaft_family',`
gen_require(
    type polaris_sysfs_ggpio_t;
    type polaris_msata_info_t;
)

polaris_utility_domain_template(msata_info)
polaris_bexecute_domain(polaris_msata_info_t, polaris_msata_info_exec_t)
# need write for pipes like "pipe:[70623]"
corecmd_exec_bin(polaris_msata_info_t)
# need write/getattr for pipes like "pipe:[71322]"
polaris_cmrp_use_fifo(polaris_msata_info_t)
fstools_domtrans(polaris_msata_info_t)

```

```

# allow use of mSATA device
polaris_nvram_manage(polaris_msata_info_t)
# allow self
allow polaris_msata_info_t self:capability sys_rawio;
allow polaris_msata_info_t self:process setfscreate;
# allow /usr/sbin/smartctl to access /sys/devices/platform/cpn-110-master/
# cpn-110-master:config-space/f2540000.sata/ata2/host1/scsi_host/host1/proc_name and
# /sys/devices/platform/cpn-110-master/cpn-110-master:config-space/f2540000.sata/
# ata2/host1/target1:0:0
read_files_pattern(polaris_msata_info_t, polaris_sysfs_ggpiot, polaris_sysfs_ggpiot)
dev_list_sysfs(polaris_msata_info_t)
# allow smartctl to access to /dev/sda to determine its lifetime
storage_raw_read_fixed_disk(polaris_msata_info_t)

# CLI: show platform hardware slot p[x] fan eeprom
polaris_utility_domain_template(smart_fan)
polaris_bexecute_domain(polaris_smart_fan_t, polaris_smart_fan_exec_t)
# allow /ls command
corecmd_exec_bin(polaris_smart_fan_t)
# allow read of /etc/passwd
auth_map_passwd(polaris_smart_fan_t)
# allow read of /sys/devices/platform/nios/*
dev_read_sysfs(polaris_smart_fan_t)
# need write/getattr access for pipes like "pipe:[86004]"
polaris_cmrp_use_fifo(polaris_smart_fan_t)

# sumatra and sparrow platforms need map access for "show platform hardware msata status | lifetime"
auth_map_passwd(polaris_msata_info_t)
')

ifdef(^sumatra_platform',`
# During "show platform hardware msata status | lifetime" - msata_info.sh accesses /tmp/sata_status
files_tmp_filetrans(polaris_msata_info_t, polaris_sata_status_tmp_t, file)
manage_files_pattern(polaris_msata_info_t, polaris_sata_status_tmp_t, polaris_sata_status_tmp_t)
`)

#####
# show platform hardware msata end
#####

#type for /dev/qcqmIX
type qcqmi_device_t;
dev_node(qcqmi_device_t);

# sm_nim_adpt device (/dev/sm_nim_adpt_XXX )
type polaris_sm_nim_adpt_device_t;
dev_node(polaris_sm_nim_adpt_device_t)

```



```

# dio device
type polaris_dio_device_t;
dev_node(polaris_dio_device_t)

# tty NMEA device
type polaris_tty_NMEA_device_t;
dev_node(polaris_tty_NMEA_device_t)

# memory blocks and gpp on Nutella-XE platform
type polaris_nutella_memory_block_p7_t;
dev_node(polaris_nutella_memory_block_p7_t)

type polaris_nutella_memory_block_p1_t;
dev_node(polaris_nutella_memory_block_p1_t)

type polaris_nutella_memory_block_boot_t;
dev_node(polaris_nutella_memory_block_boot_t)

type polaris_nutella_gp0_t;
dev_node(polaris_nutella_gp0_t)

type polaris_nutella_gpp_t;
dev_node(polaris_nutella_gpp_t)

# nim device (/dev/nim_phy)
type polaris_nim_phy_device_t;
dev_node(polaris_nim_phy_device_t)

type polaris_cwan_svr_var_run_t;
files_pid_file(polaris_cwan_svr_var_run_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscrankshaft.te

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```

#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris epc_ws_liaison Policy Rules.</summary>

interface(`polaris_epc_ws_liaison_tmp_read',`
    gen_require(`
        type polaris_epc_ws_liaison_tmp_t;
    `)

```

```

    read_files_pattern($1, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
)

#####
## <summary>
##   Allow to open, write, add_name and write /tmp/epc_ws/fed_to_wif_pipe file.
##   Allow to create and write /tmp/epc_ws dir.
## </summary>
## <param name="domain">
##   <summary>
##     epc_ws_liaison and ngwc-fed fifo_file interaction.
##   </summary>
## </param>
#
interface(`polaris_epc_ws_liaison_fifo_manage`,`
    gen_require(`
        type polaris_epc_ws_liaison_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
    manage_fifo_files_pattern($1, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
)

#####
## <summary>
##   Allow to open, read "/tmp/epc_ws/wif_to_ts_pipe" fifo file.
##
## </summary>
## <param name="domain">
##   <summary>
##     epc_ws_liaison and dumpcap fifo_file interaction.
##   </summary>
## </param>
#
interface(`polaris_epc_ws_liaison_fifo_read`,`
    gen_require(`
        type polaris_epc_ws_liaison_tmp_t;
    `)
    read_fifo_files_pattern($1, polaris_epc_ws_liaison_tmp_t, polaris_epc_ws_liaison_tmp_t)
)

#####
## <summary>
##   Allow to write, create, unlink "/tmp/*.pcapng" temporary files.
##
## </summary>
## <param name="domain">
##   <summary>
##     polaris_wireshark_show fifo_file interaction.

```

```

## </summary>
## </param>
#
interface(`polaris_wireshark_show_tmp_manage`,`
    gen_require(`
        type polaris_wireshark_show_tmp_t;
    `)
    manage_files_pattern($1, polaris_wireshark_show_tmp_t, polaris_wireshark_show_tmp_t)
`)
#####
## <summary>
## Create, read, and write temporary files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_epc_ws_liaison_tmp_file`,`
    gen_require(`
        type polaris_epc_ws_liaison_tmp_t;
    `)
    files_tmp_filetrans($1, polaris_epc_ws_liaison_tmp_t, dir, "epc_ws")
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisepcwsliaison.if

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```

#
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#

```

```
policy_module(polariscxp, 1.0);
```

```
gen_require(`
    type polaris_cxp_t;
`)

```

```
polaris_chasfs_read(polaris_cxp_t)
```

```
polaris_cpld_read(polaris_cxp_t)
```

```
logging_send_syslog_msg(polaris_cxp_t)
```

```
# vconfd_load_shared_schemas
```

```
polaris_conf_d_shared_schema_read(polaris_cxp_t)

corecmd_exec_bin(polaris_cxp_t)
corecmd_exec_shell(polaris_cxp_t)
auth_use_nsswitch(polaris_cxp_t)

# work with /tmp/xml
polaris_cedge_xml_tmp_manage(polaris_cxp_t)

# work with /tmp/tmp
polaris_cedge_tmp_manage(polaris_cxp_t)

# /var/run/cxp dir and pid
type polaris_cxp_var_run_t;
files_pid_file(polaris_cxp_var_run_t)
manage_files_pattern(polaris_cxp_t, polaris_cxp_var_run_t, polaris_cxp_var_run_t)
manage_dirs_pattern(polaris_cxp_t, polaris_cxp_var_run_t, polaris_cxp_var_run_t)
manage_sock_files_pattern(polaris_cxp_t, polaris_cxp_var_run_t, polaris_cxp_var_run_t)
files_pid_filetrans(polaris_cxp_t, polaris_cxp_var_run_t, { file dir sock_file })

polaris_ttm_var_sock_write(polaris_cxp_t)

# vip_execute_nowait uses setpgid
allow polaris_cxp_t self:process setpgid;

# cxp may create vrf-based netns on demand
polaris_vrf_netns_manage(polaris_cxp_t)

# Allow /usr//cxpd manages /usr/binos/conf/global.service.conf and
# /tmp/tldlresolve/
polaris_tldlresolve_manage(polaris_cxp_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscxp.te
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#
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#
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#

/usr/binos/conf/viptela-start.sh -- gen_context(system_u:object_r:polaris_cedge_start_exec_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscdgestart.fc
```

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```
dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
divert(-1)
```

```
include(`polaris_process.m4')
```

```
include(`polaris_database_db.m4')
include(`polaris_database_db_te.m4')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#
policy_module(polarisplatformdbauto, 1.0);
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_database\_te.m4

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```
#
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#
```

```
## <summary>Polaris vman Policy Rules.</summary>
```

```
#####
```

```
## <summary>
##   Read files of type polaris_vman_tmp_t (e.g., /tmp/cgroup.log)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_tmp_read',`
```

```
gen_require(  
    type polaris_vman_tmp_t;  
)  
read_files_pattern($1, polaris_vman_tmp_t, polaris_vman_tmp_t)  
)
```

```
#####
```

```
## <summary>  
## Write files of type polaris_vman_tmp_t (e.g., /tmp/cgroup.log)  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>  
## </param>  
#
```

```
interface('polaris_vman_tmp_write',`  
gen_require(  
    type polaris_vman_tmp_t;  
)  
write_files_pattern($1, polaris_vman_tmp_t, polaris_vman_tmp_t)  
)
```

```
#####
```

```
## <summary>  
## Manage dir/files of type polaris_vman_tmp_t (e.g., /tmp/cgroup.log)  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>  
## </param>  
#
```

```
interface('polaris_vman_tmp_manage',`  
gen_require(  
    type polaris_vman_tmp_t;  
)  
manage_files_pattern($1, polaris_vman_tmp_t, polaris_vman_tmp_t)  
manage_dirs_pattern($1, polaris_vman_tmp_t, polaris_vman_tmp_t)  
)
```

```
#####
```

```
## <summary>  
## Read files of type polaris_disk_vman_t (e.g., /bootflash/virtual-instance/  
## </summary>  
## <param name="domain">  
## <summary>
```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_vman_read`,`
    gen_require(`
        type polaris_disk_vman_t;
    `)
    read_files_pattern($1, polaris_disk_vman_t, polaris_disk_vman_t)
    read_lnk_files_pattern($1, polaris_disk_vman_t, polaris_disk_vman_t)
    list_dirs_pattern($1, polaris_disk_vman_t, polaris_disk_vman_t)
`)

#####
## <summary>
## List files of type polaris_disk_vman_t (e.g., /bootflash/virtual-instance/)
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_vman_dir_list`,`
    gen_require(`
        type polaris_disk_vman_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
    `)
    list_dirs_pattern($1, { polaris_disk_vman_t polaris_disk_bootflash_t polaris_disk_harddisk_t },
polaris_disk_vman_t)
`)

#####
## <summary>
## Operate on @vman_domain_socket unix socket. Look at
## vman_clnt_msg_transport_init function in vman_clnt_msg_uds.c
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_vman_use_client_socket`,`
    gen_require(`
        type polaris_vman_t;
    `)

```

```

    allow $1 polaris_vman_t:unix_stream_socket connectto;
)

#####
## <summary>
##   Manage /tmp/xml/
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_vman_log_files_manage',`
optional_policy(`
    gen_require(`
        type polaris_vman_log_t;
    `)

    manage_files_pattern($1, polaris_vman_log_t,polaris_vman_log_t)
    manage_dirs_pattern($1, polaris_vman_log_t, polaris_vman_log_t)
)
)

#####
## <summary>
##   Read files of type polaris_var_vman_t (e.g., /var/virtual-instance)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_var_read',`
    gen_require(`
        type polaris_var_vman_t;
    `)
    list_dirs_pattern($1, polaris_var_vman_t, polaris_var_vman_t)
    read_files_pattern($1, polaris_var_vman_t, polaris_var_vman_t)
)

#####
## <summary>
##   Write into fifo file created by vman, typical case when
##   vman starts script under popen in different domain.

```



```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_vman_use_fifo`,`
    gen_require(`
        type polaris_vman_t;
    `)

    read_fifo_files_pattern($1, polaris_vman_t, polaris_vman_t)
    write_fifo_files_pattern($1, polaris_vman_t, polaris_vman_t)
)

#####
## <summary>
##   Check existence (getattr) of vman btrace file (i.e
##   polaris_vman_bt_t)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_bt_getattr`,`
    gen_require(`
        type polaris_vman_bt_t;
        type polaris_btrace_base_t;
    `)
    getattr_files_pattern($1, polaris_btrace_base_t, polaris_vman_bt_t)
)

#####
## <summary>
##   Allow domain to write to pipes connected to virtlogd_t.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_virtlog_allow`,`
    gen_require(`

```

```

        type virtlogd_t;
    ')

    #allow domain to write to pipes
    allow $1 virtlogd_t:fifo_file rw_inherited_fifo_file_perms;

    #allow virtlogd_t to search dirs /var/log/libvirt/qemu
    logging_search_logs(virtlogd_t)
')

```

```

#####
## <summary>
##   Allow polaris_vman_t to kill process from domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vman_kill_process',`
    gen_require(`
        type polaris_vman_t;
    ')
    allow polaris_vman_t $1:process sigkill;
')

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvman.if
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```

```

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#

```

```

## <summary>Polaris tws Policy Rules.</summary>

```

```

#####
## <summary>
##   Allow the specified domain to manage KGV data files
##   I.e /tmp/package_biv_sums.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.

```

```

## </summary>
## </param>
#
interface(`polaris_kgv_data_manage`,`
    gen_require(`
        type polaris_kgv_data_t;
    `)

    manage_files_pattern($1, polaris_kgv_data_t, polaris_kgv_data_t)
    allow $1 polaris_kgv_data_t:file map;
)

#####
## <summary>
## Execute a domain transition to run code_sign_verify
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_code_verify_domtrans`,`
    gen_require(`
        type polaris_code_verify_t, polaris_code_verify_exec_t;
    `)

    domtrans_pattern($1, polaris_code_verify_exec_t, polaris_code_verify_t)
)

#####
## <summary>
## Execute a domain transition to the polaris_hw_upgrade
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_hw_upgrade_domtrans`,`
    gen_require(`
        type polaris_hw_upgrade_t, polaris_hw_upgrade_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_hw_upgrade_exec_t, polaris_hw_upgrade_t)
)

```

```
#####
## <summary>
##   Work (read, write, ioctl) with /dev/aikido device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_aikido_dev_use`,`
gen_require(`
    type device_t;
    type polaris_aikido_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_aikido_device_t)
    read_chr_files_pattern($1, device_t, polaris_aikido_device_t)
`)

#####
## <summary>
##   Execute a domain transition to the polaris_rom_upgrade
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_rom_upgrade_domtrans`,`
gen_require(`
    type polaris_hw_upgrade_t, polaris_rom_upgrade_exec_t;
`)
    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_rom_upgrade_exec_t, polaris_rom_upgrade_t)
`)

#####
## <summary>
## Write into fifo file created during rommon_upgrade
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
```

```

## </param>
## <rolecap/>
#
interface(`polaris_rom_upgrade_use_fifo`,`
gen_require(`
type polaris_rom_upgrade_t;
`)

write_fifo_files_pattern($1, polaris_rom_upgrade_t, polaris_rom_upgrade_t)
`)
#####
## <summary>
## Work (read, write, ioctl) with /dev/scansta device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_scansta_dev_use`,`
gen_require(`
type device_t;
type polaris_scansta_device_t;
`)
write_chr_files_pattern($1, device_t, polaris_scansta_device_t)
read_chr_files_pattern($1, device_t, polaris_scansta_device_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristws.if  
No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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# All rights reserved
#

```

```

/tmp/*/*chasfs(/.*)? gen_context(system_u:object_r:polaris_chasfs_t,s0)

/tmp/chassis/local/*/*chasfs(/.*)? gen_context(system_u:object_r:polaris_chasfs_t,s0)
/tmp/chassis gen_context(system_u:object_r:polaris_chasfs_t,s0)
/tmp/chassis(/.*)? gen_context(system_u:object_r:polaris_chasfs_t,s0)

/tmp/*/*chasync(/.*)? gen_context(system_u:object_r:polaris_chasync_tmp_t,s0)
/vol/harddisk/sys_report(/.*)? gen_context(system_u:object_r:polaris_chasync_files_t,s0)

```

```
/vol/harddisk/fp_cc_crash(/.*)? gen_context(system_u:object_r:polaris_chasync_files_t,s0)
/var/log/chasync(/.*)? gen_context(system_u:object_r:polaris_chasync_log_t,s0)

/usr/binos/conf/chasync.sh -- gen_context(system_u:object_r:polaris_chasync_exec_t,s0)

# real path is /etc/init.d/chasfs_boottime.sh but we need to add rc.d because
# in file_contexts.subs_dist we have substitute rule for /etc/init.d/
/etc/rc.d/init.d/chasfs_boottime.sh -- gen_context(system_u:object_r:polaris_chasfs_boottime_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarischasfs.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
/tmp/.CRDU_COMMAND_PIPE gen_context(system_u:object_r:polaris_crdu_pipe_tmp_t,s0)
/tmp/.CRDU_RESPONSE_PIPE gen_context(system_u:object_r:polaris_crdu_pipe_tmp_t,s0)
```

```
/usr/binos/conf/trans_ports_helper.sh -- gen_context(system_u:object_r:polaris_trans_ports_helper_exec_t,s0)
/usr/binos/conf/trans_stats_helper.sh -- gen_context(system_u:object_r:polaris_trans_stats_helper_exec_t,s0)
/usr/binos/conf/mcp_disk_oir.sh -- gen_context(system_u:object_r:polaris_disk_oir_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissmand.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polarissmand, 1.0);
```

```
gen_require(`
    type polaris_smand_t;
    type polaris_smand_exec_t;
`)
```

```
polaris_btrace_data_manage(polaris_smand_t)
polaris_crft_data_manage(polaris_smand_t)
polaris_chasfs_manage(polaris_smand_t)
```

```

polaris_tdlresolve_read(polaris_smand_t)
polaris_tdlldb_list_dirs(polaris_smand_t)
polaris_cpld_read(polaris_smand_t)
polaris_lua_read(polaris_smand_t)
polaris_flashlib_read(polaris_smand_t)

polaris_send_signal_to_bexecute(polaris_smand_t)

polaris_ripc_sman_ui_serv_connect(polaris_smand_t)

polaris_db_tdlldb_dir_use(polaris_smand_t)

type polaris_crdu_pipe_tmp_t;
files_tmp_file(polaris_crdu_pipe_tmp_t)
files_tmp_filetrans(polaris_smand_t, polaris_crdu_pipe_tmp_t, fifo_file, ".CRDU_COMMAND_PIPE")
files_tmp_filetrans(polaris_smand_t, polaris_crdu_pipe_tmp_t, fifo_file, ".CRDU_RESPONSE_PIPE")
polaris_smand_crdu_pipe_manage(polaris_smand_t)

# work with /tmp/sman files
type polaris_smand_tmp_t;
files_tmp_file(polaris_smand_tmp_t)
manage_dirs_pattern(polaris_smand_t, polaris_smand_tmp_t, polaris_smand_tmp_t)
manage_files_pattern(polaris_smand_t, polaris_smand_tmp_t, polaris_smand_tmp_t)
files_tmp_filetrans(polaris_smand_t, polaris_smand_tmp_t, { file dir })

# allow read of /etc/group
auth_use_nsswitch(polaris_smand_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_smand_t)

# allow objstore access
polaris_disk_objstore_read(polaris_smand_t)

# on edison smand shares sysv semaphore with iosd, why sem got initrc_t label
# is not clear.
gen_require(
    type initrc_t;
)
allow polaris_smand_t initrc_t:sem { read write unix_write associate };

# why smand needs all these capability?
allow polaris_smand_t self:capability { dac_override chown fsetid };
allow polaris_smand_t self:capability2 block_suspend;
allow polaris_smand_t self:capability sys_resource;

# on edison smand wants to read /proc/mtd which is proc_t
# type=AVC msg=audit(1478481219.216:6): avc: denied { read } for pid=5410 comm="smand" name="mtd"

```

```

dev="proc" ino=4026535811 scontext=system_u:system_r:polaris_smand_t:s0
tcontext=system_u:object_r:proc_t:s0 tclass=file
# try to drop it latter
kernel_read_system_state(polaris_smand_t)

# on edison silent roll package is still in iso format
# type=AVC msg=audit(1478497356.229:7): avc: denied { getattr } for pid=5816 comm="smand"
path="/tmp/sw/mount/cat3k_caa-srdriver.2016-11-06_21.10_kamensky.SSA.pkg/usr/binos/lib64" dev="loop7"
ino=3456 scontext=system_u:system_r:polaris_smand_t:s0 tcontext=system_u:object_r:iso9660_t:s0 tclass=dir
gen_require(
    type iso9660_t;
    )
allow polaris_smand_t iso9660_t:dir { search getattr };

polaris_dyncfg_tmp_read(polaris_smand_t)

corecmd_exec_shell(polaris_smand_t)

# CLI "Show install issu history" invokes /usr/binos/conf/install_issu_show.py which
# needs /usr/bin/python3(bin file) execution
corecmd_exec_bin(polaris_smand_t)

# smand execute install_show.sh in its own domain need read results
polaris_install_show_tmp_read(polaris_smand_t)

# during boot issu_boottime.sh calls smand to obtain some information
gen_require(
    type unconfined_service_t;
    )
domtrans_pattern(unconfined_service_t, polaris_smand_exec_t, polaris_smand_t)

# system_stats_periodic function from sman/src/fru_stats.c does
# ioctl(fd, SIOCGIFADDR, &ifr); on "system" interface name, which normally
# does not exist in Polaris platforms
kernel_dontaudit_request_load_module(polaris_smand_t)

# system_stats_periodic function from sman/src/fru_stats.c does
# statfs64 for /flash directory
fs_getattr_xattr_fs(polaris_smand_t)
polaris_disk_bootflash_read_lnk(polaris_smand_t)
polaris_disk_bootflash_search(polaris_smand_t)

gen_require(
    type rsync_t;
    )
# upon exec rsync inherits smand's stdout/stderr fifo files
allow rsync_t polaris_smand_t:fifo_file write;

```



```

gen_require(
    type polaris_bshell_t;
)
polaris_chasfs_read(polaris_bshell_t)
polaris_tdlresolve_read(polaris_bshell_t)

# bshell memory logs related
type polaris_memmon_tmp_files_t;
files_tmp_file(polaris_memmon_tmp_files_t)
files_tmp_filetrans(unconfined_service_t, polaris_memmon_tmp_files_t, dir, "memmon_logs")
## give bshell permissions
manage_files_pattern(polaris_bshell_t, polaris_memmon_tmp_files_t, polaris_memmon_tmp_files_t)

# sman needs to access gnmib gnoi images
optional_policy(
polaris_gnmib_gnoi_images_read(polaris_smand_t)
)

# CLI "Show install issu history" access to "/bootflash/.installer/install_issu_history"
# and "/tmp/show_install_output.txt"
polaris_install_engine_domtrans(polaris_smand_t)
polaris_install_show_domtrans(polaris_smand_t)

# xcopy_script gets called for xcopy RPC data model
polaris_xcopy_script_domtrans(polaris_smand_t)

#
=====
=
# "sh ip ports" CLI policies, execute trans_ports_helper.sh script
polaris_utility_domain_template(trans_ports_helper)
# transit into the domain
domtrans_pattern(polaris_smand_t, polaris_trans_ports_helper_exec_t, polaris_trans_ports_helper_t)
#binary tracing fifo_file as standard output
polaris_use_btrace_fifo(polaris_trans_ports_helper_t)
# execute "tail" command
corecmd_exec_bin(polaris_trans_ports_helper_t)
corecmd_exec_shell(polaris_trans_ports_helper_t)
polaris_proc_fd_all_getattr(polaris_trans_ports_helper_t)
# getattr all polaris_domain
domain_getattr_all_domains(polaris_trans_ports_helper_t)
# run mcp_chvrf.sh without transition
polaris_exec_chvrf(polaris_trans_ports_helper_t)
fs_read_nsfs_files(polaris_trans_ports_helper_t)

# lsof options tcp reads /proc/net/raw
kernel_read_network_state(polaris_trans_ports_helper_t)
# ls access to /proc/3792/fd/6 triggers sys_ptrace capability

```

```

allow polaris_trans_ports_helper_t self:capability { sys_ptrace };

# allow file and directory read and execute permission checks
allow polaris_trans_ports_helper_t self:capability dac_read_search;

# map /etc/passwd
auth_use_nsswitch(polaris_trans_ports_helper_t)

type polaris_trans_ports_tmp_t;
files_tmp_file(polaris_trans_ports_tmp_t)
# create /tmp/trans_ports_tmp and /tmp/trans_ports_result
files_tmp_filetrans(polaris_trans_ports_helper_t, polaris_trans_ports_tmp_t, file, "show_ports_tmp")
files_tmp_filetrans(polaris_trans_ports_helper_t, polaris_trans_ports_tmp_t, file, "show_ports_result")
polaris_trans_ports_tmp_manage(polaris_trans_ports_helper_t)
# smand open and unlinks /tmp/trans_ports_tmp
polaris_trans_ports_tmp_manage(polaris_smand_t)
#
=====
=
# "show platform software kernel ... " CLI executes trans_stats_helper.sh. Need domain
# transition
#
polaris_utility_domain_template(trans_stats_helper)
# transit into the domain
domtrans_pattern(polaris_smand_t, polaris_trans_stats_helper_exec_t, polaris_trans_stats_helper_t)
#binary tracing fifo_file as standard output
polaris_use_btrace_fifo(polaris_trans_stats_helper_t)
#execute lsof in helper script
corecmd_exec_bin(polaris_trans_stats_helper_t)
corecmd_exec_shell(polaris_trans_stats_helper_t)
auth_use_nsswitch(polaris_trans_stats_helper_t)
# lsof reads /proc/*/fd/* attributes
polaris_proc_fd_all_getattr(polaris_trans_stats_helper_t)

# lsof options tcp reads /proc/net/raw
kernel_read_network_state(polaris_trans_stats_helper_t)

# lsof reads /proc/locks
kernel_read_system_state(polaris_trans_stats_helper_t)

# lsof readmnt
fs_read_nsfs_files(polaris_trans_stats_helper_t)

# ls access to /proc/3792/fd/6 triggers sys_ptrace capability
# and dac_read_search as well.
allow polaris_trans_stats_helper_t self:capability { sys_ptrace dac_read_search };

type polaris_trans_stats_tmp_t;

```

```

files_tmp_file(polaris_trans_stats_tmp_t)
# create /tmp/trans_tmp and /tmp/trans_tmp.1 to store lsof output
files_tmp_filetrans(polaris_trans_stats_helper_t, polaris_trans_stats_tmp_t, file, "trans_tmp")
files_tmp_filetrans(polaris_trans_stats_helper_t, polaris_trans_stats_tmp_t, file, "trans_tmp.1")
polaris_trans_stats_tmp_manage(polaris_trans_stats_helper_t)
# smand open and unlinks /tmp/trans_tmp
polaris_trans_stats_tmp_manage(polaris_smand_t)

# run mcp_chvrf.sh without transition
polaris_exec_chvrf(polaris_trans_stats_helper_t)

#
=====
=====
# CLI "request platform hardware filesystem harddisk: offline | online" which runs mcp_disk_oir.sh

polaris_utility_domain_template(disk_oir)
polaris_bexecute_domain(polaris_disk_oir_t, polaris_disk_oir_exec_t)

#execute lsof
corecmd_exec_bin(polaris_disk_oir_t)

# This is a CLI script that access types and /proc/pid/fd/*
polaris_proc_fd_all_getattr(polaris_disk_oir_t)

# access sysctl_rpc_t
kernel_read_rpc_sysctls(polaris_disk_oir_t)

# reads /proc/net/*
kernel_read_network_state(polaris_disk_oir_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_disk_oir_t)

# lsof readmnt
fs_read_nsfs_files(polaris_disk_oir_t)

#inherits stdin/stdout of pty opened by telnetd
telnet_use_ptys(polaris_disk_oir_t)

allow polaris_disk_oir_t self:capability { dac_read_search sys_nice sys_rawio };
allow polaris_disk_oir_t self:process { setfscreate setsched };

# execute lvm commands
lvm_domtrans(polaris_disk_oir_t)

# "lsof -nP" read /dev/sda1 (/csl_p_0) and other operations when disk is destroyed.
storage_manage_fixed_disk(polaris_disk_oir_t)

```

```

# access /tmp/chassis/cpld/chasfs
polaris_chasfs_read(polaris_disk_oir_t)

#cat /tmp/chassis/cpld/chasfs/platform_type'
polaris_cpld_read(polaris_disk_oir_t)

#'/bin/rm -rf /tmp/udev/etc/udev/harddisk'
fs_getattr_tmpfs(polaris_disk_oir_t)

# access /tmp/udev/etc/udev/harddisk'
polaris_udev_tmp_manage(polaris_disk_oir_t)

# /bin/mkdir -p /tmp/udev_cache/harddisk
files_tmp_filetrans(polaris_disk_oir_t, polaris_udev_tmp_files_t, dir, "udev_cache")

# systemctl start handle_mount@vol-harddisk.service, communicate with systemd
systemd_exec_systemctl(polaris_disk_oir_t)
# mount /dev/harddisk1 /vol/harddisk
mount_domtrans(polaris_disk_oir_t)

# read /proc/cmdline
kernel_read_all_proc(polaris_disk_oir_t)

# system service start/stop: /lib/systemd/system/handle_mount@.service
systemd_config_generic_services(polaris_disk_oir_t)

# /sbin/hdparm -S 0 /dev/sdb, execute hdparm in its own domain
fstools_domtrans(polaris_disk_oir_t)

ifdef(^crankshaft_family',`
    gen_require(`
        type device_t;
        type udev_t;
    `)
    filetrans_pattern( {udev_t polaris_disk_oir_t}, device_t, fixed_disk_device_t, lnk_file, "harddisk")
    filetrans_pattern( {udev_t polaris_disk_oir_t}, device_t, fixed_disk_device_t, lnk_file, "harddisk1")
    manage_lnk_files_pattern(polaris_disk_oir_t, fixed_disk_device_t, fixed_disk_device_t)
    # /dev/harddisk may be labeled with device_t. The "unlink" AVC denial will be fixed when it is labeled correctly

# allow /bin/dd to access /dev/nvme in blk_file
dev_nvme_blk_files_manage(polaris_disk_oir_t)

# allow /bin/cat to access /tmp/nim_xxd_present
gen_require(`
    type polaris_cmrp_nim_xxd_tmp_t;
` )
read_files_pattern(polaris_disk_oir_t, polaris_cmrp_nim_xxd_tmp_t, polaris_cmrp_nim_xxd_tmp_t)

```

)

#watches of /tmp/[rp|fp|cc]/pvp/process\_state directory  
polaris\_process\_state\_watch(polaris\_smand\_t)

```
ifdef(`petra_platform',`  
#allow access to polaris_cm_rp sem  
polaris_cm_rp_sem_use(polaris_smand_t)  
#allow access to /flash12/moncfg/cfg.dat  
polaris_swipedrive_file_manage(polaris_smand_t)  
#allow access to /flash6/moncfg/cfg.dat  
polaris_nvram_read(polaris_smand_t)  
)  
dmesg_domtrans(polaris_smand_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissmand.te  
No license file was found, but licenses were detected in source scan.

```
#  
# July 2017, Victor Kamensky  
#  
# Copyright (c) 2017-2019 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
# pci rescan shm file  
/dev/shm/rescan_shm          gen_context(system_u:object_r:polaris_cm_cc_tmpfs_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismcc.fc  
No license file was found, but licenses were detected in source scan.

```
#  
# August 2017, Shawn Lu  
#  
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# All rights reserved  
#
```

```
## <summary>Polaris mobilityd Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismobilityd.if  
No license file was found, but licenses were detected in source scan.

```
#
```

```

# September 2018, Anubha Balani
#
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#

policy_module(polarismemory, 1.0);

#####
# Polaris memory: libmaroon and such
#####

attribute polaris_maroon_data_domain;

type polaris_maroon_base_t;
files_type(polaris_maroon_base_t)

typeattribute polaris_maroon_base_t polaris_maroon_data_domain;

gen_require(
    attribute polaris_extended_domain;
)

files_tmp_filetrans(polaris_extended_domain, polaris_maroon_base_t, dir, "maroon_stats")

type polaris_zram_device_t;
dev_node(polaris_zram_device_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismemory.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

# polarisemd file contexts place holder

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisemd.fc
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#

```

```

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#

## <summary>Polaris nif_mgr Policy Rules.</summary>

#####

## <summary>
##   Use /tmp/sv directory and files. Currently this acts as a
##   chasfs root for information shared between the nif manager
##   and the fed.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_sv_tmp_use`,`
  gen_require(`
    type polaris_sv_tmp_t;
    type tmp_t;
  `)

  manage_dirs_pattern($1, tmp_t, polaris_sv_tmp_t)
  manage_files_pattern($1, polaris_sv_tmp_t, polaris_sv_tmp_t)
  allow $1 polaris_sv_tmp_t:dir watch;
)

#####

## <summary>
##   This is to allow creation and write to
##   doppler_sesa file under proc
##
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_proc_sesa_create_write`,`
  gen_require(`
    type polaris_proc_sesa_t;
  `)

  setattr_files_pattern($1, polaris_proc_sesa_t, polaris_proc_sesa_t)
  rw_files_pattern($1, polaris_proc_sesa_t, polaris_proc_sesa_t)
)

```

')

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnifmgr.if

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

/usr/binos/conf/btdecode -- gen\_context(system\_u:object\_r:polaris\_btdecode\_exec\_t,s0)

/usr/binos/conf/bttail -- gen\_context(system\_u:object\_r:polaris\_btdecode\_exec\_t,s0)

/usr/binos/conf/mcp\_trace\_filter.sh -- gen\_context(system\_u:object\_r:polaris\_trace\_filter\_exec\_t,s0)

/usr/binos/conf/mcp\_trace\_request.sh -- gen\_context(system\_u:object\_r:polaris\_trace\_request\_exec\_t,s0)

/usr/binos/bin/create\_luid\_file\_db -- gen\_context(system\_u:object\_r:polaris\_create\_ldb\_exec\_t,s0)

/tmp/btrace\_luids\_file.cdb.tmp -- gen\_context(system\_u:object\_r:polaris\_ldb\_tmp\_t,s0)

/tmp/btrace\_luids\_file.cdb -- gen\_context(system\_u:object\_r:polaris\_ldb\_tmp\_t,s0)

/tmp/cc/0/trace(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_base\_t,s0)

/tmp/cc/0/trace/fifo(/.\*)? gen\_context(system\_u:object\_r:polaris\_fifo\_stdout\_base\_t,s0)

/tmp/fp/trace(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_base\_t,s0)

/tmp/fp/trace/fifo gen\_context(system\_u:object\_r:polaris\_fifo\_stdout\_base\_t,s0)

/tmp/fp/trace/fifo(/.\*)? gen\_context(system\_u:object\_r:polaris\_fifo\_stdout\_t,s0)

/tmp/rp/trace(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_base\_t,s0)

/tmp/rp/trace/fifo gen\_context(system\_u:object\_r:polaris\_fifo\_stdout\_base\_t,s0)

/tmp/rp/trace/fifo(/.\*)? gen\_context(system\_u:object\_r:polaris\_fifo\_stdout\_t,s0)

/dev/shm/sem\,uuid\_sem gen\_context(system\_u:object\_r:polaris\_btrace\_tmpfs\_t,s0)

/dev/shm/oper\_uuid\_shm gen\_context(system\_u:object\_r:polaris\_btrace\_tmpfs\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtrace.fc

No license file was found, but licenses were detected in source scan.

#

# September 2017, Victor Kamensky

#

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#

# polarisunconfined file contexts place holder

Found in path(s):



\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisunconfined.fc

No license file was found, but licenses were detected in source scan.

#

# February 2020, Victor Kamensky

#

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#

policy\_module(polarisdbgd, 1.0);

gen\_require(`

type polaris\_dbgd\_t;

`)

polaris\_chasfs\_read(polaris\_dbgd\_t)

polaris\_tdlresolve\_read(polaris\_dbgd\_t)

polaris\_cpld\_read(polaris\_dbgd\_t)

logging\_send\_syslog\_msg(polaris\_dbgd\_t)

# vconfd\_load\_shared\_schemas

polaris\_confid\_shared\_schema\_read(polaris\_dbgd\_t)

# /var/run/.dbgd socket and pid

type polaris\_dbgd\_var\_run\_t;

files\_pid\_file(polaris\_dbgd\_var\_run\_t)

manage\_files\_pattern(polaris\_dbgd\_t, polaris\_dbgd\_var\_run\_t, polaris\_dbgd\_var\_run\_t)

manage\_sock\_files\_pattern(polaris\_dbgd\_t, polaris\_dbgd\_var\_run\_t, polaris\_dbgd\_var\_run\_t)

files\_pid\_filetrans(polaris\_dbgd\_t, polaris\_dbgd\_var\_run\_t, { file sock\_file })

polaris\_vdaemon\_var\_sock\_write(polaris\_dbgd\_t)

# dbgd may create vrf-based netns on demand

polaris\_vrf\_netns\_manage(polaris\_dbgd\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdbgd.te

No license file was found, but licenses were detected in source scan.

#

# March 2020, Victor Kamensky

#

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#

## <summary>Polaris JVM Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisjvm.if

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Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisinstall.te

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristws.te

No license file was found, but licenses were detected in source scan.

#

# December 2018, Victor Kamensky

#

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#

policy\_module(polarisezmancc, 1.0);

gen\_require(`

type polaris\_ezman\_cc\_t;

`)

polaris\_chasfs\_read(polaris\_ezman\_cc\_t)

polaris\_cpld\_read(polaris\_ezman\_cc\_t)

polaris\_tdlresolve\_read(polaris\_ezman\_cc\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_ezman\_cc\_t)

allow polaris\_ezman\_cc\_t self:capability dac\_override;

polaris\_oob\_evfc\_dev\_use(polaris\_ezman\_cc\_t)

# LOOK AT ME by some reason relabeling of /dev/ezlkm

# device files does not work

dev\_rw\_generic\_chr\_files(polaris\_ezman\_cc\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisezmancc.te

No license file was found, but licenses were detected in source scan.

#

# Oct 2020, Xin Xiang

#

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#

```
policy_module(polarisdoppler, 1.0);
```

```
# doppler interrupt device  
type polaris_dplr_device_t;  
dev_node(polaris_dplr_device_t)
```

```
# dma mmap device  
type polaris_dmammap_device_t;  
dev_node(polaris_dmammap_device_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdoppler.te
```

No license file was found, but licenses were detected in source scan.

```
#  
# Nov 2020, Swati Kumari  
#  
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#
```

```
## <summary>Polaris PTPD Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/blzi_fpga
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_blzi_dev_use',`
```

```
gen_require(`
```

```
type device_t;
```

```
type polaris_blzi_device_t;
```

```
`)
```

```
write_chr_files_pattern($1, device_t, polaris_blzi_device_t)
```

```
read_chr_files_pattern($1, device_t, polaris_blzi_device_t)
```

```
allow $1 polaris_blzi_device_t:chr_file map;
```

```
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisptpdrp.if
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#

## <summary>Polaris cpp_cp Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppcp.if

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polariscppdriver, 1.0);
```

```
gen_require(`
    type polaris_cpp_driver_t;
`)
```

```
polaris_btrace_data_manage(polaris_cpp_driver_t)
polaris_crft_data_manage(polaris_cpp_driver_t)
polaris_chasfs_manage(polaris_cpp_driver_t)
polaris_tdlresolve_read(polaris_cpp_driver_t)
polaris_tdlldb_list_dirs(polaris_cpp_driver_t)
polaris_cpld_read(polaris_cpp_driver_t)
polaris_flashlib_read(polaris_cpp_driver_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_cpp_driver_t)
```

```
polaris_cpp_process(polaris_cpp_driver_t)
polaris_cpp_dev_use(polaris_cpp_driver_t)
```

```
# allow read variety of system information from sysfs
# type=AVC msg=audit(1479601620.503:19): avc: denied { open } for pid=22839 comm="cpp_driver"
path="/sys/devices/system/node/node0/meminfo" dev="sysfs" ino=805
scontext=system_u:system_r:polaris_cpp_driver_t:s0 tcontext=system_u:object_r:sysfs_t:s0 tclass=file
dev_read_sysfs(polaris_cpp_driver_t)
```

```
optional_policy(`
# cpp_driver reads qfp executable to look at .stabs sections that
# contains qfp code fixups, then this fixup data is passed to kernel
```

```

# module to modify qfp code.
gen_require(
    type bin_t;
    type polaris_qfp_exec_t;
)
read_files_pattern(polaris_cpp_driver_t, bin_t, polaris_qfp_exec_t)
)

polaris_icc_broken_relocations(polaris_cpp_driver_t)

# work with /dev/i2c devices
polaris_i2c_use(polaris_cpp_driver_t)

polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_driver_t)

logging_send_syslog_msg(polaris_cpp_driver_t)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(^crankshaft_family',`
polaris_dev_mem_use(polaris_cpp_driver_t)
)

# allow access to /tmp/octeon-remote-lock-pci***
# This is required as part of cpp_driver access of octeon chip.
# As part of the init, call is made to octeon_remote_lock()
# which requires access to the /tmp file.
#ifdef(^crankshaft_family',`
polaris_cm_fp_tmp_filetrans(polaris_cpp_driver_t)
polaris_cm_fp_tmp_manage(polaris_cpp_driver_t)
)

# LOOK AT ME on overload cpp_driver needs access to /dev/cavium_e
# and /dev/pcie0 devices, on 1ng cpp_driver needs access to
# /dev/yoda0_tree2, etc
dev_rw_generic_chr_files(polaris_cpp_driver_t)

# /dev/cpp_il on qwlc
optional_policy(
polaris_cpp_il_dev_use(polaris_cpp_driver_t)
)

#ifdef(^qwlc_platform',`
polaris_cpld_dev_use(polaris_cpp_driver_t)
)

#ifdef(^katar_platform',`
polaris_cpld_dev_use(polaris_cpp_driver_t)
)

```

```
)

ifdef(`mcp_family',`
polaris_cpld_dev_use(polaris_cpp_driver_t)
`)

optional_policy(`
polaris_cpp_htdp_dev_use(polaris_cpp_driver_t)
polaris_cbdma_dev_use(polaris_cpp_driver_t)
polaris_cpp_htdp_dev_use(polaris_cpp_driver_t)
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppdriver.te

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```
#
# August 2017, Shawn Lu
#
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#
```

```
## <summary>Polaris odm_proxy Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisodmproxy.if

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisbtrace, 1.0);
```

```
#####
```

```
# Btrace policy
```

```
#####
```

```
gen_require(`
    attribute domain;
    attribute polaris_extended_domain;
    attribute unconfined_domain_type;
`)
```

```
# persistent btrace files stored under btrace_data
```

```

type polaris_btrace_data_t;
files_type(polaris_btrace_data_t)

# allow btrace data file reside on persistent storage
polaris_pfile_type(polaris_btrace_data_t)

type polaris_fifo_stdout_t;
files_type(polaris_fifo_stdout_t)

type polaris_fifo_stdout_base_t;
files_type(polaris_fifo_stdout_base_t)

attribute polaris_btrace_data_domain;

type polaris_btrace_base_t;
files_type(polaris_btrace_base_t)

typeattribute polaris_btrace_base_t polaris_btrace_data_domain;
typeattribute polaris_btrace_data_t polaris_btrace_data_domain;

# is "trace" in tmp_t specific enough? Maybe we would need to change it in polaris
files_tmp_filetrans(polaris_extended_domain, polaris_btrace_base_t, dir, "trace")
# udev -> cat9k-ssd.mount -> unifiedfs_rsync_udev.sh -> btrace.sh might also create this dir
files_tmp_filetrans(udev_t, polaris_btrace_base_t, dir, "trace")

gen_require(
    attribute polaris_extended_domain;
    type polaris_pvp_tmp_t;
)
filetrans_pattern(polaris_extended_domain, polaris_pvp_tmp_t, polaris_btrace_base_t, dir, "trace")

# filetrans_pattern(polaris_extended_domain, polaris_btrace_base_t, polaris_fifo_stdout_base_t, dir, "fifo")
filetrans_pattern(domain, polaris_btrace_base_t, polaris_fifo_stdout_base_t, dir, "fifo")
filetrans_pattern(domain, polaris_fifo_stdout_base_t, polaris_fifo_stdout_t, fifo_file)
manage_dirs_pattern(polaris_extended_domain, polaris_btrace_base_t, polaris_fifo_stdout_base_t)

polaris_utility_domain_template(btdecode)

# any polaris process except iosd can execve btdecode utility to decode its own traces
gen_require(
    attribute polaris_domain;
    type polaris_iosd_t;
)
domtrans_pattern(polaris_domain - polaris_iosd_t, polaris_btdecode_exec_t, polaris_btdecode_t)
corecmd_check_exec_shell(polaris_domain - polaris_iosd_t)

# btdecode not only reads btrace files, but also creates copy of the file

```

```

polaris_btrace_data_manage_all(polaris_btdecode_t)
polaris_btrace_persistent_data_manage(polaris_btdecode_t)

polaris_use_btrace_fifo(polaris_btdecode_t)
polaris_tdlresolve_read(polaris_btdecode_t)
polaris_boot_tmp_read(polaris_btdecode_t)
polaris_lua_read(polaris_btdecode_t)
polaris_chasfs_read(polaris_btdecode_t)
polaris_cpld_read(polaris_btdecode_t)
polaris_bootflash_manage(polaris_btdecode_t)

# lua files need to read executables to retrieve btrace meta informations
files_mmap_all_files(polaris_btdecode_t)

# could be called on trace files on persistent storage
polaris_persistent_read(polaris_btdecode_t)

# need to read executables to retrieve btrace meta informations
polaris_read_exec_domain(polaris_btdecode_t)

corecmd_exec_bin(polaris_btdecode_t)
corecmd_exec_shell(polaris_btdecode_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_btdecode_t)

# executes luajit
allow polaris_btdecode_t self:process execmem;

# tmp files created by /lua/btdecode.lua in /tmp
type polaris_btdecode_tmp_t;
files_tmp_file(polaris_btdecode_tmp_t)
files_tmp_filetrans(polaris_btdecode_t, polaris_btdecode_tmp_t, file)
manage_files_pattern(polaris_btdecode_t, polaris_btdecode_tmp_t, polaris_btdecode_tmp_t)

# /lua/btdecode.lua may call create_luid_file_db on demand
polaris_create_ldb_domtrans(polaris_btdecode_t)

# in some cases it runs with telnet /dev/ptyN as stdin/stdout
# example when executed on other node, or "monitor log profile"
# command
telnet_use_ptys(polaris_btdecode_t)

# Allow btdecode to read/write /dev/pts/*
term_use_generic_ptys(polaris_btdecode_t)

polaris_btrace_ldb_tmp_read(polaris_btdecode_t)

```



```

# Allow btdecode to watch over /bootflash/tracelogs, /vol/harddisk/tarcelogs and /flash2/CRASH/tracelogs
polaris_btrace_data_watch(polaris_btdecode_t)

# Allow btdecode to watch over /usr/binos/conf
files_watch_usr_dirs(polaris_btdecode_t)

#Allow btdecode to access UFS mounted directories for other members
optional_policy(
polaris_ncd_tmp_read(polaris_btdecode_t)
)

# btrace_rotate calls ftw function through create_luid_file_db utility
# that walks whole file tree in order to create btrace_luids_file.cdb
# let's have separate domain for this utility
polaris_utility_domain_template(create_ldb)

files_read_all_files(polaris_create_ldb_t)
files_getattr_all_dirs(polaris_create_ldb_t)
files_read_all_symlinks(polaris_create_ldb_t)
files_list_non_security(polaris_create_ldb_t)
files_dontaudit_list_security_dirs(polaris_create_ldb_t)
files_mmap_all_files(polaris_create_ldb_t)

# allow luid database scripts to read/write /dev/pts/*
term_use_generic_ptys(polaris_create_ldb_t)

# creates files like btrace_luids_file.cdb_20170907160108.tmp, btrace_luids_file.cdb
type polaris_ldb_tmp_t;
files_tmp_file(polaris_ldb_tmp_t)
files_tmp_filetrans(polaris_create_ldb_t, polaris_ldb_tmp_t, file)
files_tmp_filetrans(polaris_btdecode_t, polaris_ldb_tmp_t, file, "btrace_luids_file.cdb")
manage_files_pattern(polaris_create_ldb_t, polaris_ldb_tmp_t, polaris_ldb_tmp_t)
mmap_files_pattern(polaris_create_ldb_t, polaris_create_ldb_t, polaris_create_ldb_t)
polaris_use_btrace_fifo(polaris_create_ldb_t)

# in some cases it runs with telnet /dev/ptyN as stdin/stdout
# example when executed on other node, or "monitor log profile"
# command
telnet_use_ptys(polaris_create_ldb_t)

# Allowing permission to read/open/getattr/ on
# /tmp/sw/mount/*universalk9.*.SSA.pkg/usr/binos/sbin/in.telnetd
gen_require(
    type telnetd_exec_t;
)
allow polaris_btdecode_t telnetd_exec_t:file { getattr open read };

#####

```

```

# CLI: show platform software trace filter-binary wired
# invokes.../bin/sh /usr/bin/os/conf/mcp_trace_filter.sh --binary wired
#####

polaris_utility_domain_template(trace_filter)

polaris_bexecute_domtrans(polaris_trace_filter_t)
polaris_bexecute_domain(polaris_trace_filter_t, polaris_trace_filter_exec_t)
# mcp_trace_filter.sh runs with telnet /dev/ptyN as
# stdin/stdout if on standby
telnet_use_ptys(polaris_trace_filter_t)

# script starts rsync with mcp_chvrf.sh
polaris_chvrf_domtrans(polaris_trace_filter_t)

allow polaris_trace_filter_t self:capability { dac_override sys_resource };

# access /tmp/sw/boot/pkginfo
# awk -v what=^.BuildPath: $pkginfo_file ~ what { print $2 } /tmp/sw/boot/pkginfo
polaris_boot_tmp_read(polaris_trace_filter_t)

polaris_chasfs_read(polaris_trace_filter_t)
polaris_disk_bootflash_read_lnk(polaris_trace_filter_t)
polaris_disk_crashinfo_getattr(polaris_trace_filter_t)
polaris_bootflash_manage(polaris_trace_filter_t)
polaris_use_btman_fifo(polaris_trace_filter_t)
polaris_use_btrace_fifo(polaris_trace_filter_t)
polaris_smand_use_fifo(polaris_trace_filter_t)
polaris_cpld_read(polaris_trace_filter_t)
polaris_tdlb_list_dirs(polaris_trace_filter_t)
polaris_disk_hddisk_read_lnk(polaris_trace_filter_t)
kernel_read_system_state(polaris_trace_filter_t)

# read /proc/rmonbifo files such as env_var.sh
polaris_rmonbifo_tmp_read(polaris_trace_filter_t)

# df on "/" needs fs_t.filesystem getattr
fs_getattr_xattr_fs(polaris_trace_filter_t)

#Allow mcp_trace_request.sh to access UFS mounted directories for other members
optional_policy(`
polaris_ncd_tmp_read(polaris_trace_filter_t)
`)

# allow creation/access of temporary files created by bash such as
# /tmp/sh-thd-1499428203 etc
type polaris_trace_filter_tmp_t;
files_tmp_file(polaris_trace_filter_tmp_t)

```

```

files_tmp_filetrans(polaris_trace_filter_t, polaris_trace_filter_tmp_t, file)
manage_files_pattern(polaris_trace_filter_t, polaris_trace_filter_tmp_t, polaris_trace_filter_tmp_t)

# mcp_trace_filter.sh invokes: "df /tmp/rp/tlddb" and "df /dev/shm"
fs_getattr_tmpfs(polaris_trace_filter_t)

# allow accesses to polaris lua files
polaris_lua_read(polaris_trace_filter_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_trace_filter_t)

corecmd_exec_bin(polaris_trace_filter_t)

# why does btrace show command needs to write into btrace state?
polaris_btrace_data_manage_all(polaris_trace_filter_t)
polaris_btrace_persistent_data_manage(polaris_trace_filter_t)

# Allow mcp_trace_request.sh to access NFS mounted directories for other members
# such as /tmp/ufs/harddisk/10.130.1.0
fs_getattr_nfs(polaris_trace_filter_t)

#####
# CLI: monitor log profile <iwan | wireless | wired ..>
#  invokes.../bin/sh /usr/binos/conf/mcp_trace_request.sh --operation monitor
#####

polaris_utility_domain_template(trace_request)

polaris_bexecute_domtrans(polaris_trace_request_t)
polaris_bexecute_domain(polaris_trace_request_t, polaris_trace_request_exec_t)

# Provide sys_resource capability for sys_pipe calls
allow polaris_trace_request_t self:capability sys_resource;

polaris_cpld_read(polaris_trace_request_t)
polaris_disk_crashinfo_getattr(polaris_trace_request_t)
polaris_disk_bootflash_read_lnk(polaris_trace_request_t)
polaris_disk_harddisk_read_lnk(polaris_trace_request_t)
polaris_chasfs_manage(polaris_trace_request_t)

fs_getattr_xattr_fs(polaris_trace_request_t)

# can execute hostname
hostname_exec(polaris_trace_request_t)

# can execute dmesg
dmesg_domtrans(polaris_trace_request_t)

```

```

# creates archives under /crashinfo
polaris_disk_crashinfo_manage(polaris_trace_request_t)

# can tar logs to persistent all file systems (including removable file systems)
polaris_persistent_manage(polaris_trace_request_t)
polaris_removable_manage(polaris_trace_request_t)

# read and write all btrace fifo file as standard input/output.
polaris_use_btrace_fifo(polaris_trace_request_t)

# read /proc/rmbonbifo files such as env_var.sh
polaris_rmonbifo_tmp_read(polaris_trace_request_t)

# copies /tmp/silent_roll_select.log into /crashinfo so that it can be tar'd into an
# archive
polaris_pvp_read_tmp_files(polaris_trace_request_t)

# read /tmp/sw/boot/base_pkg
polaris_boot_tmp_read(polaris_trace_request_t)

# in some cases mcp_trace_request.sh runs with telnet /dev/ptyN as
# stdin/stdout
telnet_use_ptys(polaris_trace_request_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_trace_request_t)

# read /proc/cmdline
kernel_read_system_state(polaris_trace_request_t)

corecmd_exec_bin(polaris_trace_request_t)

#ifdef(^ngwc_family',`
optional_policy(`
polaris_ncd_tmp_read(polaris_trace_request_t)
`)
`)

# mcp_trace_request.sh can read all btrace files both in temp storage
# as well as in persistent storage
polaris_btrace_data_manage_all(polaris_trace_request_t)
polaris_btrace_persistent_data_manage(polaris_trace_request_t)

# Allow mcp_trace_request.sh to create and manage temporary files under /tmp
# such as /tmp/mtr_cntrl
type polaris_trace_request_tmp_t;
files_tmp_file(polaris_trace_request_tmp_t)

```

```

files_tmp_filetrans(polaris_trace_request_t, polaris_trace_request_tmp_t, file)
manage_files_pattern(polaris_trace_request_t, polaris_trace_request_tmp_t, polaris_trace_request_tmp_t)

# Allow mcp_trace_request.sh to access NFS mounted directories for other members
# such as /tmp/ufs/crashinfo/10.1.1.1
fs_getattr_nfs(polaris_trace_request_t)

# mcp_trace_request.sh invokes dmesg, which runs in dmesg_t domain needs access
# to btrace data store
gen_require(`
    type dmesg_t;
`)
polaris_btrace_persistent_data_manage(dmesg_t)
# dmesg invocation in case of disk being full,
# results in writing to area of disk that
# requires the sys_resource capability.
allow dmesg_t self:capability sys_resource;

# Set /tmp/udev_ng4k.vbd.log to be under polaris_udev_tmp_files_t label
gen_require(`
    type udev_t;
    type polaris_udev_tmp_files_t;
    type init_t;
`)
files_tmp_filetrans(udev_t, polaris_udev_tmp_files_t, file, "udev_ng4k.vbd.log")
fs_tmpfs_filetrans(udev_t, polaris_udev_tmp_files_t, file, "udev_ng4k.vbd.log")
files_tmp_filetrans(init_t, polaris_udev_tmp_files_t, file, "udev_ng4k.vbd.log")
fs_tmpfs_filetrans(init_t, polaris_udev_tmp_files_t, file, "udev_ng4k.vbd.log")

# Add permission for mcp_trace_request to access polaris_udev_tmp_files_t files
polaris_udev_tmp_manage(polaris_trace_request_t)

# Allow ls /tmp/ufs/harddisk
optional_policy(`
polaris_ncd_tmp_read(polaris_trace_request_t)
`)

#Allow mcp_trace_request to get tmpfs attributes
fs_getattr_tmpfs(polaris_trace_request_t)

#allow mcp_trace_request to execute tar
allow polaris_trace_request_t self:capability { chown fowner fsetid };

#####

type polaris_btrace_tmpfs_t;
files_tmpfs_file(polaris_btrace_tmpfs_t)

```

```

# btrace semaphore created by systemd-tmpfiles needs map permission
gen_require(
    type systemd_tmpfiles_t;
)
mmap_files_pattern(systemd_tmpfiles_t, polaris_btrace_tmpfs_t, polaris_btrace_tmpfs_t)

# Allow polaris processes to manage level config files in tracelogs persistent
# directory like /bootflash/tracelogs/level_config
type polaris_btrace_lvl_config_t;
files_type(polaris_btrace_lvl_config_t)
gen_require(
    attribute polaris_domain;
)
polaris_btrace_lvl_config_manage(polaris_domain)

optional_policy(
    polaris_cedge_tanman_tmp_manage(polaris_btdecode_t)
)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbtrace.te
No license file was found, but licenses were detected in source scan.

```

```

#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#

/usr/binos/conf/psvp.sh -- gen_context(system_u:object_r:polaris_psvp_exec_t,s0)

/tmp/rp/psvp      -d gen_context(system_u:object_r:polaris_psvp_tmp_t,s0)
/tmp/rp/psvp/inot_fifo  -p gen_context(system_u:object_r:polaris_psvp_tmp_t,s0)
/tmp/rp/psvp/pvp\pid  -- gen_context(system_u:object_r:polaris_psvp_tmp_t,s0)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispsvp.fc
No license file was found, but licenses were detected in source scan.

```

```

#
# July 2017, Victor Kamensky
#
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#

```

```

policy_module(polarisbexecute, 1.0);

```

polaris\_utility\_domain\_template(bexecute)

polaris\_utility\_domain\_template(chvrf)

polaris\_bexecute\_domtrans(polaris\_chvrf\_t)

polaris\_chvrf\_domtrans(polaris\_bexecute\_t)

polaris\_ngio\_module\_session\_domtrans(polaris\_bexecute\_t)

polaris\_rom\_upgrade\_use\_fifo(polaris\_chvrf\_t)

#####

# bexecute

#####

corecmd\_exec\_bin(polaris\_bexecute\_t)

# allow read of /etc/passwd

auth\_use\_nsswitch(polaris\_bexecute\_t)

dev\_setattr\_null\_dev(polaris\_bexecute\_t)

polaris\_btrace\_data\_manage(polaris\_bexecute\_t)

polaris\_crft\_data\_manage(polaris\_bexecute\_t)

polaris\_chasfs\_manage(polaris\_bexecute\_t)

polaris\_cpld\_read(polaris\_bexecute\_t)

polaris\_boot\_tmp\_read(polaris\_bexecute\_t)

polaris\_rmonbifo\_tmp\_read(polaris\_bexecute\_t)

polaris\_proc\_rmonbifo\_read(polaris\_bexecute\_t)

polaris\_dyncfg\_tmp\_read(polaris\_bexecute\_t)

polaris\_read\_debug\_conf(polaris\_bexecute\_t)

polaris\_tdlld\_list\_dirs(polaris\_bexecute\_t)

polaris\_disk\_bootflash\_read\_lnk(polaris\_bexecute\_t)

polaris\_disk\_harddisk\_read\_lnk(polaris\_bexecute\_t)

# open/read /tmp/sw/rp/max\_elastic\_bays

polaris\_pvp\_read\_tmp\_files(polaris\_bexecute\_t)

# search/getattr of /tmp/udev/etc/udev

polaris\_udev\_tmp\_list\_dirs(polaris\_bexecute\_t)

# manage files in /tmp/pman\_ports

polaris\_pman\_manage\_tmp\_files(polaris\_bexecute\_t)

# brelay.sh does rm -rf of "/tmp/pman\_ports/gdbport/9910"

# This checks tmpfs file system attributes

#

# Denial is observed after "show platform software audit summary"

# which uses brelay to trigger corresponding audit\_log.sh script

```

fs_getattr_tmpfs(polaris_bexecute_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_bexecute_t)

# follow /tftp/inv symlink to /tmp/chassis/local/rp/chasfs/inventory
gen_require(
    type tftpd_dir_rw_t;
)
read_inlink_files_pattern(polaris_bexecute_t, tftpd_dir_rw_t, tftpd_dir_rw_t)

# tries to do mkdir -p /tmp/rp/lipc, but it should exist already so
# getattr should be sufficient
polaris_lipc_getattr(polaris_bexecute_t)

# read /proc/cmdline
kernel_read_system_state(polaris_bexecute_t)

# binary tracing fifo_file as standard output
polaris_use_btrace_fifo(polaris_bexecute_t)

# write into pipe that smand created for us with popen
polaris_smand_use_fifo(polaris_bexecute_t)

allow polaris_bexecute_t self:capability { chown setgid setuid fowner net_admin };
allow polaris_bexecute_t self:process { setpgid setcap };

# temporary files created by bexecute like /tmp/get_status_type_pkg_list.rp-1-0-0.20170707094059.out.log
type polaris_bexecute_tmp_t;
files_tmp_file(polaris_bexecute_tmp_t)
files_tmp_filetrans(polaris_bexecute_t, polaris_bexecute_tmp_t, file)
manage_files_pattern(polaris_bexecute_t, polaris_bexecute_tmp_t, polaris_bexecute_tmp_t)

# smand calls many commands through bexec.sh
polaris_smand_domain(polaris_bexecute_t, polaris_bexecute_exec_t)

# hman invokes cpp_shm_mgr_info_show.sh which in turn invokes "mktemp -p /tmp/tmppub..."
polaris_btrace_tmppub_manage(polaris_bexecute_t)

ifdef(^nyquist_platform',`
term_use_unallocated_ttys(polaris_bexecute_t)
term_setattr_unallocated_ttys(polaris_bexecute_t)
`)

ifdef(^radium_platform',`
polaris_load_usbnet_domtrans(polaris_bexecute_t)

# allow /usr/binos/conf/bexecute.sh for tcp_socket access

```



```

# due to "/bin/sh /usr/binos/conf/mcp_chvrf.sh eobc
# /usr/binos/conf/bexecute.sh -c /usr/binos/conf/module_direct.py
# 0 bp0 PROMETHIUM-L"
gen_require(`
    type polaris_cm_rp_t;
`)
allow polaris_chvrf_t polaris_cm_rp_t:tcp_socket ioctl;

# allow /usr/binos/conf/bexecute.sh for tcp_socket access
# due to "/bin/sh /usr/binos/conf/mcp_chvrf.sh eobc
# /usr/binos/conf/bexecute.sh -c /bin/mcp_pkg_wrap rp_daemons
# /usr/binos/conf/execute_co"
gen_require(`
    type polaris_dmi_ncsshd_fwd_t;
`)
allow polaris_chvrf_t polaris_dmi_ncsshd_fwd_t:tcp_socket ioctl;
)

ifdef(`sumatra_platform',`
polaris_load_usbnet_domtrans(polaris_bexecute_t)
)

ifdef(`nanook_platform',`
polaris_load_usbnet_domtrans(polaris_bexecute_t)
)

ifdef(`supernova_platform',`
polaris_load_usbnet_domtrans(polaris_bexecute_t)
)
polaris_issu_tmp_files_manage(polaris_bexecute_t)

# Unlike other platforms, quake platform has runin_exec_proc.sh script,
# which is started by xinetd in inetd_t domain,
# and needs to switch to bexecute domain.
# In turn, runin_exec_proc.sh then starts in.telnetd process which needs
# to run in telnetd_t domain, for the existing policies to do the rest.
ifdef(`quake_platform',`
gen_require(`
    type inetd_t;
    type telnetd_t;
    type telnetd_exec_t;
`)
polaris_bexecute_domtrans(inetd_t)
polaris_bexecute_domain(telnetd_t, telnetd_exec_t)
)

#####
# chvrf

```

```
#####
```

```
corecmd_exec_bin(polaris_chvrf_t)
```

```
# allow read of /etc/passwd
```

```
auth_use_nsswitch(polaris_chvrf_t)
```

```
# read polaris vrf net namespace file(s) /var/run/netns/0
```

```
fs_read_nsfs_files(polaris_chvrf_t)
```

```
# write into pipe that various binos processes created for us with popen
```

```
polaris_smand_use_fifo(polaris_chvrf_t)
```

```
polaris_hman_use_fifo(polaris_chvrf_t)
```

```
polaris_dmiauthd_use_fifo(polaris_chvrf_t)
```

```
optional_policy(`
```

```
  polaris_cmprp_use_fifo(polaris_chvrf_t)
```

```
`)
```

```
optional_policy(`
```

```
  polaris_dmi_ncsshd_fwd_use_fifo(polaris_chvrf_t)
```

```
`)
```

```
# mcp_chvrf.sh may run into files created by bexecute
```

```
manage_files_pattern(polaris_chvrf_t, polaris_bexecute_tmp_t, polaris_bexecute_tmp_t)
```

```
# init may transition to polaris_chvrf_t - certain systemd units use
```

```
# mcp_chvrf.sh to start services
```

```
gen_require(`
```

```
  type init_t;
```

```
`)
```

```
polaris_chvrf_domtrans(init_t)
```

```
# mcp_chvrf.sh used to start xinetd services
```

```
gen_require(`
```

```
  type inetd_t;
```

```
  type inetd_exec_t;
```

```
`)
```

```
domtrans_pattern(polaris_chvrf_t, inetd_exec_t, inetd_t)
```

```
# in some cases mcp_chvrf needs to write into someone fifo stdout
```

```
# file, i.e when called from ncd.sh script
```

```
polaris_use_btrace_fifo(polaris_chvrf_t)
```

```
sysnet_domtrans_ifconfig(polaris_chvrf_t)
```

```
# during some execve calls chvrf needs list /tmp/etc
```

```
polaris_etc_list(polaris_chvrf_t)
```

```
ifdef(`ngwc_family',`
```

```

# /tmp/rsync_log_dir/rsync_log_XXX is stdout when mcp_chvrf.sh with rsync is called
# also /tmp/etc/installer/inot_fifo file descriptor is leaked from the script
polaris_manage_rsync_tmplog_dir(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_bexecute_t)
')

ifdef(`mcp_family',`
# /tmp/rsync_log_dir/rsync_log_XXX is stdout when mcp_chvrf.sh with rsync is called
# also /tmp/etc/installer/inot_fifo file descriptor is leaked from the script
polaris_manage_rsync_tmplog_dir(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_bexecute_t)
')

ifdef(`wlc_family',`
# /tmp/rsync_log_dir/rsync_log_XXX is stdout when mcp_chvrf.sh with rsync is called
# also /tmp/etc/installer/inot_fifo file descriptor is leaked from the script
polaris_manage_rsync_tmplog_dir(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_chvrf_t)
polaris_autoupgrade_tmp_manage(polaris_bexecute_t)
')

# For "request platform software system shell" CLI, we have:
# /bin/sh /usr/binos/conf/mcp_chvrf.sh eobc /usr/binos/conf/bexecute.sh
# -c /usr/binos/conf/mcp_record_shell.sh
# mcp_chvrf.sh needs read/write access to /dev/pts/1:
# allow polaris_chvrf_t telnetd_devpts_t:chr_file { read write };
telnet_use_ptys(polaris_chvrf_t)

ifdef(`nyquist_platform',`
term_use_unallocated_ttys(polaris_chvrf_t)
')

# some times run with unix_stream_socket as stdin
init_ioctl_stream_sockets(polaris_chvrf_t)

#####
# bexecute and mcp_chvrf.sh called from install_show.sh
#####

polaris_install_show_tmp_write(polaris_bexecute_t)
polaris_install_show_tmp_write(polaris_chvrf_t)

#####
# install_engine.sh uses breelay to re-launch install_engine in all FRUs.
# So, op_rp_switch_to_remote_loc_in_parallel() outputs to install tmp log file;
# check invocation-point for comms_run_on_remote_fru.

```

```

#####
polaris_install_tmp_log_write(polaris_bexecute_t)
polaris_install_tmp_log_write(polaris_chvrf_t)

#####
# CLI: show platform hardware cpp active infrastructure shared-memory all
# this results in hman invoking following chain of shell scrips.
# /bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/cpp_shm_mgr_info_show.sh
# /bin/bash /usr/binos/conf/bexecute.sh -c /usr/binos/conf/cpp_shm_mgr_info_show.sh
# /bin/sh /usr/binos/conf/cpp_shm_mgr_info_show.sh
# /bin/bash /usr/binos/conf/bshell.sh -S -c "show platform hardware qfp active \
# infrastructure shared-memory process cpp-control-process"
# All these are executed in polaris_bexecute_t domain and write access to following lipc
# is needed: /tmp/rp/lipc/shell_mgr_bshell_serv_socket
#####
polaris_sman_bshell_serv_lipc_write(polaris_bexecute_t)
polaris_tdlresolve_read(polaris_bexecute_t)
#####
# This block is policies for "sh pla so process memory r0 name iosd maps" CLI

polaris_utility_domain_template(process_maps)

polaris_bexecute_domain(polaris_process_maps_t, polaris_process_maps_exec_t)

# needs to read maps files.
domain_read_all_domains_state(polaris_process_maps_t)

# "ps" needs read access to /sys/devices/system/cpu/online
# "ps" needs read access to /proc/uptime
dev_read_sysfs(polaris_process_maps_t)
kernel_read_system_state(polaris_process_maps_t)

# need write/ioctl/getattr access for pipes like "pipe:[118396]"
polaris_hman_use_fifo(polaris_process_maps_t)

corecmd_exec_bin(polaris_process_maps_t)
#####
# This block is policies for "request platform software system shell" CLI.
# Eventually, mcp_record_shell.sh is invoked. That needs its own domain.

polaris_utility_domain_template(platform_shell)

polaris_bexecute_domain(polaris_platform_shell_t, polaris_platform_shell_exec_t)
corecmd_exec_bin(polaris_platform_shell_t)
auth_use_nsswitch(polaris_platform_shell_t)

polaris_btrace_persistent_data_manage(polaris_platform_shell_t)
polaris_cpld_read(polaris_platform_shell_t)

```

```

# cyan libraries access /tmp/sw/boot/rmonbifo/boardsubtype
polaris_rmonbifo_tmp_read(polaris_platform_shell_t)

# pglobals.sh accesses /tmp/ufs//crashinfo on cat9k platforms
optional_policy(
polaris_ncd_tmp_read(polaris_platform_shell_t)
')

# mcp_record_shell.sh needs read access to chasfs
polaris_chasfs_read(polaris_platform_shell_t)

# mcp_record_shell.sh needs read access to /dev/pts/0 (telnetd_devpts_t)
telnet_use_ptys(polaris_platform_shell_t)

#  rsync /tmp/system_shell_access_logs/$system_shell_access_log_file
#          rsync://rp0-0/chasfs/etc/system_shell_access_logs/.
gen_require(
    type rsync_t;
    ')
rsync_entry_domtrans(polaris_platform_shell_t, rsync_t)
allow rsync_t polaris_platform_shell_t:process sigchld;
telnet_use_ptys(rsync_t)

logging_send_syslog_msg(polaris_platform_shell_t)
init_list_pid_dirs(polaris_platform_shell_t)

#when reload command is issued, needs "kill" capability
allow polaris_platform_shell_t self:capability kill;

# brelay started from telnetd as result it inherits stdin/stdout of pty opened
# by telnetd
telnet_use_ptys(polaris_bexecute_t)
gen_require(
    type telnetd_devpts_t;
    ')
allow polaris_bexecute_t telnetd_devpts_t:chr_file setattr_chr_file_perms;
allow polaris_bexecute_t self:capability fsetid;

# mcp_record_shell.sh invokes:
# /usr/bin/script -q /harddisk/tracelogs/system_shell_R0*
# - needs access to /root/.bash_history
# - performs chmod on /dev/pts/2 (needs fsetid on self)
# - ioctl/open/read/write on /dev/ptmx
# - needs read/search access to /harddisk/tracelogs
type polaris_bash_tmp_t;
files_type(polaris_bash_tmp_t)
filetrans_pattern(domain, user_home_dir_t, polaris_bash_tmp_t, file, ".bash_history")

```

```

polaris_bash_tmp_manage(polaris_platform_shell_t)
allow polaris_platform_shell_t self:capability fsetid;
term_use_generic_ptys(polaris_platform_shell_t)
term_setattr_generic_ptys(polaris_platform_shell_t)
term_getattr_pty_fs(polaris_platform_shell_t)
term_use_ptmx(polaris_platform_shell_t)
polaris_disk_bootflash_read_lnk(polaris_platform_shell_t)
polaris_disk_harddisk_read_lnk(polaris_platform_shell_t)

# mcp_record_shell.sh invokes:
# mkdir /tmp/system_shell_access_logs
# create /tmp/system_shell_access_logs/SHELL_ACCESSED_*
type polaris_platform_shell_tmp_t;
files_tmp_file(polaris_platform_shell_tmp_t)
files_tmp_filetrans(polaris_platform_shell_t, polaris_platform_shell_tmp_t, dir, "system_shell_access_logs")
files_tmp_filetrans(polaris_platform_shell_t, polaris_platform_shell_tmp_t, file)
manage_dirs_pattern(polaris_platform_shell_t, polaris_platform_shell_tmp_t, polaris_platform_shell_tmp_t)
manage_files_pattern(polaris_platform_shell_t, polaris_platform_shell_tmp_t, polaris_platform_shell_tmp_t)

# read /proc/cmdline
kernel_read_system_state(polaris_platform_shell_t)

# read /tmp/sw/boot/base_pkg
polaris_boot_tmp_read(polaris_platform_shell_t)

polaris_disk_crashinfo_getattr(polaris_platform_shell_t)
#####

polaris_utility_domain_template(shell)

term_use_generic_ptys(polaris_shell_t)

domtrans_pattern(polaris_platform_shell_t, polaris_shell_exec_t, polaris_shell_t)

# reload command needs the following policies to send signal
polaris_send_signal_to_bexecute(polaris_platform_shell_t)
polaris_send_signal_to_shell(polaris_platform_shell_t)

## <desc>
## <p>
## Polaris "request platform system shell" drops into unconfined shell
## </p>
## </desc>
gen_tunable(polaris_dev_shell, true)

tunable_policy(`polaris_dev_shell`,`
    polaris_unconfined_domain(polaris_shell_t)
`)

```

```

polaris_domain_storage_unconfined_type(polaris_shell_t)

# PLEASE LOOK AT ME do we have to many ports open
# btelnet runs under bexecute in case of guest shell console access
# command like app-hosting connect appid guestshell console
allow polaris_bexecute_t self:tcp_socket { connect create setopt };
corenet_tcp_connect_unreserved_ports(polaris_bexecute_t)
sysnet_read_config(polaris_bexecute_t)

# brelay.sh does ls /tmp/ufs//crashinfo on cat9k
allow polaris_bexecute_t self:capability dac_override;
polaris_disk_crashinfo_getattr(polaris_bexecute_t)
optional_policy(`
polaris_ncd_tmp_read(polaris_bexecute_t)
`)

polaris_utility_domain_template(bconsole)

polaris_boot_tmp_read(polaris_bconsole_t)
polaris_btrace_data_manage(polaris_bconsole_t)
polaris_chasfs_read(polaris_bconsole_t)
polaris_cpld_read(polaris_bconsole_t)
polaris_proc_rmonbifo_read(polaris_bconsole_t)
polaris_rmonbifo_tmp_read(polaris_bconsole_t)
polaris_use_btrace_fifo(polaris_bconsole_t)
polaris_show_provision_temp_read(polaris_bconsole_t)

corecmd_exec_bin(polaris_bconsole_t)
polaris_bexecute_domtrans(polaris_bconsole_t)

allow polaris_bconsole_t self:process setrlimit;

# handling /var/run/agetty-iosd.pid
type polaris_bconsole_var_run_t;
files_pid_file(polaris_bconsole_var_run_t)
manage_files_pattern(polaris_bconsole_t, polaris_bconsole_var_run_t, polaris_bconsole_var_run_t)
files_pid_filetrans(polaris_bconsole_t, polaris_bconsole_var_run_t, file, "agetty-iosd.pid")

# access /dev/ttyS0
term_use_unallocated_ttys(polaris_bconsole_t)

auth_use_nsswitch(polaris_bconsole_t)

#####
# This block is policies for
# "request platform software console attach switch standby RO" CLI.
# It invokes usr/bin/os/conf/mcp_console_attach.sh, eventually invoking

```

```

# ioucon binary, to telnet to standby.

polaris_utility_domain_template(mcp_console_attach)
polaris_bexecute_domain(polaris_mcp_console_attach_t, polaris_mcp_console_attach_exec_t)
corecmd_exec_bin(polaris_mcp_console_attach_t)
polaris_bexecute_domtrans(polaris_mcp_console_attach_t)
allow polaris_mcp_console_attach_t self:process setpgid;
polaris_chasfs_read(polaris_mcp_console_attach_t)
telnet_use_ptys(polaris_mcp_console_attach_t)

# working with ioucon binary, invoked by usr/binos/conf/mcp_console_attach.sh
polaris_utility_domain_template(ioucon)
polaris_bexecute_domain(polaris_ioucon_t, polaris_ioucon_exec_t)

allow polaris_ioucon_t self:unix_dgram_socket create_socket_perms;
polaris_iosd_dgram_send(polaris_ioucon_t)
polaris_iosd_tmp_file_use(polaris_ioucon_t)
telnet_use_ptys(polaris_ioucon_t)

# "test platform hardware eobc ping" invokes eobc_ping.sh
# send sigchld when it is done
gen_require(^
    type ping_t;
)
allow ping_t polaris_bexecute_t:process sigchld;
polaris_confd_domtrans(polaris_bexecute_t)

# app-hosting connect appid <> console/session
# Beluga/Meraki container
ifdef(^ms_platform',`
polaris_iox_container_domtrans(polaris_bexecute_t)
)

# Bottlenose/Meraki container
ifdef(^bottlenose_platform',`
polaris_iox_container_domtrans(polaris_bexecute_t)
)

# IOx downloads the application package using network protocol (e.g http)
gen_require(^
    type fifo_var_run_t;
)
allow polaris_bexecute_t fifo_var_run_t:fifo_file read;

# on vxe platforms with MBRv2/MBRv4/GPTv1/GPTv3 partition layouts
# /config is file system and export_mcp_environment tries to create it anyway
polaris_getattr_disk_config(polaris_bexecute_t)

```



```
#####
# This block is policies for
# "hw-module session <x/y>" CLI.
# It invokes usr/binos/conf/ngio_module_session.sh, eventually invoking
# open64.

polaris_utility_domain_template(ngio_module_session)
polaris_bexecute_domain(polaris_ngio_module_session_t, polaris_ngio_module_session_exec_t)
corecmd_exec_bin(polaris_ngio_module_session_t)
polaris_bexecute_domtrans(polaris_ngio_module_session_t)
term_use_unallocated_ttys(polaris_ngio_module_session_t)
dev_read_sysfs(polaris_ngio_module_session_t)
allow polaris_ngio_module_session_t self:process setsched;
auth_map_passwd(polaris_ngio_module_session_t)
polaris_chasfs_read(polaris_ngio_module_session_t)
polaris_cpld_read(polaris_ngio_module_session_t)
telnet_use_ptys(polaris_ngio_module_session_t)

# work with /tmp files
type polaris_ngio_module_session_tmp_t;
files_tmp_file(polaris_ngio_module_session_tmp_t)
manage_dirs_pattern(polaris_ngio_module_session_t, tmp_t, polaris_ngio_module_session_tmp_t)
manage_files_pattern(polaris_ngio_module_session_t, polaris_ngio_module_session_tmp_t,
polaris_ngio_module_session_tmp_t)
manage_fifo_files_pattern(polaris_ngio_module_session_t, polaris_ngio_module_session_tmp_t,
polaris_ngio_module_session_tmp_t)
files_tmp_filetrans(polaris_ngio_module_session_t, polaris_ngio_module_session_tmp_t, { file dir })

# CLI: show platform software tech-support
# requires bshell execution
# /bin/bash /usr/binos/conf/bshell.sh -S -P ---- __CMD__ ---- -f
/usr/binos/conf/mcp_tech_support_command_file.txt
gen_require(
    type polaris_bshell_t;
    type polaris_bshell_exec_t;
)
domtrans_pattern(polaris_bexecute_t, polaris_bshell_exec_t, polaris_bshell_t)
# scripts stdin is set by hman and needs write/append access to pipes like pipe:[80159]
polaris_hman_use_fifo(polaris_bshell_t)
# in case of ISR4k show tech input for bshell dynamically created
polaris_tech_support_tmp_read(polaris_bshell_t)

# CLI: show software authenticity running
# this results in hman invoking below command:
# /bin/sh /usr/binos/conf/bexec.sh -c "/usr/bin/code_sign_verify show3 abcd "
polaris_code_verify_domtrans(polaris_bexecute_t)

# stdin is inherited when bexecute calls fts_client
```

```

polaris_fts_client_tmp_manage(polaris_bexecute_t)

# disk space full issue
allow polaris_platform_shell_t self:capability sys_resource;
#####
# CLI: request platform software sdwan admin-tech

# executes: /bin/sh vconfd_script_show_installerfs.sh
polaris_confd_unix_stream_stdio_use(polaris_bexecute_t)

# executes: bash bshell.sh -S -P ---- __CMD__ ---- -f /tmp/sdwan_tech_support_command_file_out.txt
polaris_confd_unix_stream_stdio_use(polaris_bshell_t)
#####

# write to /tmp/out_$(date "+%Y%m%d%H%M%S%N") for base version verification on smu install
polaris_install_tmp_write(polaris_bexecute_t)

# Nutella-XE install image
#/bin/bash /usr/binos/conf/brelay.sh -E -f rp 0 16023 -c /usr/binos/conf/install_engine.sh --operation install_commit
--isremote
polaris_confd_tmp_use_fifo(polaris_bexecute_t)

#awk -v what=^.BuildPath: $pkginfo_file ~ what { print $2 } /tmp/sw/rp/0/0/rp_security/mount/.pkginfo
polaris_read_packages_conf(polaris_bexecute_t)

dev_read_rand(polaris_bexecute_t)

# /usr/bin/python3 /usr/binos/conf/issu_client_comp.py compare -b /usr/binos/conf/base_clients.txt -n
/bootflash/installer/current_clients.txt
polaris_disk_install_read(polaris_bexecute_t)

# allow "/usr/binos/conf/module_direct.py" (bexecute_t) to execute
# "/usr/sbin/ethtool" (ifconfig_exec_t) when invoking CLI
# "show platform1 hardware subslot <slot/card> backplane statistics"
sysnet_domtrans_ifconfig(polaris_bexecute_t)
# Write into pipe created by stack_mgr
# Parent Child Relation - stack_mgr -> mcp_trace_request -> brelay (to relay output to active)
optional_policy(
    polaris_use_stack_mgr_fifo(polaris_bexecute_t)
)

polaris_etc_list(polaris_bexecute_t)
#manage /tmp/existing_rommon_info file
polaris_manage_rommon_info(polaris_capsule_upgrade_t)

#Policies for "upgrade rom-monitor capsule primary switch 1 R0" CLI
#/usr/binos/conf/bexecute.sh -c /usr/binos/conf/cat9k-primary-capsule-upgrade.sh

```

```

#cat9k-primary-capsule-upgrade.sh have to run in its own domain

polaris_utility_domain_template(capsule_upgrade)

polaris_bootflash_manage(polaris_capsule_upgrade_t)

type polaris_capsule_upgrade_log_t;
polaris_pfile_type(polaris_capsule_upgrade_log_t)

polaris_capsule_upgrade_log_use(polaris_capsule_upgrade_t)

polaris_bexecute_domain(polaris_capsule_upgrade_t, polaris_capsule_upgrade_exec_t)

polaris_bexecute_domtrans(polaris_capsule_upgrade_t)
corecmd_exec_bin(polaris_capsule_upgrade_t)
auth_use_nsswitch(polaris_capsule_upgrade_t)
polaris_chasfs_manage(polaris_capsule_upgrade_t)
polaris_cpld_read(polaris_capsule_upgrade_t)
telnet_use_ptys(polaris_capsule_upgrade_t)

polaris_rommon_device_read(polaris_capsule_upgrade_t)

# For "/bin/sh /usr/binos/conf/mcp_chvrf.sh eobc
# /usr/binos/conf/bexecute.sh -c /usr/binos/conf/install_engine.sh
# --operation install_c",
# uses unix stream socket created by confd as standard I/O.
polaris_conf_unix_stream_stdio_use(polaris_chvrf_t)

#####
# mcp_dmesg_service
#####
polaris_utility_domain_template(mcp_dmesg)

polaris_bexecute_domain(polaris_mcp_dmesg_t, polaris_mcp_dmesg_exec_t)
polaris_bexecute_domtrans(polaris_mcp_dmesg_t)
dmesg_domtrans(polaris_mcp_dmesg_t)
corecmd_exec_bin(polaris_mcp_dmesg_t)
polaris_smand_use_fifo(polaris_mcp_dmesg_t)
auth_use_nsswitch(polaris_mcp_dmesg_t)
telnet_use_ptys(polaris_mcp_dmesg_t)

# allow creation/access of temporary files like /tmp/sh-thd-1608024622
type polaris_mcp_dmesg_tmp_t;
files_type(polaris_mcp_dmesg_tmp_t)
files_tmp_file(polaris_mcp_dmesg_tmp_t)
files_tmp_filetrans(polaris_mcp_dmesg_t, polaris_mcp_dmesg_tmp_t, file)
manage_files_pattern(polaris_mcp_dmesg_t, polaris_mcp_dmesg_tmp_t, polaris_mcp_dmesg_tmp_t)
fs_getattr_tmpfs(polaris_mcp_dmesg_t)

```

```
# allowing reload_fru.sh for doing systemctl list-jobs
systemd_config_generic_services(polaris_bexecute_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbexecute.te
```

No license file was found, but licenses were detected in source scan.

```
#
# July 2017, Victor Kamensky
#
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#
```

```
/dev/quack -c gen_context(system_u:object_r:polaris_quack_device_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisquack.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisdbm, 1.0);
```

```
gen_require(`
    type polaris_dbm_t;
`)
```

```
#####
# mqipc manual, one that missing in platform tdl file
#####
```

```
ifdef(`nyquist_platform',`
gen_require(`
    type polaris_bt_logger_dbm_mqipc_t;
`)
# dbm may start first and create this mqipc channel
polaris_mqipc_create_name(polaris_dbm_t, polaris_bt_logger_dbm_mqipc_t, bt_logger_dbm)
`)
```

```
polaris_btrace_data_manage(polaris_dbm_t)
polaris_crft_data_manage(polaris_dbm_t)
```

```

polaris_chasfs_manage(polaris_dbm_t)
polaris_tdlresolve_read(polaris_dbm_t)
polaris_tdlldb_list_dirs(polaris_dbm_t)
polaris_cpld_read(polaris_dbm_t)
polaris_flashlib_read(polaris_dbm_t)

polaris_ripc_sman_ui_serv_connect(polaris_dbm_t)

polaris_db_tdlldb_dir_use(polaris_dbm_t)

polaris_libeiutil_build_config_directory(polaris_dbm_t)

polaris_cfg_data_manage(polaris_dbm_t)

allow polaris_dbm_t self:capability { sys_resource };
allow polaris_dbm_t self:process setrlimit;

# dbm listen on 9090 port; in case of ultra only in tcp6
corenet_tcp_bind_websm_port(polaris_dbm_t)

polaris_dyncfg_tmp_read(polaris_dbm_t)

allow polaris_dbm_t self:capability dac_override;

# port 9090, is it exclusively wnc_mgrd port?
corenet_tcp_bind_polaris_wnc_mgrd_port(polaris_dbm_t)
allow polaris_dbm_t self:tcp_socket {shutdown};

# working dbm persistent files in /bootflash/.dbpersist
type polaris_disk_dbm_t;
polaris_disk_type(polaris_disk_dbm_t)

polaris_tdlldbpersist_setup(polaris_dbm_t)

# dbm on active syncs with /bootflash/.dbpersist on standby
# related call dbm_persist_binary_cfg_sync_to_standby()
gen_require(^
    type rsync_t;
)
rsync_entry_domtrans(polaris_dbm_t, rsync_t)

polaris_tmp_tdlldb_persist_setup(polaris_dbm_t)

logging_send_syslog_msg(polaris_dbm_t)

corecmd_exec_bin(polaris_dbm_t)

corecmd_exec_shell(polaris_dbm_t)

```

# dbm needs access to "/flash1/user/.installer/install\_issu\_state"

polaris\_disk\_install\_read(polaris\_dbm\_t)

# runs over /usr/bin/rsync

corenet\_tcp\_connect\_rsync\_port(polaris\_dbm\_t)

# tar invocation in dbm code necessitates this permission

auth\_map\_passwd(polaris\_dbm\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdbm.te

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#

# Sep 2020, Sridhar C

#

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#

/tmp/tlsd(/.\*)? gen\_context(system\_u:object\_r:polaris\_tlsd\_uds\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristlsd.fc

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#

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#

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#

/tmp/fp/lipc -d gen\_context(system\_u:object\_r:polaris\_lipc\_t,s0)

/tmp/rp/lipc -d gen\_context(system\_u:object\_r:polaris\_lipc\_t,s0)

/tmp/cc/lipc -d gen\_context(system\_u:object\_r:polaris\_lipc\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislipc.fc

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#

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#

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#

```

policy_module(polarisdmincshdfwd, 1.0);

gen_require(
    type polaris_dmi_ncsshd_fwd_t;
)

polaris_btrace_data_manage(polaris_dmi_ncsshd_fwd_t)
polaris_chasfs_manage(polaris_dmi_ncsshd_fwd_t)
polaris_tdlresolve_read(polaris_dmi_ncsshd_fwd_t)
polaris_tdlldb_list_dirs(polaris_dmi_ncsshd_fwd_t)
polaris_cpld_read(polaris_dmi_ncsshd_fwd_t)
polaris_flashlib_read(polaris_dmi_ncsshd_fwd_t)

polaris_ripc_sman_ui_serv_connect(polaris_dmi_ncsshd_fwd_t)

allow polaris_dmi_ncsshd_fwd_t self:unix_stream_socket create_stream_socket_perms;

type polaris_dmi_ncsshd_log_t;
files_tmp_file(polaris_dmi_ncsshd_log_t)
manage_files_pattern(polaris_dmi_ncsshd_fwd_t, polaris_dmi_ncsshd_log_t, polaris_dmi_ncsshd_log_t)
manage_sock_files_pattern(polaris_dmi_ncsshd_fwd_t, polaris_dmi_ncsshd_log_t, polaris_dmi_ncsshd_log_t)
files_tmp_filetrans(polaris_dmi_ncsshd_fwd_t, polaris_dmi_ncsshd_log_t, { file sock_file })

logging_send_syslog_msg(polaris_dmi_ncsshd_fwd_t)

polaris_cpld_read(polaris_dmi_ncsshd_fwd_t)

# allow to execute execute_confid_cli.sh under confid domain
polaris_confid_domtrans(polaris_dmi_ncsshd_fwd_t)

# starts bexec.sh
polaris_bexecute_domtrans(polaris_dmi_ncsshd_fwd_t)
polaris_send_signal_to_bexecute(polaris_dmi_ncsshd_fwd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmincshdfwd.te
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#
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#
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#

/usr/binos/conf/cyan_init\sh -- gen_context(system_u:object_r:polaris_dyncfg_exec_t,s0)
/usr/binos/conf/dyncfg_setup\sh -- gen_context(system_u:object_r:polaris_dyncfg_exec_t,s0)

```

```
# temp files created by cyan_init.sh
/tmp/cyan/cyan.log          gen_context(system_u:object_r:polaris_dyncfg_log_t,s0)
/tmp/cyan/cyan_runtime.log  gen_context(system_u:object_r:polaris_dyncfg_log_t,s0)

/tmp/cyan(/.*)?           gen_context(system_u:object_r:polaris_dyncfg_tmp_t,s0)
/tmp/cyan\.lock           gen_context(system_u:object_r:polaris_dyncfg_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscyan.fc
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
## <summary>Polaris bexecute Policy Rules.</summary>
```

```
#####
```

```
## <summary>
## Execute bexecute in the polaris_bexecute domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
```

```
#
interface(`polaris_bexecute_domtrans`,
gen_require(`
type polaris_bexecute_t, polaris_bexecute_exec_t;
`)
```

```
corecmd_search_bin($1)
domtrans_pattern($1, polaris_bexecute_exec_t, polaris_bexecute_t)
`)
```

```
#####
```

```
## <summary>
## Allow domain to be started by bexecute with
## transition into specific service domain.
## </summary>
## <param name="domain">
## <summary>
## Type to be used to run utility.
## </summary>
```



```

## </param>
## <param name="entry_point">
## <summary>
## Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
interface(`polaris_bexecute_domain`,`
gen_require(`
type polaris_bexecute_t;
`)

domtrans_pattern(polaris_bexecute_t, $2, $1)
`)

```

```

#####
## <summary>
## Execute mcp_chvrf.sh in the polaris_chvrf domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_chvrf_domtrans`,`
gen_require(`
type polaris_chvrf_t, polaris_chvrf_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_chvrf_exec_t, polaris_chvrf_t)
`)

```

```

#####
## <summary>
## Execute mcp_chvrf.sh in the caller domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_exec_chvrf`,`
gen_require(`
type polaris_chvrf_exec_t;
`)

```

```

    corecmd_search_bin($1)
    can_exec($1, polaris_chvrf_exec_t)
)

#####
## <summary>
## Execute ngio_module_session.sh in the polaris_ngio_module_session domain
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_ngio_module_session_domtrans`,`
gen_require(`
type polaris_ngio_module_session_t, polaris_ngio_module_session_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_ngio_module_session_exec_t, polaris_ngio_module_session_t)
)

#####
#####
## <summary>
## Allow the specified domain to send signals to any
## polaris process.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_send_signal_to_bexecute`,`
gen_require(`
type polaris_bexecute_t;
`)

allow $1 polaris_bexecute_t:process signal_perms;
)

#####
## <summary>
## Allow manage of polaris_bash_tmp_t.
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_bash_tmp_manage`,`
    gen_require(`
        type user_home_dir_t;
        type polaris_bash_tmp_t;
    `)

    manage_dirs_pattern($1, user_home_dir_t, polaris_bash_tmp_t)
    manage_files_pattern($1, polaris_bash_tmp_t, polaris_bash_tmp_t)
`)

```

```

#####
## <summary>
## Execute bexecute in the polaris_bexecute domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_bconsole_domtrans`,`
    gen_require(`
        type polaris_bconsole_t, polaris_bconsole_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_bconsole_exec_t, polaris_bconsole_t)
`)

```

```

#####
## <summary>
## Send messages to ioucon unix datagram sockets.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ioucon_dgram_send`,`
    gen_require(`
        type polaris_ioucon_t;
    `)

```

```

    )

    allow $1 polaris_ioucon_t:unix_dgram_socket sendto;
)

#####
## <summary>
##   Execute cat9k-primary-capsule-upgrade.sh , cat9k-capsule-upgrade.sh in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_capsule_upgrade_domtrans`,`
    gen_require(`
        type polaris_capsule_upgrade_t, polaris_capsule_upgrade_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_capsule_upgrade_exec_t, polaris_capsule_upgrade_t)
)

#####
## <summary>
##   Work(open,create,append,getattr) with /capsule-upgrade.log file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_capsule_upgrade_log_use`,`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_capsule_upgrade_log_t;
    `)
    allow $1 polaris_capsule_upgrade_log_t:filesystem getattr;

    filetrans_pattern($1, polaris_disk_bootflash_t, polaris_capsule_upgrade_log_t, file, "capsule-upgrade.log")
    manage_files_pattern($1, polaris_capsule_upgrade_log_t, polaris_capsule_upgrade_log_t)
    create_files_pattern($1, polaris_capsule_upgrade_log_t, polaris_capsule_upgrade_log_t)
    getattr_files_pattern($1, polaris_capsule_upgrade_log_t, polaris_capsule_upgrade_log_t)
    append_files_pattern($1, polaris_capsule_upgrade_log_t, polaris_capsule_upgrade_log_t)
    allow $1 polaris_capsule_upgrade_log_t:file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbexecute.if

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```
#
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#
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#
```

```
policy_module(polarisobfl, 1.0);
```

```
#####
# Obfl policy
#####
```

```
type polaris_obfl_data_t;
files_type(polaris_obfl_data_t)
```

```
gen_require(
    type init_t;
    type default_t;
    type tmp_t;
    attribute domain;
)
```

```
filetrans_pattern(domain, default_t, polaris_obfl_data_t, lnk_file, "obfl")
# edison uses obfl0 name
filetrans_pattern(domain, default_t, polaris_obfl_data_t, lnk_file, "obfl0")
# /tmp/obfl
files_tmp_filetrans(domain, polaris_obfl_data_t, dir, "obfl")
```

```
# allow obfl data file reside on persistent storage
polaris_pfile_type(polaris_obfl_data_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisobfl.te

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```
#
# March 2017, Victor Kamensky
#
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#
```

```

policy_module(polarisbtlogger, 1.0);

gen_require(
    type polaris_bt_logger_t;
)

polaris_btrace_data_manage(polaris_bt_logger_t)
polaris_crft_data_manage(polaris_bt_logger_t)
polaris_chasfs_manage(polaris_bt_logger_t)
polaris_tdlresolve_read(polaris_bt_logger_t)
polaris_tdlldb_list_dirs(polaris_bt_logger_t)
polaris_cpld_read(polaris_bt_logger_t)
polaris_flashlib_read(polaris_bt_logger_t)

polaris_ripc_sman_ui_serv_connect(polaris_bt_logger_t)

polaris_db_tdlldb_dir_use(polaris_bt_logger_t)

#####
# mqipc manual, one that missing in platform tdl file
#####

# mq.-bt_logger_dbm
type polaris_bt_logger_dbm_mqipc_t;
polaris_mqipc_type(polaris_bt_logger_dbm_mqipc_t)

# mq.-bt_logger_fman-rp
type polaris_bt_logger_fman_rp_mqipc_t;
polaris_mqipc_type(polaris_bt_logger_fman_rp_mqipc_t)

# mq.-bt_logger_iosd
type polaris_bt_logger_iosd_mqipc_t;
polaris_mqipc_type(polaris_bt_logger_iosd_mqipc_t)

# mq.-bt_logger_smd
type polaris_bt_logger_smd_mqipc_t;
polaris_mqipc_type(polaris_bt_logger_smd_mqipc_t)

polaris_mqipc_create_name(polaris_bt_logger_t, polaris_bt_logger_dbm_mqipc_t, bt_logger_dbm)
polaris_mqipc_create_name(polaris_bt_logger_t, polaris_bt_logger_fman_rp_mqipc_t, bt_logger_fman-rp)
polaris_mqipc_create_name(polaris_bt_logger_t, polaris_bt_logger_iosd_mqipc_t, bt_logger_iosd)
polaris_mqipc_create_name(polaris_bt_logger_t, polaris_bt_logger_smd_mqipc_t, bt_logger_smd)

allow polaris_bt_logger_t self:capability { dac_override };

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtlogger.te

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```
#
# November 2017, Victor Kamensky
#
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#

## <summary>Polaris gnmib Policy Rules.</summary>

#####
## <summary>
## Create rule for ndbutils file ".l.schema_use.gnmib" under /var/lock/ndbutil
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_gnmib_ndbutil_lock`,`
    gen_require(`
        type polaris_confd_ndbutil_lock_t;
        type polaris_gnmib_ndbutil_t;
    `)

    filetrans_pattern($1, polaris_confd_ndbutil_lock_t, polaris_gnmib_ndbutil_t, file, $2)
    manage_files_pattern($1, polaris_confd_ndbutil_lock_t, polaris_gnmib_ndbutil_t)

    allow $1 polaris_gnmib_ndbutil_t:file { watch watch_reads };
)

#####
## <summary>
## Allow reading gnoi image files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_gnmib_gnoi_images_read`,`
    gen_require(`
        type polaris_gnmib_gnoi_images_t;
    `)
)
```

```
read_files_pattern($1, polaris_gnmib_gnoi_images_t, polaris_gnmib_gnoi_images_t)
mmap_files_pattern($1, polaris_gnmib_gnoi_images_t, polaris_gnmib_gnoi_images_t)
')
```

```
#####
```

```
## <summary>
## Allow manage gnoi image files
## </summary>
```

```
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
```

```
#
```

```
interface('polaris_gnmib_gnoi_images_manage'`
gen_require(`
    type polaris_gnmib_gnoi_images_t;
`
')
```

```
manage_files_pattern($1, polaris_gnmib_gnoi_images_t, polaris_gnmib_gnoi_images_t)
mmap_files_pattern($1, polaris_gnmib_gnoi_images_t, polaris_gnmib_gnoi_images_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgnmib.if

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```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polaristdldb, 1.0);
```

```
#####
```

```
# Polaris tdldb (infra/tdllib)
```

```
#####
```

```
type polaris_tdldb_t;
polaris_tdldb_type(polaris_tdldb_t)
```

```
attribute polaris_tdldb;
```

```
# any process creating tdldb in /tmp/rp/tdldb should transition into its domain
```

```
gen_require(`
    attribute domain;
`
')
```



```
files_tmp_filetrans(domain, polaris_tdlldb_t, dir, "tdlldb")
```

```
# DB_DIR database is not described in TDL
type polaris_dir_db_tdlldb_t;
polaris_tdlldb_type(polaris_dir_db_tdlldb_t)
```

```
type polaris_tdlldb_persist_t;
polaris_tdlldb_type(polaris_tdlldb_persist_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristdlldb.te

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```
#
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#
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#
```

```
policy_module(polarislfts, 1.0);
```

```
#####
```

```
# Polaris lfts
```

```
#####
```

```
type polaris_lfts_device_t;
dev_node(polaris_lfts_device_t)
```

```
# "ip netns add foo" commands mounts "foo" under "/var/run/netns"
```

```
gen_require(
    type ifconfig_t;
    type var_run_t;
```

```
')
```

```
allow ifconfig_t var_run_t:dir mounton;
```

```
# "ip netns exec 16 sysctl -w net.core.vrfid=16" commands mounts "16" to "/sys"
```

```
gen_require(
    type ifconfig_t;
    type unlabeled_t;
```

```
')
```

```
allow ifconfig_t unlabeled_t:dir mounton;
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislfts.te

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```
#
```

# March 2017, Victor Kamensky

#

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#

```
/var/tmp/trace/nginx_access.log    gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx_error.log     gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx.pid           gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx.lock.accept   gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx.lock.cookie_tbl gen_context(system_u:object_r:httpd_log_t, s0)
/var/tmp/trace/nginx.lock.login_count gen_context(system_u:object_r:httpd_log_t, s0)
/tmp/nginx_aaa                     gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)
/tmp/nginx_master                  gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)
/tmp/nginx_session                 gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)
```

#/tmp base folder for nginx apps to create temporary files.

```
/tmp/nginx_webui_tmp -d gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)
```

```
/tmp/nginx -d gen_context(system_u:object_r:polaris_nginx_tmp_t, s0)
```

# Polaris WebUI Aireos translator files

```
/usr/binos/conf/aireos_translate_helper.sh
```

```
gen_context(system_u:object_r:polaris_nginx_webui_aireos_translator_exec_t, s0)
```

```
/var/scripts/python/aireosConfigTranslator(/.*)? --
```

```
gen_context(system_u:object_r:polaris_aireos_translator_scripts_t,s0)
```

```
/var/scripts/webui_install.sh gen_context(system_u:object_r:polaris_nginx_webui_exec_t, s0)
```

```
/usr/binos/conf/webui_upgrade_helper.sh gen_context(system_u:object_r:polaris_nginx_webui_install_exec_t, s0)
```

```
/usr/binos/conf/webui_smu_helper.sh gen_context(system_u:object_r:polaris_nginx_webui_install_exec_t, s0)
```

```
/usr/binos/conf/ra_trace_webui_helper.sh
```

```
gen_context(system_u:object_r:polaris_nginx_webui_trace_filter_exec_t, s0)
```

```
/usr/binos/conf/nginx-conf gen_context(system_u:object_r:httpd_config_t, s0)
```

```
/usr/binos/conf/nginx-conf/servers gen_context(system_u:object_r:httpd_config_t, s0)
```

```
/tmp/fts_client gen_context(system_u:object_r:polaris_fts_client_tmp_t, s0)
```

```
/usr/binos/conf/nginx_helper.sh gen_context(system_u:object_r:polaris_nginx_helper_exec_t, s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnginx.fc
```

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#

# May 2017, Victor Kamensky

#

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#

```

policy_module(polarismdtpubd, 1.0);

gen_require(`
    type polaris_mdt_pubd_t;
`)

polaris_btrace_data_manage(polaris_mdt_pubd_t)
polaris_chasfs_manage(polaris_mdt_pubd_t)
polaris_tdlresolve_read(polaris_mdt_pubd_t)
polaris_tdlldb_list_dirs(polaris_mdt_pubd_t)
polaris_cpld_read(polaris_mdt_pubd_t)
polaris_lua_read(polaris_mdt_pubd_t)
polaris_flashlib_read(polaris_mdt_pubd_t)

polaris_ripc_sman_ui_serv_connect(polaris_mdt_pubd_t)

polaris_db_tdlldb_dir_use(polaris_mdt_pubd_t)

#For initializing capabilities DB cfg file
polaris_libeutil_build_config_directory(polaris_mdt_pubd_t)
polaris_cfg_data_manage(polaris_mdt_pubd_t)

optional_policy(`
# deals with /dev/shm/confd setup (schema and pid)
polaris_confd_shm_setup(polaris_mdt_pubd_t)
# and allow read shared schema
polaris_confd_shared_schema_read(polaris_mdt_pubd_t)
# read /proc/confd_pid/exe file
polaris_confd_read(polaris_mdt_pubd_t)
`)

# pubd could be configured to connect any port on DNAC
# please see cndp_setup_tcp_socket function
polaris_lfts_dev_use(polaris_mdt_pubd_t)
corenet_tcp_connect_all_ports(polaris_mdt_pubd_t)

polaris_ndbload_lock_use(polaris_mdt_pubd_t)

corenet_tcp_connect_polaris_pttcd_port(polaris_mdt_pubd_t)

corenet_tcp_bind_polaris_netconf_interceptor_port(polaris_mdt_pubd_t)
corenet_tcp_bind_all_unreserved_ports(polaris_mdt_pubd_t)

allow polaris_mdt_pubd_t self:capability { dac_override dac_read_search };

# create ndbutil directory under /var/lock
polaris_confd_ndbutil_create(polaris_mdt_pubd_t)

```

```

polaris_ndbutil_lock_template(polaris_mdt_pubd_t, pubd, ".l.schema_use.pubd")

# grpc library through sysconf accesses /sys/devices/system/cpu
# to get number of CPUs
dev_read_sysfs(polaris_mdt_pubd_t)

# handling /tmp/rp/.telemetry and /tmp/rp/telemetry
type polaris_mdt_pubd_tmp_t;
files_tmp_file(polaris_mdt_pubd_tmp_t)
files_tmp_filetrans(polaris_mdt_pubd_t, polaris_mdt_pubd_tmp_t, dir, "telemetry")
files_tmp_filetrans(polaris_mdt_pubd_t, polaris_mdt_pubd_tmp_t, dir, ".telemetry")
gen_require(
    type tmp_t;
)
manage_dirs_pattern(polaris_mdt_pubd_t, { tmp_t polaris_mdt_pubd_tmp_t }, polaris_mdt_pubd_tmp_t)
manage_files_pattern(polaris_mdt_pubd_t, polaris_mdt_pubd_tmp_t, polaris_mdt_pubd_tmp_t)

# from evconfd_dynamic_load
polaris_conf_d_shared_schema_watch(polaris_mdt_pubd_t)

# allow grpc library to shutdown socket
allow polaris_mdt_pubd_t self:tcp_socket create_socket_perms;

# allow pubd to access logging facility
logging_send_syslog_msg(polaris_mdt_pubd_t)

# enabling access to /etc/netns and /etc/hosts
polaris_namespace_set_netns_with_etc(polaris_mdt_pubd_t)
gen_require(
    type net_conf_t;
)
files_etc_filetrans(polaris_mdt_pubd_t, net_conf_t, file, "hosts")
files_etc_filetrans(polaris_mdt_pubd_t, net_conf_t, file, "resolv.conf")
files_etc_filetrans(polaris_mdt_pubd_t, net_conf_t, dir, "netns")

# allow pubd to create, modify, delete system network config files/dir
sysnet_manage_config(polaris_mdt_pubd_t)
sysnet_manage_config_dirs(polaris_mdt_pubd_t)

# allow pubd to connect socket
allow polaris_mdt_pubd_t self:udp_socket connect;

# allow pubd (object net_conf_t) to watch /etc/netns/1/resolv.conf
allow polaris_mdt_pubd_t net_conf_t:{file dir} watch;

# read access to /dev/random
dev_read_rand(polaris_mdt_pubd_t)

```

```
#DB persistence
polaris_tdlldbpersist_setup(polaris_mdt_pubd_t)
polaris_tmp_tdlldb_persist_setup(polaris_mdt_pubd_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismdtpubd.te
```

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```
#
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#
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#
```

```
# polarisstackmgr file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisstackmgr.fc
```

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```
dnl
dnl Mar 2020, Manu Roy
dnl
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dnl
dnl Hellcat Platform Max Bay Limits
max_bay_map_set(`rp', `per_bay', 0)
max_bay_map_set(`cc', `per_bay', 0)
max_bay_map_set(`fp', `per_bay', 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/hellcatmaps.m4
```

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```
#
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#
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#
```

```
policy_module(polarisperiodic, 1.0);
```

```
gen_require(^
    type polaris_periodic_t;
')
```

```

corecmd_exec_bin(polaris_periodic_t)
corecmd_exec_shell(polaris_periodic_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_periodic_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_periodic_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_periodic_t)

# read /etc/init.d/common-utility-functions
init_read_script_files(polaris_periodic_t)

fs_getattr_all_fs(polaris_periodic_t)

# work with /tmp files
type polaris_periodic_tmp_t;
files_tmp_file(polaris_periodic_tmp_t)
manage_files_pattern(polaris_periodic_t, tmp_t, polaris_periodic_tmp_t)
files_tmp_filetrans(polaris_periodic_t, polaris_periodic_tmp_t, file)

allow polaris_periodic_t self:capability sys_resource;

polaris_btrace_data_manage(polaris_periodic_t)
polaris_chasfs_manage(polaris_periodic_t)
polaris_cpld_read(polaris_periodic_t)
polaris_proc_rmonbifo_read(polaris_periodic_t)
polaris_rmonbifo_tmp_read(polaris_periodic_t)
polaris_boot_tmp_read(polaris_periodic_t)
polaris_read_debug_conf(polaris_periodic_t)
polaris_persistent_manage(polaris_periodic_t)

# reads /tmp/issu_proc
polaris_install_tmp_read(polaris_periodic_t)

optional_policy(`
polaris_ncd_tmp_read(polaris_periodic_t)
`)
# "install add file" CLI triggers logger sending syslog messages
logging_send_syslog_msg(polaris_periodic_t)
# "install add file" CLI triggers logger executing "pidof linux_iosd-image" which
# read "/sys/devices/system/cpu/online"
dev_read_sysfs(polaris_periodic_t)
#
# /usr/bin/conf/cleanup.sh do_cleanup does packages and other umount calls

```

```
mount_domtrans(polaris_periodic_t)
polaris_sw_data_manage(polaris_periodic_t)
```

```
# determine if the installer is executing
domain_read_all_domains_state(polaris_periodic_t)
```

```
# access to /cdrom0/ when *ova image is booted during
# first instance of vwlc on ucs server
polaris_removable_read(polaris_periodic_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisperiodic.te
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
/tmp/pm_post_result -- gen_context(system_u:object_r:polaris_ngwc_plfm_mgr_tmp_t,s0)
/tmp/microcode_update(/.*)? gen_context(system_u:object_r:polaris_ngwc_plfm_mgr_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwcplfmmgr.fc
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
policy_module(polarisfpm, 1.0);
```

```
gen_require(
    type polaris_fpm_t;
)
polaris_chasfs_manage(polaris_fpm_t)
polaris_cpld_read(polaris_fpm_t)
polaris_flashlib_read(polaris_fpm_t)
polaris_tdlresolve_read(polaris_fpm_t)

polaris_ripc_sman_ui_serv_connect(polaris_fpm_t)

polaris_db_tdlldb_dir_use(polaris_fpm_t)
```

```

logging_send_syslog_msg(polaris_fpm_t)

# vconfd_load_shared_schemas
polaris_confd_shared_schema_read(polaris_fpm_t)

# /var/run/.fpm socket and pid
type polaris_fpm_var_run_t;
files_pid_file(polaris_fpm_var_run_t)
manage_files_pattern(polaris_fpm_t, polaris_fpm_var_run_t, polaris_fpm_var_run_t)
manage_sock_files_pattern(polaris_fpm_t, polaris_fpm_var_run_t, polaris_fpm_var_run_t)
files_pid_filetrans(polaris_fpm_t, polaris_fpm_var_run_t, { file sock_file })

polaris_ttm_var_sock_write(polaris_fpm_t)

# fp_scaling_init calls posix_sysconf
dev_read_sysfs(polaris_fpm_t)

# PLEASE LOOK AT ME: write access to /boot/hugepage.conf
# which on ultra translates into /varied/hugepage.conf access
# But no code in polaris uses it
polaris_disk_varied_manage(polaris_fpm_t)
files_manage_boot_files(polaris_fpm_t)

polaris_cedge_tmpfs_manage(polaris_fpm_t)

polaris_fm2fpm_mqipc_use(polaris_fpm_t)

# manually create mqipc channel: missing in TDL
type polaris_fm2fpm_mqipc_t;
polaris_mqipc_type(polaris_fm2fpm_mqipc_t)
polaris_mqipc_create_name(polaris_fpm_t, polaris_fm2fpm_mqipc_t, fm2fpm_vulcan_mqipc)

# fp_scaling_read_core_count accesses cgroups file at
# /sys/fs/cgroup/cpuset/iosxe_control_processes/cpuset.cpus
fs_read_cgroup_files(polaris_fpm_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfpm.te

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

divert(-1)



```
include(`polaris_process.m4')
include(`polaris_process_te.m4')
```

```
include(`polaris_ipc_mqipc.m4')
include(`polaris_ipc_mqipc_te.m4')
```

```
include(`polaris_ipc_ripc.m4')
include(`polaris_ipc_ripc_te.m4')
```

```
include(`polaris_ipc_lipc.m4')
include(`polaris_ipc_lipc_te.m4')
```

```
dnl Stub out non existent one
define(`polaris_websocket_service_server',`)
define(`polaris_cipc_service_server',`')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#
policy_module(polarisplatformipcauto, 1.0);
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_te.m4
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
## <summary>Polaris polarisbhytoolsd Policy Rules.</summary>
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbhytoolsd.if
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
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```

```
#

/tmp/tdlresolve_tmp(/.*)?          gen_context(system_u:object_r:polaris_tdlresolve_t,s0)
/tmp/tdlresolve(/.*)?              gen_context(system_u:object_r:polaris_tdlresolve_t,s0)

/usr/binos/conf/global.service.conf -- gen_context(system_u:object_r:polaris_global_service_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristdlresolve.fc
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
## <summary>Polaris ttm Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
##   Write ttm /var/run socket file
```

```
## </summary>
```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed access.
```

```
##   </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_ttm_var_sock_write`,
    gen_require(`
        type polaris_ttm_t;
        type polaris_ttm_var_run_t;
        type var_run_t;
    `)
    write_sock_files_pattern($1, var_run_t, polaris_ttm_var_run_t)
    allow $1 polaris_ttm_t:unix_stream_socket { connectto };
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristtm.if
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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```

```

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#

## <summary>Polaris CYAN Policy Rules.</summary>

#####

## <summary>
## Execute dyncfg in the dyncfg domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_dyncfg_domtrans`,`
gen_require(`
type polaris_dyncfg_t, polaris_dyncfg_exec_t;
`)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_dyncfg_exec_t, polaris_dyncfg_t)
`)

#####

## <summary>
## Make the specified domain able to read tmp file created by
## cyan_init.sh like /tmp/cyan/mono.cdb
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dyncfg_tmp_read`,`
gen_require(`
type polaris_dyncfg_tmp_t;
type tmp_t;
`)

read_files_pattern($1, { tmp_t polaris_dyncfg_tmp_t }, polaris_dyncfg_tmp_t)
read_lnk_files_pattern($1, { tmp_t polaris_dyncfg_tmp_t }, polaris_dyncfg_tmp_t)
allow $1 polaris_dyncfg_tmp_t:file map;

# need by shell that is called from luajit script
auth_read_passwd($1)

```

```

)

#####
## <summary>
##   Make the specified domain able to manage tmp file created by
##   cyan_init.sh like /tmp/cyan.lock
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dynconfg_tmp_manage`,`
    gen_require(`
        type polaris_dynconfg_tmp_t;
        type tmp_t;
    `)

    manage_files_pattern($1, { tmp_t polaris_dynconfg_tmp_t }, polaris_dynconfg_tmp_t)
    manage_lnk_files_pattern($1, { tmp_t polaris_dynconfg_tmp_t }, polaris_dynconfg_tmp_t)
    allow $1 polaris_dynconfg_tmp_t:file map;
)

#####
## <summary>
##   Execute /tmp/dynconfg/N intialization within given domain.
##
##   Effectively one need this if it needs to run dynconfg_db_run_init_script,
##   dynconfg_db_init functions within domain context.
##
##   Note it involves lua execution that leads to execmem. Also lua script
##   may execve shell and some other simple bin processes like mkdir or ln.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dynconfg_setup`,`
    gen_require(`
        type polaris_dynconfg_tmp_t;
        type tmp_t;
    `)

    files_tmp_filetrans($1, polaris_dynconfg_tmp_t, dir, "cyan")
    manage_dirs_pattern($1, polaris_dynconfg_tmp_t, polaris_dynconfg_tmp_t)
    manage_files_pattern($1, { tmp_t polaris_dynconfg_tmp_t }, polaris_dynconfg_tmp_t)
)

```

```

manage_lnk_files_pattern($1, { tmp_t polaris_dyncfg_tmp_t }, polaris_dyncfg_tmp_t)
allow $1 polaris_dyncfg_tmp_t:file map;

# dyncfg_setup calls luajit and luajit needs execute JIT generated code
allow $1 self:process execmem;

# LOOK AT ME lua initialization code still uses system function call do some
# trivial things like mkdir. But because of that we need to grant shell and
# bin access to all callers of
corecmd_exec_shell($1)
corecmd_exec_bin($1)

# In chassis_attrs.lua method THIS.WIRELESS checks whether wireless package is installed
# by opening (why open, not stat) wncmgrd binary.
optional_policy(`
    gen_require(`
        type polaris_wncmgrd_exec_t;
        type bin_t;
    `)
    read_files_pattern($1, bin_t, polaris_wncmgrd_exec_t)
`)

# lua code reads /tmp/sw/boot/rmonbifo/boardtype
polaris_rmonbifo_tmp_read($1)
`)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscyan.if
```

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```

#
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#

```

```
policy_module(polariscppcp, 1.0);
```

```

gen_require(`
    type polaris_cpp_cp_t;
`)

```

```

polaris_btrace_data_manage(polaris_cpp_cp_t)
polaris_crft_data_manage(polaris_cpp_cp_t)
polaris_chasfs_manage(polaris_cpp_cp_t)
polaris_tdlresolve_read(polaris_cpp_cp_t)
polaris_tdlldb_list_dirs(polaris_cpp_cp_t)

```

```

polaris_cpld_read(polaris_cpp_cp_t)
polaris_flashlib_read(polaris_cpp_cp_t)

polaris_ripc_sman_ui_serv_connect(polaris_cpp_cp_t)

polaris_db_tdlb_dir_use(polaris_cpp_cp_t)

polaris_cpp_process(polaris_cpp_cp_t)
polaris_cpp_dev_use(polaris_cpp_cp_t)

polaris_icc_broken_relocations(polaris_cpp_cp_t)

logging_send_syslog_msg(polaris_cpp_cp_t)

polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_cp_t)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(`crankshaft_family',`
polaris_dev_mem_use(polaris_cpp_cp_t)
')

# cpp_palci_wallclock_time_ticks function reads /var/lock/subsys/sntp.offset
files_read_all_locks(polaris_cpp_cp_t)

# allow objstore access
polaris_disk_objstore_read(polaris_cpp_cp_t)

optional_policy(`
polaris_spa_dev_use(polaris_cpp_cp_t)
')

# handle geodb file access
polaris_geodb_files_manage(polaris_cpp_cp_t)

optional_policy(`
polaris_cbdma_dev_use(polaris_cpp_cp_t)

polaris_hkp_dev_use(polaris_cpp_cp_t)
# Access /dev/astro
polaris_astro_dev_use(polaris_cpp_cp_t)
polaris_vega_dev_use(polaris_cpp_cp_t)
')
polaris_cpp_tmpfs_manage(polaris_cpp_cp_t)
polaris_cpld_dev_use(polaris_cpp_cp_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppcp.te

```

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```
#
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#
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#

policy_module(polariscppstats, 1.0);

gen_require(`
    type polaris_cpp_stats_t;
`)

polaris_btrace_data_manage(polaris_cpp_stats_t)
polaris_crft_data_manage(polaris_cpp_stats_t)
polaris_chasfs_manage(polaris_cpp_stats_t)
polaris_tdlresolve_read(polaris_cpp_stats_t)
polaris_tdlldb_list_dirs(polaris_cpp_stats_t)
polaris_cpld_read(polaris_cpp_stats_t)
polaris_flashlib_read(polaris_cpp_stats_t)

polaris_ripc_sman_ui_serv_connect(polaris_cpp_stats_t)

polaris_cpp_tmp_files_use(polaris_cpp_stats_t)
# works with /dev/cpp_dev_info, /dev/cpp and /dev/cpp_kipc
polaris_cpp_dev_use(polaris_cpp_stats_t)
polaris_cpp_tmpfs_ifdev_rw(polaris_cpp_stats_t)

polaris_icc_broken_relocations(polaris_cpp_stats_t)

# get attributes of /dev/shm from glibc where_is_shmfs function
fs_getattr_tmpfs(polaris_cpp_stats_t)

optional_policy(`
polaris_cbdma_dev_use(polaris_cpp_stats_t)
`)
polaris_cpp_tmpfs_manage(polaris_cpp_stats_t)
polaris_cpld_dev_use(polaris_cpp_stats_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppstats.te
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#
# March 2017, Victor Kamensky
#
```

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#

policy\_module(polarism, 1.0);

gen\_require(  
 type polaris\_lm\_t;  
)

polaris\_btrace\_data\_manage(polaris\_lm\_t)

polaris\_crft\_data\_manage(polaris\_lm\_t)

polaris\_chasfs\_manage(polaris\_lm\_t)

polaris\_tdlresolve\_read(polaris\_lm\_t)

polaris\_tdlldb\_list\_dirs(polaris\_lm\_t)

polaris\_cpld\_read(polaris\_lm\_t)

polaris\_flashlib\_read(polaris\_lm\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_lm\_t)

allow polaris\_lm\_t self:capability { dac\_override };

# allow to read /proc/mtd

kernel\_read\_system\_state(polaris\_lm\_t)

# work with /tmp files (/tmp/iosd\_level)

type polaris\_lm\_tmp\_t;

files\_tmp\_file(polaris\_lm\_tmp\_t)

files\_tmp\_filetrans(polaris\_lm\_t, polaris\_lm\_tmp\_t, file, "iosd\_level")

files\_tmp\_filetrans(polaris\_lm\_t, polaris\_lm\_tmp\_t, file, "stack\_apcount")

manage\_files\_pattern(polaris\_lm\_t, tmp\_t, polaris\_lm\_tmp\_t)

polaris\_dyncfg\_tmp\_read(polaris\_lm\_t)

polaris\_disk\_license\_manage(polaris\_lm\_t)

polaris\_disk\_csl\_manage(polaris\_lm\_t)

logging\_send\_syslog\_msg(polaris\_lm\_t)

polaris\_lua\_read(polaris\_lm\_t)

# permission to access /tmp/rp/lipc/lmanrtu\_stackrtu\_socket

# polaris\_lm\_t policy

allow polaris\_lm\_t self:unix\_stream\_socket connectto;

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarism.te



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```
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#
```

```
/usr/binos/conf/flash_check.sh -- gen_context(system_u:object_r:polaris_flashcheck_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisflashcheck.fc
```

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```
#  
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#
```

```
policy_module(polarislipc, 1.0);
```

```
#####  
# LIPC policy  
#####  
gen_require(  
    type polaris_pvp_t;  
    attribute polaris_extended_domain;  
)
```

```
type polaris_lipc_t;  
files_type(polaris_lipc_t)
```

```
files_tmp_filetrans(polaris_extended_domain, polaris_lipc_t, dir, "lipc")  
init_script_tmp_filetrans(polaris_extended_domain, polaris_lipc_t, dir, "lipc")
```

```
# in some cases pvp.sh creates lipc tmp directory it needs permissions for that  
manage_dirs_pattern(polaris_pvp_t, tmp_t, polaris_lipc_t)
```

```
gen_require(  
    attribute polaris_extended_domain;  
    type polaris_pvp_tmp_t;  
)  
filetrans_pattern(polaris_extended_domain, polaris_pvp_tmp_t, polaris_lipc_t, dir, "lipc")
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislipc.te

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#

# September 2018, Anubha Balani

#

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#

## <summary>Polaris Memory Service Policy Rules.</summary>

#####

# Polaris memory: libmaroon and such

#####

#####

## <summary>

## Allow the specified domain to check existence of  
## /lib/systemd/system/ksm.service file. Effectively checking  
## whether KSM kernel feature is enabled on device or not.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_ksm\_run\_check`,`

gen\_require(`  
type systemd\_unit\_file\_t;  
`)

getattr\_files\_pattern(\$1, systemd\_unit\_file\_t, systemd\_unit\_file\_t)  
)

#####

## <summary>

## Manage temporary maroon files

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

## <rolebase/>

#

interface(`polaris\_maroon\_data\_manage\_all`,`

```

gen_require(
    attribute polaris_maroon_data_domain;
type polaris_maroon_base_t;
)

manage_files_pattern($1, polaris_maroon_base_t, polaris_maroon_data_domain)
allow $1 polaris_maroon_data_domain:file map;

# manage temporary files in maroon_stats directory
manage_files_pattern($1, polaris_maroon_base_t, polaris_maroon_base_t)
)

```

```

#####
## <summary>
## Make the specified type usable as maroon data file type.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.
## </summary>
## </param>
#

```

```

interface(`polaris_maroon_data_type`,`
    files_type($1)
    gen_require(
        attribute polaris_maroon_data_domain;
    )
    typeattribute $1 polaris_maroon_data_domain;
)

```

```

#####
## <summary>
## Process to manage its own maroon files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="file_type">
## <summary>
## File type of maroon that corresponds to given domain.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_maroon_data_client`,`

```

```

gen_require(
    type polaris_maroon_base_t;
)

    manage_files_pattern($1, polaris_maroon_base_t, $2)
    allow $1 $2:file map;
    filetrans_pattern($1, polaris_maroon_base_t, $2, file)
)

#####
## <summary>
##   Process to manage its own maroon files
## </summary>
## <param name="domain_stem">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface( polaris_maroon_data_client_template,`
    gen_require(
        type polaris_maroon_base_t;
    )

        type polaris_$1_maroon_t;
        polaris_maroon_data_type(polaris_$1_maroon_t)

        polaris_maroon_data_client(polaris_$1_t, polaris_$1_maroon_t)
    )

#####
## <summary>
##   Getattr of polaris_zram_device_t files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface( polaris_zram_getattr,`
    gen_require(
        type device_t;
        type polaris_zram_device_t;
    )

    getattr_blk_files_pattern($1, device_t, polaris_zram_device_t)
)

```

')

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismemory.if

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#

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#

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#

/bootflash/.dbpersist(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_dbm\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdbm.fc

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#

policy\_module(polarisreflector, 1.0);

polaris\_process\_domain\_template(reflector)

corecmd\_exec\_bin(polaris\_reflector\_t)

# allow to read /proc/meminfo

kernel\_read\_system\_state(polaris\_reflector\_t)

# allow read of /etc/passwd

auth\_use\_nsswitch(polaris\_reflector\_t)

# run ldd, which in turns execve "ld.so --verify"

libs\_exec\_ld\_so(polaris\_reflector\_t)

# read /etc/hosts file

sysnet\_read\_config(polaris\_reflector\_t)

# work with /tmp files

type polaris\_reflector\_tmp\_t;

files\_tmp\_file(polaris\_reflector\_tmp\_t)

manage\_dirs\_pattern(polaris\_reflector\_t, tmp\_t, polaris\_reflector\_tmp\_t)

```
manage_files_pattern(polaris_reflector_t, polaris_reflector_tmp_t, polaris_reflector_tmp_t)
manage_fifo_files_pattern(polaris_reflector_t, polaris_reflector_tmp_t, polaris_reflector_tmp_t)
files_tmp_filetrans(polaris_reflector_t, polaris_reflector_tmp_t, { file dir })
```

```
# reflector can work with droputil tmp files
polaris_droputil_manage_tmp_files(polaris_reflector_t)
```

```
#rsync_exec(polaris_reflector_t)
gen_require(`
    type rsync_t;
`)
rsync_entry_domtrans(polaris_reflector_t, rsync_t)
allow rsync_t polaris_reflector_t:process sigchld;
# upon exec rsync inherits reflector.sh stdout/stderr which are
# polaris_reflector_t fifo_files
allow rsync_t polaris_reflector_t:fifo_file write;
```

```
allow polaris_reflector_t self:capability { sys_resource dac_override };
allow polaris_reflector_t self:process setpgid;
```

```
polaris_btrace_data_manage(polaris_reflector_t)
polaris_cpld_read(polaris_reflector_t)
polaris_chasfs_manage(polaris_reflector_t)
polaris_boot_tmp_read(polaris_reflector_t)
polaris_read_debug_conf(polaris_reflector_t)
polaris_disk_crashinfo_getattr(polaris_reflector_t)
polaris_rmonbifo_tmp_read(polaris_reflector_t)
```

```
# watch over /tmp/rp/dropbox
polaris_droputil_tmp_watch(polaris_reflector_t)
```

```
# Allow /tmp/ufs/bootflash & /tmp/ufs/harddisk read access
optional_policy(`
polaris_ncd_tmp_read(polaris_reflector_t)
`)
```

```
# 'rm -rf /tmp/rp/reflector'
fs_getattr_tmpfs(polaris_reflector_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisreflector.te

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```
#
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```

```

#

policy_module(polarispman, 1.0);

polaris_process_domain_template(pman)

#reassess all permissions granted here for new pman
# - do we clone this domain to pman, or replace it?

gen_require(
    type polaris_psvp_t;
    type polaris_pvp_t;
    ')

corecmd_exec_bin(polaris_pman_t)
corecmd_exec_shell(polaris_pman_t)
# can execute process in polaris domain
polaris_exec(polaris_pman_t)

# LOOK AT ME start-stop-daemon from busy box iterates all
# /proc/<pid> directories and reads /proc/<pid>/cmdline
# /proc/<pid>/exe. I.e it need quite a bit of privileges
domain_read_all_domains_state(polaris_pman_t)

# pman wants to write to /proc/<pid>/oom_adj of each process
# it started. Now oom_adj is under label of process that owns
# it, so for now let pman to be able to write into any file
# in polaris_domain. Latter try to clean it up by transitioning
# oom_adj into separate domain?
gen_require(
    attribute polaris_domain;
    ')
manage_files_pattern(polaris_pman_t, polaris_domain, polaris_domain)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_pman_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_pman_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_pman_t)

# read /proc/sys/vm/nr_hugepages
kernel_read_vm_sysctls(polaris_pman_t)

# read/write cgroups files
fs_rw_cgroup_files(polaris_pman_t)

```

```

dmidecode_domtrans(polaris_pman_t)

allow polaris_pman_t self:capability { sys_nice sys_resource dac_override sys_rawio sys_admin };

polaris_btrace_data_manage(polaris_pman_t)
polaris_chasfs_manage(polaris_pman_t)
polaris_cpld_read(polaris_pman_t)
ifdef(`ngwc_family',`
polaris_cpld_write(polaris_pman_t)
')
polaris_proc_rmonbifo_read(polaris_pman_t)
polaris_rmonbifo_tmp_read(polaris_pman_t)
polaris_boot_tmp_read(polaris_pman_t)
polaris_read_debug_conf(polaris_pman_t)
polaris_disk_crashinfo_getattr(polaris_pman_t)

# work with /tmp files
type polaris_pman_tmp_t;
files_tmp_file(polaris_pman_tmp_t)
manage_dirs_pattern(polaris_pman_t, tmp_t, polaris_pman_tmp_t)
manage_files_pattern(polaris_pman_t, polaris_pman_tmp_t, polaris_pman_tmp_t)
manage_fifo_files_pattern(polaris_pman_t, polaris_pman_tmp_t, polaris_pman_tmp_t)
files_tmp_filetrans(polaris_pman_t, polaris_pman_tmp_t, { file dir })
filetrans_pattern(domain, tmp_t, polaris_pman_tmp_t, dir, "process")
filetrans_pattern(domain, tmp_t, polaris_pman_tmp_t, dir, "pman_ports")

# pcohort reads files in /tmp/rp/process directory
gen_require(`
    attribute polaris_extended_domain;
')
read_files_pattern(polaris_extended_domain, polaris_pman_tmp_t, polaris_pman_tmp_t)
list_dirs_pattern(polaris_extended_domain, polaris_pman_tmp_t, polaris_pman_tmp_t)

# bash needs setpgid in its make_child function
allow polaris_pman_t self:process { setpgid };

# pmanlite uses getsid
allow polaris_pman_t self:process { getsession };

# pman call renice utility to change process nice level
allow polaris_pman_t self:process { setsched };

# pman needs to work with pvp tmp files
polaris_pvp_manage_tmp_files(polaris_pman_t)

# on ultra pman waits for /tmp/cpp_ifdev_rep pipes appearance before
# proceeding further before it starts iosd

```



```

optional_policy(`
polaris_cpp_tmp_ifdev_getattr(polaris_pman_t)

# /tmp/vxe_ucose_image created by some systemd units and accessed
# by pman, lets transition it into polaris_pman_tmp_t domain
gen_require(`
    type initrc_t;
    type init_t;
    `)
files_tmp_filetrans({ initrc_t init_t }, polaris_pman_tmp_t, file, "vxe_ucose_image")
files_tmp_filetrans({ initrc_t init_t }, polaris_pman_tmp_t, file, "wlc_ucose_image")
files_tmp_filetrans({ initrc_t init_t }, polaris_pman_tmp_t, file, "utah_ucose_image")
files_tmp_filetrans({ initrc_t init_t }, polaris_pman_tmp_t, file, "fugazi_ucose_image")
`)
# pman needs to manage cgroups membership of dofferent processes
# See move_to_cgroup pman function. It needs setsched permission
domain_setpriority_all_domains(polaris_pman_t)

# pman.sh can call logger command
logging_send_syslog_msg(polaris_pman_t)

# pman can receive signals from any polaris domain process
polaris_receive_signal_from_domain(polaris_pman_t)

# pman.sh calls pidof command (similar to ps)
# pidof needs access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_pman_t)
# pidof commands wants sys_ptrace
allow polaris_pman_t self:capability sys_ptrace;

# pman can send signal to anything
domain_signal_all_domains(polaris_pman_t)

# pmanlite can getpgid to its child group processes
domain_getpgid_all_domains(polaris_pman_t)

# pmanlite uses killpg(<child pid>,SIGNULL) to test its child processes
domain_signull_all_domains(polaris_pman_t)

term_use_unallocated_ttys(polaris_pman_t)

optional_policy(`
polaris_repm_tmp_manage(polaris_pman_t)
`)

optional_policy(`
# pman on nyquist ls /tmp/ufs/crashinfo
polaris_ncd_tmp_read(polaris_pman_t)

```

```

')

# runs find over /proc
kernel_getattr_proc(polaris_pman_t)

# PLEASE LOOK AT ME: pman removes /tmp/subpkg directory after CSCvm14562 commit
# back out and change properly after CSCvm51181 is fixed
polaris_install_tmp_manage(polaris_pman_t)

# rm from coreutils-8.30 wants to know filesystem type
fs_getattr_tmpfs(polaris_pman_t)
fs_getattr_xattr_fs(polaris_pman_t)

# domain for gdbserver started by pman

polaris_utility_domain_template(gdb)

domtrans_pattern(polaris_pman_t, polaris_gdb_exec_t, polaris_gdb_t)

# pman starts gdbserver with stdout pointing to btrace fifo
polaris_use_btrace_fifo(polaris_gdb_t)

# gdbserver reads /proc/$pid/exe of a process it gets attached to.
# Allow to read state of all processes for now.
domain_read_all_domains_state(polaris_gdb_t)

# allow gdbserver to bind to all unreserved ports for now
corenet_tcp_bind_unreserved_ports(polaris_gdb_t)
corenet_tcp_bind_generic_node(polaris_gdb_t)

allow polaris_gdb_t self:process { ptrace setpgid };
allow polaris_gdb_t self:tcp_socket { accept bind create getattr listen setopt };

# pman update iosxe_control_processes/iosxe_mgmt_processes/tasks
fs_manage_cgroup_dirs(polaris_pman_t)
fs_manage_cgroup_files(polaris_pman_t)

optional_policy(`
container_runtime_domtrans(polaris_pman_t)
`)

# pman calls show_version for dockerd executable
optional_policy(`
polaris_container_runtime_show_version(polaris_pman_t)
`)

# needs to access nsfs file during killall invocation
fs_read_nsfs_files(polaris_pman_t)

```

```

#runs over /proc/<pid>/net/arp
kernel_read_network_state(polaris_pman_t)

#runs over /proc/<pid>/net/stat
kernel_read_network_state_symlinks(polaris_pman_t)

#runs over /proc/<pid>/net/rpc
kernel_read_rpc_sysctls(polaris_pman_t)

# LOOK AT ME: why pman doing it
# from mgmt/confd/confd/src/confd_startup_sh_post_exit.sh archive_errlog function
polaris_btrace_persistent_data_manage(polaris_pman_t)
polaris_confd_log_manage(polaris_pman_t)
allow polaris_pman_t self:process setfscreate;

# access /bootflash/.installer/install_issu_state
polaris_disk_install_read(polaris_pman_t)

# /usr/binos/conf/umbrella_init.sh that runs under pman
# copies into /bootflash/ios_core.p7b
polaris_bootflash_manage(polaris_pman_t)

optional_policy(`
# we may write bits to the exiting_bays file in /proc
polaris_rw_exiting_bays(polaris_pman_t)
`)

ifdef(`ngwc_family',`
# linux_iosd_image_post_exit.sh restores the slot-based address
# for the management ethernet should be restored on dual RP system.
polaris_chvrf_domtrans(polaris_pman_t)
sysnet_domtrans_ifconfig(polaris_pman_t)

# For use of flashutil preparing for reload
polaris_flashlib_read(polaris_pman_t)
polaris_flashlib_write(polaris_pman_t)
`)

# File description leaks for TDL db lock files as processes are managed by
# pman.
# TODO Eventually these fd leaks should be fixed in the calling processes
#
# Note that TDL db lock file interfaces are typically generated by TDL and
# are not found in our local .if files
polaris_tdlresolve_read(polaris_pman_t)
polaris_db_tdlb_ios_oper_use(polaris_pman_t)

```

```

ifdef(`nyquist_platform',`
polaris_db_tdldb_ewlc_operational_use(polaris_pman_t)
polaris_db_tdldb_rogued_use(polaris_pman_t)
polaris_db_tdldb_ewlc_config_use(polaris_pman_t)
polaris_db_tdldb_wstatsd_use(polaris_pman_t)
polaris_db_tdldb_client_global_use(polaris_pman_t)
')

# delete /tmp/booted from linux_iosd_image_post_exit.sh when iosd goes down.
# For example: preparing for reload.
gen_require(`
    type polaris_iosd_tmp_files_t;
')
allow polaris_pman_t polaris_iosd_tmp_files_t:file { delete_file_perms open };

# Upon exit of a process, pman needs to remove sai directory and files
# associated with the process
polaris_pvp_delete_sai_files(polaris_pman_t)
#rsync port want to establish Tcp connection
#runs over /usr/bin/rsync
corenet_tcp_connect_rsync_port(polaris_pman_t)
rsync_entry_type(polaris_pman_t)

ifdef(`crankshaft_family',`
# Provide process signal perms to pman.
polaris_caf_proc_signal_perms(polaris_pman_t)
')

# open connections from processes managed by pman can leak. The selinux
# errors associated with these typically come from a forked and renamed
# elastic process like wncd_0. During process forking/startup, node
# binds may cause denials as they are brought up by pman
ifdef(`ngwc_family',`
corenet_tcp_bind_generic_node(polaris_pman_t)
corenet_udp_bind_generic_node(polaris_pman_t)
corenet_tcp_connect_lisp_cons_control_port(polaris_pman_t)
')

# pman can stop itself on reload
allow polaris_pman_t self:capability kill;

# For pmanlite, allow pman's grand-children rsync to be able to operate on pipe created by pman.
gen_require(`
    type rsync_t;
')
polaris_use_pman_fifo(rsync_t)

ifdef(`sumatra_platform',`

```

```
# Allow pman to execute cman_fp in the polaris_cm_fp_t domain
polaris_cm_fp_domtrans(polaris_pman_t)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispman.te
```

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

dnl Nyquist Platform Max Bay Limits

```
max_bay_map_set(rp, `per_bay', 0)
```

```
max_bay_map_set(cc, `per_bay', 0)
```

```
max_bay_map_set(fp, `per_bay', 0)
```

dnl in elastic scope each process has its own value

```
max_elastic_map_set(rp, `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(cc, `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(fp, `elasitic', BPROC_ODM, 0)
```

```
max_elastic_map_set(rp, `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(cc, `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(fp, `elastic', BPROC_WNCD, 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/nyquistmaps.m4
```

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#

# Aug 2020, Sridhar

#

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#

```
## <summary>Polaris xcopy Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
##   Execute xcopy related scripts in its own domain.
```

```
## </summary>
```

```
## <param name="domain">
```

```
##   <summary>
```

```
##   Domain allowed to transition.
```

```

## </summary>
## </param>
#
interface(`polaris_xcopy_script_domtrans`,`
    gen_require(`
        type polaris_xcopy_script_t, polaris_xcopy_script_exec_t;
    `)

    domtrans_pattern($1, polaris_xcopy_script_exec_t, polaris_xcopy_script_t)
)
#
#####
## <summary>
## xcopy progress temp file access
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_xcopy_tmp_manage`,`
    gen_require(`
        type polaris_xcopy_tmp_t;
    `)

    manage_dirs_pattern($1,polaris_xcopy_tmp_t, polaris_xcopy_tmp_t)
    manage_files_pattern($1,polaris_xcopy_tmp_t, polaris_xcopy_tmp_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisxcopy.if

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```

#
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#
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#

## <summary>Polaris dmi_ncsshd_mgmt Policy Rules.</summary>

#####
## <summary>
## Read polaris_ncsshd_keys_t files, effectively access
## /tmp/.ncsshd_authorized_keys created by psd and read by ncsshd
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ncsshd_authorized_keys_read`,`
    gen_require(`
        type polaris_ncsshd_keys_t;
    `)
    read_files_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)
    list_dirs_pattern($1, polaris_ncsshd_keys_t, polaris_ncsshd_keys_t)
`)

```

```
#####
```

```

## <summary>
## Watch /var/run/netns and list contents
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_watch_netns`,`
    gen_require(`
        type ifconfig_var_run_t;
    `)
    list_dirs_pattern($1, ifconfig_var_run_t, ifconfig_var_run_t)
    allow $1 ifconfig_var_run_t:dir watch;
`)

```

```
#####
```

```

## <summary>
## Manage polaris_pttcd_tmp_t files, effectively files
## under /tmp/tmp/pub/interceptor
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_interceptor_manage`,`
    gen_require(`
        type polaris_pttcd_tmp_t;
    `)
    manage_files_pattern($1, polaris_pttcd_tmp_t, polaris_pttcd_tmp_t)
`)

```

```

    manage_dirs_pattern($1, polaris_pttcd_tmp_t, polaris_pttcd_tmp_t)
    allow $1 polaris_pttcd_tmp_t:{ dir file } watch;
)

#####
## <summary>
##   Execute a domain transition to run ncsshd polaris process.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ncsshd_mgmt_domtrans`,`
    gen_require(`
        type polaris_dmi_ncsshd_mgmt_t, polaris_dmi_ncsshd_mgmt_exec_t;
    `)

    domtrans_pattern($1, polaris_dmi_ncsshd_mgmt_exec_t, polaris_dmi_ncsshd_mgmt_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmincsshdmgmt.if

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```

#
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#
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#

## <summary>Polaris cm_rp Policy Rules.</summary>

#####
## <summary>
## Execute cmand_fp in the polaris_cm_fp_t domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_cm_rp_domtrans`,`
    gen_require(`
        type polaris_cm_rp_t, polaris_cm_rp_exec_t;
    `)

```



```

)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_cm_rp_exec_t, polaris_cm_rp_t)
)

#####
## <summary>
##   Write into fifo file created by cmrp, typical case when
##   cmrp starts script under popen.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_cmrp_use_fifo`,`
    gen_require(`
        type polaris_cm_rp_t;
    `)

    write_fifo_files_pattern($1, polaris_cm_rp_t, polaris_cm_rp_t)
)

#####
## <summary>
##   Write/read /tmp/pfu_overtime.lock file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cm_rp_tmp_manage`,`
    gen_require(`
        type polaris_cm_rp_tmp_t;
        type tmp_t;
    `)
    manage_dirs_pattern($1, { tmp_t polaris_cm_rp_tmp_t }, polaris_cm_rp_tmp_t)
    manage_files_pattern($1, { tmp_t polaris_cm_rp_tmp_t }, polaris_cm_rp_tmp_t)
)

#####
## <summary>
##   Setup policies to access dir and file

```

```

## /vol/harddisk/.inv/inv_log_file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cm_rp_inv_log_setup`,`
    gen_require(`
        type polaris_cm_rp_inv_log_file_t;
        type polaris_disk_harddisk_t;
        type polaris_disk_bootflash_t;
    `)
    filetrans_pattern($1, {polaris_disk_harddisk_t polaris_disk_bootflash_t}, polaris_cm_rp_inv_log_file_t, dir,
".inv")
    # allow access to /vol/harddisk/.inv
    manage_dirs_pattern($1, {polaris_disk_harddisk_t polaris_disk_bootflash_t}, polaris_cm_rp_inv_log_file_t)
    # allow access to /vol/harddisk/.inv/inv_log_file
    manage_files_pattern($1,{polaris_cm_rp_inv_log_file_t}, polaris_cm_rp_inv_log_file_t)
)`)

```

```
#####
```

```

## <summary>
## Write into /tmp/codesign.txt file created by cm_rp
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_cm_rp_tmp_write`,`
    gen_require(`
        type polaris_cm_rp_tmp_t;
    `)
    write_files_pattern($1, { tmp_t polaris_cm_rp_tmp_t }, polaris_cm_rp_tmp_t)
)`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmrp.if

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```

#
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```

```

#

policy_module(polarisvdaemon, 1.0);

gen_require(
    type polaris_vdaemon_t;
)
polaris_chasfs_manage(polaris_vdaemon_t)
# read and write /bootflash/sdwan/etc/vdaemon_gen_id
polaris_bootflash_manage(polaris_vdaemon_t)
polaris_tdlresolve_read(polaris_vdaemon_t)
polaris_cpld_read(polaris_vdaemon_t)
polaris_flashlib_read(polaris_vdaemon_t)

polaris_ripc_sman_ui_serv_connect(polaris_vdaemon_t)

polaris_db_tlddb_dir_use(polaris_vdaemon_t)

logging_send_syslog_msg(polaris_vdaemon_t)

# vconfd_load_shared_schemas
polaris_confd_shared_schema_read(polaris_vdaemon_t)

# manage /etc/viptela
polaris_cedge_etc_manage(polaris_vdaemon_t)

polaris_cedge_reset_ns(polaris_vdaemon_t)

# calls ifconfig for tun_0_0 interface
sysnet_domtrans_ifconfig(polaris_vdaemon_t)

# calls dmidecode get system serial number
dmidecode_domtrans(polaris_vdaemon_t)

# /var/run/.vdaemon socket and pid
type polaris_vdaemon_var_run_t;
files_pid_file(polaris_vdaemon_var_run_t)
manage_files_pattern(polaris_vdaemon_t, polaris_vdaemon_var_run_t, polaris_vdaemon_var_run_t)
manage_sock_files_pattern(polaris_vdaemon_t, polaris_vdaemon_var_run_t, polaris_vdaemon_var_run_t)
files_pid_filetrans(polaris_vdaemon_t, polaris_vdaemon_var_run_t, { file sock_file })

polaris_ttm_var_sock_write(polaris_vdaemon_t)

# generate_instance_uuid reads /sys/devices/virtual/dmi/id/product_uuid
dev_read_sysfs(polaris_vdaemon_t)

# vip_util_set_fd_limits calls setrlimit
allow polaris_vdaemon_t self:process { setrlimit setpgid };

```

```

allow polaris_vdaemon_t self:capability { dac_override fowner sys_resource };

# vdaemon_init_tunn_intf initialize tun_0_0 in vrf 1
allow polaris_vdaemon_t self:tun_socket create;
corenet_rw_tun_tap_dev(polaris_vdaemon_t)

polaris_persistent_watch(polaris_vdaemon_t)
# from vdaemon_misc.c vdaemon_init_inotify function
polaris_cedge_etc_watch(polaris_vdaemon_t)

# set_netns_with_etc mounts on / and /sys
# set_netns_with_etc opens /etc/netns/1 dir
polaris_namespace_set_netns_with_etc(polaris_vdaemon_t)
# DNS thread complains about tmp_t mounton
# on /sys when switching namespace
gen_require(
    type tmp_t;
)
allow polaris_vdaemon_t tmp_t:dir mounton;

# vip_util_set_ns opens /var/run/netns/*
polaris_cedge_set_ns(polaris_vdaemon_t)
# vip_dns_process_request switches namespace from linux n/w namespace to
# original mount namespace
allow polaris_vdaemon_t self:capability { net_admin sys_chroot };
allow polaris_vdaemon_t self:udp_socket { bind connect create getattr getopt setopt shutdown };

# control linux routes vip_route_delete and vdaemon_setup_system_ip_route
allow polaris_vdaemon_t self:netlink_route_socket { bind create getattr nlmsg_read nlmsg_write };

# binds to vbond udp ports
corenet_udp_bind_generic_node(polaris_vdaemon_t)
corenet_udp_bind_polaris_vbond_port(polaris_vdaemon_t)

# though default ports exist, users can configure the tcp ports in vManage and vSmart
corenet_tcp_connect_all_ports(polaris_vdaemon_t)

# vbond_proc_hello executes VIP_CDB_BACKUP_SCRIPT
polaris_confd_domtrans(polaris_vdaemon_t)
# VIP_CDB_BACKUP_SCRIPT makes use of /etc/confd/confd_ipc_secret
auth_map_passwd(polaris_vdaemon_t)

# vdaemon_write_authorized_keys_to_ncsshd opens VDAEMON_NCSSHD_AUTH_KEY_FILE file
polaris_ncsshd_keys_manage(polaris_vdaemon_t)
# vbond_encode_version opens /etc/version
polaris_confd_etc_read(polaris_vdaemon_t)

```

```
# generate_or_parse_uuid() invokes uuid_generate that needs read on
# random-number generator devices (e.g., /dev/random).
dev_read_rand(polaris_vdaemon_t)
```

```
# vdaemon_exec_iptables() is invoked by vdaemon all over the place
iptables_domtrans(polaris_vdaemon_t)
```

```
allow polaris_vdaemon_t self:capability net_raw;
allow polaris_vdaemon_t self:rawip_socket create_socket_perms;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvdaemon.te
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```

```
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#
```

```
## <summary>Polaris fman_rp Policy Rules.</summary>
```

```
#####
```

```
## <summary>
##   Manage mqipc fmrp2fpm shared memory file in /dev/shm directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_fmrp2fpm_mqipc_use`,
gen_require(`
type polaris_fmrp2fpm_mqipc_t;
`)
polaris_mqipc_use($1, polaris_fmrp2fpm_mqipc_t)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmanrp.if
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```

```
dnl
dnl May 2019
dnl
dnl Copyright (c) 2019 by Cisco Systems, Inc.
```

```

dnl All rights reserved
dnl
dnl confined and permissive domain maps
divert(-1)
define(`permissive_domain', `defn(format(``permissive_domain[%s]", `$1'))')
define(`permissive_domain_set', `define(format(``permissive_domain[%s]", `$1'), `$2'))

define(`confined_domain', `defn(format(``confined_domain[%s]", `$1'))')
define(`confined_domain_set', `define(format(``confined_domain[%s]", `$1'), `$2'))

dnl
dnl list of all subjects that should be in confined mode
dnl
confined_domain_set(`polaris_iosd_t', `polaris_iosd_t')

dnl
dnl list of all subjects that should be placed in permissive mode
dnl
permissive_domain_set(`polaris_nginx_t', `polaris_nginx_t')
permissive_domain_set(`polaris_nginx_webui_t', `polaris_nginx_webui_t')
permissive_domain_set(`polaris_nginx_webui_install_t', `polaris_nginx_webui_install_t')
divert(0)dnl

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/domainmaps.m4
No license file was found, but licenses were detected in source scan.

#
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#
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#

/tmp/dbgmn_log_svr gen_context(system_u:object_r:polaris_fed_sock_t,s0)

/tmp/fed_post_result -- gen_context(system_u:object_r:polaris_fed_tmp_t,s0)

/flash/shfwd_params.txt gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwcfed.fc
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#

```

```

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#
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#

policy_module(polarisrollbacktimer, 1.0);

polaris_process_domain_template(rbtimer)

corecmd_exec_bin(polaris_rbtimer_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_rbtimer_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_rbtimer_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_rbtimer_t)

# work with /tmp files
type polaris_rbtimer_tmp_t;
files_tmp_file(polaris_rbtimer_tmp_t)
manage_dirs_pattern(polaris_rbtimer_t, tmp_t, polaris_rbtimer_tmp_t)
manage_files_pattern(polaris_rbtimer_t, polaris_rbtimer_tmp_t, polaris_rbtimer_tmp_t)
manage_fifo_files_pattern(polaris_rbtimer_t, polaris_rbtimer_tmp_t, polaris_rbtimer_tmp_t)
files_tmp_filetrans(polaris_rbtimer_t, polaris_rbtimer_tmp_t, { file dir })

# work with /bootflash/.rollback_timer (RBT_CONTROL_DIR) file
type polaris_rbtimer_bootflash_t;
polaris_disk_type(polaris_rbtimer_bootflash_t)
polaris_rbtimer_bootflash_manage(polaris_rbtimer_t)

allow polaris_rbtimer_t self:capability sys_resource;
allow polaris_rbtimer_t self:capability dac_override;
allow polaris_rbtimer_t self:process setpgid;

polaris_btrace_data_manage(polaris_rbtimer_t)
polaris_chasfs_manage(polaris_rbtimer_t)
polaris_cpld_read(polaris_rbtimer_t)
polaris_boot_tmp_read(polaris_rbtimer_t)
polaris_read_debug_conf(polaris_rbtimer_t)
polaris_proc_rmonbifo_read(polaris_rbtimer_t)
polaris_rmonbifo_tmp_read(polaris_rbtimer_t)
polaris_disk_crashinfo_getattr(polaris_rbtimer_t)
polaris_disk_harddisk_read_lnk(polaris_rbtimer_t)
polaris_bootflash_manage(polaris_rbtimer_t)

```

```

logging_send_syslog_msg(polaris_rbtimer_t)

# uses pidof
domain_read_all_domains_state(polaris_rbtimer_t)
dev_read_sysfs(polaris_rbtimer_t)

#rollbacktimer runs install_engine.sh
polaris_install_engine_domtrans(polaris_rbtimer_t)

polaris_script_errmsg_use(polaris_rbtimer_t)

# watch over /bootflash/.rollback_timer
allow polaris_rbtimer_t polaris_rbtimer_bootflash_t:dir watch;
# watch over /tmp/rp/rollback_timer
allow polaris_rbtimer_t polaris_rbtimer_tmp_t:dir watch;

# access to /tmp/ufs//crashinfo
optional_policy(`
polaris_ncd_tmp_read(polaris_rbtimer_t)
')
# access to read packages.conf
polaris_read_packages_conf(polaris_rbtimer_t)

# access to /cdrom0/ when *ova image is booted during
# first instance of vwlc on ucs server
polaris_removable_read(polaris_rbtimer_t)

# access to "/bootflash/.installer/install_abort_timer_val"
polaris_disk_install_read(polaris_rbtimer_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrollbacktimer.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisbhytoolsd, 1.0);

polaris_process_domain_template(bhytoolsd)

polaris_btrace_data_manage(polaris_bhytoolsd_t)
polaris_chasfs_manage(polaris_bhytoolsd_t)

```



```
polaris_cpld_read(polaris_bhytoolsd_t)
```

```
# vmttoolsd transtions from polaris_bhytoolsd_t to vmttools_t -  
# bhytoolsd is small wrapper that calls vmttoolsd  
vmttools_domtrans(polaris_bhytoolsd_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbhytoolsd.te
```

```
No license file was found, but licenses were detected in source scan.
```

```
#  
# August 2017, Shawn Lu  
#  
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#
```

```
policy_module(polarismobilityd, 1.0);
```

```
gen_require(  
    type polaris_mobilityd_t;  
)
```

```
polaris_btrace_data_manage(polaris_mobilityd_t)  
polaris_crft_data_manage(polaris_mobilityd_t)  
polaris_chasfs_manage(polaris_mobilityd_t)  
polaris_tdlresolve_read(polaris_mobilityd_t)  
polaris_tdlldb_list_dirs(polaris_mobilityd_t)  
polaris_cpld_read(polaris_mobilityd_t)  
polaris_lua_read(polaris_mobilityd_t)  
polaris_flashlib_read(polaris_mobilityd_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_mobilityd_t)
```

```
polaris_db_tdlldb_dir_use(polaris_mobilityd_t)
```

```
# allow to use setrlimit  
allow polaris_mobilityd_t self:capability sys_resource;  
allow polaris_mobilityd_t self:process setrlimit;  
allow polaris_mobilityd_t self:capability dac_override;  
allow polaris_mobilityd_t self:udp_socket { create_socket_perms recv_msg send_msg };
```

```
logging_send_syslog_msg(polaris_mobilityd_t)
```

```
polaris_lfts_dev_use(polaris_mobilityd_t)
```

```
polaris_cpld_read(polaris_mobilityd_t)
```

polaris\_odm\_clnt2svr\_mqipc\_create(polaris\_mobilityd\_t)

polaris\_tmp\_tdldb\_persist\_setup(polaris\_mobilityd\_t)

polaris\_tdldbpersist\_setup(polaris\_mobilityd\_t)

corenet\_udp\_bind\_generic\_node(polaris\_mobilityd\_t)

corenet\_udp\_bind\_polaris\_mobility\_ctl\_port(polaris\_mobilityd\_t)

corenet\_udp\_bind\_polaris\_mobility\_data\_port(polaris\_mobilityd\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismobilityd.te

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#

# June 2017, Victor Kamensky

#

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#

/usr/binos/conf/wui-lighttpd-launch.sh -- gen\_context(system\_u:object\_r:polaris\_webui\_lighttpd\_exec\_t,s0)

/usr/binos/conf/wui-app-launch.sh -- gen\_context(system\_u:object\_r:polaris\_webui\_exec\_t,s0)

/usr/binos/conf/wui-tipc-launch.sh -- gen\_context(system\_u:object\_r:polaris\_webui\_exec\_t,s0)

/webui(/.\*)? gen\_context(system\_u:object\_r:polaris\_webui\_file\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswebui.fc

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#

# April 2017, Victor Kamensky

#

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#

/tmp/.DmiAuth\socket -s gen\_context(system\_u:object\_r:polaris\_dmi\_dmiauthd\_tmp\_t,s0)

/tmp/netconf-yang-diag(/.\*)? gen\_context(system\_u:object\_r:polaris\_dmi\_dmiauthd\_tmp\_diags\_t,s0)

/usr/binos/conf/dmid\_diag\_logs.sh -- gen\_context(system\_u:object\_r:polaris\_dmid\_diag\_logs\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmidmiauthd.fc

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```
#
# August 2017, Shawn Lu
#
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#

# polarisrrmmgr file contexts place holder

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrrmmgr.fc
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#
# May 2017, Victor Kamensky
#
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#

## <summary>Polaris pttcd Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispttcd.if
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#
# March 2017, Victor Kamensky
#
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#

/usr/binos/conf/oom.sh -- gen_context(system_u:object_r:polaris_oom_exec_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisoom.fc
No license file was found, but licenses were detected in source scan.

#
# July 2020, Swati Kumari
#
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#

policy_module(polarisptdrp, 1.0);
```

```

gen_require(
    type polaris_ptpd_rp_t;
)
polaris_chasfs_read(polaris_ptpd_rp_t)
polaris_cpld_read(polaris_ptpd_rp_t)
polaris_tdlresolve_read(polaris_ptpd_rp_t)
polaris_lsmapi_dev_use(polaris_ptpd_rp_t)

# ptpd needs to have open,read,write access with /dev/ds31408
polaris_ds31408_dev_use(polaris_ptpd_rp_t)

# blzi device
polaris_blzi_dev_use(polaris_ptpd_rp_t)

allow polaris_ptpd_rp_t self:capability sys_nice;
allow polaris_ptpd_rp_t self:process setsched;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisptpdrrp.te
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#
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#
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#

/tmp/lsm.log -- gen_context(system_u:object_r:polaris_epc_ws_liaison_tmp_t,s0)

/tmp/epc_ws(/.*)? gen_context(system_u:object_r:polaris_epc_ws_liaison_tmp_t,s0)

# CLI: show platform software wireshark
/usr/bin/os/conf/wireshark_show.sh -- gen_context(system_u:object_r:polaris_wireshark_show_exec_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisepcwsliaison.fc
No license file was found, but licenses were detected in source scan.

#
# July 2017, Victor Kamensky
#
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#

policy_module(polarisgsdrp, 1.0);

```

```

gen_require(
    type polaris_gsd_rp_t;
)

#allow to run readlink /dev/loop0 & /bin/date
corecmd_exec_bin(polaris_gsd_rp_t)

#run ldd, which in turn exec "ld.so --verify"
libs_exec_ld_so(polaris_gsd_rp_t)

# allow to run mount in its own domain
mount_domtrans(polaris_gsd_rp_t)
# awk -v what=^.BuildPath: $pkginfo_file ~ what { print $2 } /tmp/sw/boot/pkginfo
polaris_boot_tmp_read(polaris_gsd_rp_t)
polaris_btrace_data_manage(polaris_gsd_rp_t)
polaris_chasfs_manage(polaris_gsd_rp_t)
polaris_read_debug_conf(polaris_gsd_rp_t)
polaris_disk_crashinfo_getattr(polaris_gsd_rp_t)
polaris_guestshell_exec_files_exec(polaris_gsd_rp_t)
polaris_guestshell_files_read(polaris_gsd_rp_t)
polaris_ncd_tmp_read(polaris_gsd_rp_t)
polaris_proc_rmonbifo_read(polaris_gsd_rp_t)
polaris_cpld_read(polaris_gsd_rp_t)
polaris_bootflash_read(polaris_gsd_rp_t)
polaris_harddisk_read(polaris_gsd_rp_t)

# read /proc/cmdline
kernel_read_system_state(polaris_gsd_rp_t)

auth_use_nsswitch(polaris_gsd_rp_t)
polaris_rmonbifo_tmp_read(polaris_gsd_rp_t)

allow polaris_gsd_rp_t self:capability { dac_override sys_resource };
allow polaris_gsd_rp_t self:process setpgid;

type polaris_gsd_rp_tmp_t;
files_tmp_file(polaris_gsd_rp_tmp_t)
manage_dirs_pattern(polaris_gsd_rp_t, tmp_t, polaris_gsd_rp_tmp_t)
manage_files_pattern(polaris_gsd_rp_t, tmp_t, polaris_gsd_rp_tmp_t)
manage_fifo_files_pattern(polaris_gsd_rp_t, polaris_gsd_rp_tmp_t, polaris_gsd_rp_tmp_t)
# work with /tmp/guestshell_stk directory
files_tmp_filetrans(polaris_gsd_rp_t, polaris_gsd_rp_tmp_t, dir, "guestshell_stk")

gen_require(
    type rsync_t;
)
rsync_entry_domtrans(polaris_gsd_rp_t, rsync_t)
allow rsync_t polaris_gsd_rp_t:process sigchld;

```

```

# read /opt/cisco/caf directory
polaris_caf_files_read(polaris_gsd_rp_t)

gen_require(
    type polaris_caf_api_port_t;
    type polaris_caf_exec_t;
)
allow polaris_gsd_rp_t polaris_caf_api_port_t:tcp_socket name_connect;
allow polaris_gsd_rp_t polaris_caf_exec_t:file { getattr open read };
allow polaris_gsd_rp_t tmp_t:dir { create rmdir };

polaris_flashlib_read(polaris_gsd_rp_t)
polaris_flashlib_write(polaris_gsd_rp_t)

# watch over /tmp/udev/etc/udev
polaris_udev_tmp_read(polaris_gsd_rp_t)
polaris_udev_tmp_watch(polaris_gsd_rp_t)
# watch over /bootflash/gs_script
polaris_persistent_watch(polaris_gsd_rp_t)
#allow iox_ha_utils.sh to read /etc/docker/daemon.json.
gen_require(
    type container_config_t;
)
read_files_pattern(polaris_gsd_rp_t, container_config_t, container_config_t)

# allow guestshell_ha.sh to log messages
logging_send_syslog_msg(polaris_gsd_rp_t)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisgsdrp.te
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```

```

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#

```

```

## <summary>Polaris Rmonbifo Policy Rules.</summary>

```

```

#####
# Polaris Rmonbifo Driver policy
#####

```

```

#####
## <summary>

```

```

## Read /proc/rmbonbifo files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_proc_rmonbifo_read`,`
gen_require(`
type polaris_proc_rmonbifo_t;
`)
read_files_pattern($1, polaris_proc_rmonbifo_t, polaris_proc_rmonbifo_t)
list_dirs_pattern($1, polaris_proc_rmonbifo_t, polaris_proc_rmonbifo_t)
`)

#####
## <summary>
## Getattr of /proc/rmbonbifo files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_proc_rmonbifo_getattr`,`
gen_require(`
type polaris_proc_rmonbifo_t;
`)
getattr_files_pattern($1, polaris_proc_rmonbifo_t, polaris_proc_rmonbifo_t)
`)

#####
## <summary>
## Read /tmp/sw/boot/rmbonbifo files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_rmonbifo_tmp_read`,`
gen_require(`
type polaris_rmonbifo_tmp_t;
type polaris_boot_tmp_t;
`)

```

```
read_files_pattern($1, polaris_rmonbifo_tmp_t, polaris_rmonbifo_tmp_t)
# /tmp/sw/boot/rmonbifo dir is inside of polaris_boot_tmp_t dir
search_dirs_pattern($1, polaris_boot_tmp_t, polaris_rmonbifo_tmp_t)
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrmonbifo.if
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
/usr/binos/conf/ncd.sh -- gen_context(system_u:object_r:polaris_ncd_exec_t,s0)
/etc/conf/unifiedfs/mount_data gen_context(system_u:object_r:polaris_ncd_etc_t,s0)
```

```
/usr/binos/conf/iosd_console_attach.sh -- gen_context(system_u:object_r:polaris_console_attach_exec_t,s0)
```

```
/usr/binos/conf/unifiedfs/unifiedfs_helper.sh -- gen_context(system_u:object_r:polaris_ufs_helper_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisncd.fc
No license file was found, but licenses were detected in source scan.
```

```
#
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#
```

```
## <summary>Polaris iosd Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Make the specified domain able to work with /tmp/restconf
```

```
## </summary>
```

```
## <param name="type">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_restconf_tmp_use',`
```



```

gen_require(
    type polaris_restconf_tmp_t;
)

manage_files_pattern($1, polaris_restconf_tmp_t, polaris_restconf_tmp_t)
manage_dirs_pattern($1, polaris_restconf_tmp_t, polaris_restconf_tmp_t)
)

```

```

#####
## <summary>
##   Create domain for IOSD Polaris processes. Note
##   depending on policy build setting it could be confined or
##   not confined
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="entry_point">
## <summary>
##   Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#
interface( polaris_iosd_domain,`
    polaris_process_domain_confined($1, $2)

    polaris_iosd_maybe_unconfined($1)
)

```

```

#####
## <summary>
##   Make the specified domain able to work with iosd2iox files
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface( polaris_iosd2iox_tmp_manage,`
    gen_require(
        type polaris_iosd2iox_tmp_t;
    )

    manage_files_pattern($1, polaris_iosd2iox_tmp_t, polaris_iosd2iox_tmp_t)
)

```

```

')

#####
## <summary>
##   Make the specified domain able to read iosd2iox files
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iosd2iox_tmp_read`,`
    gen_require(`
        type polaris_iosd2iox_tmp_t;
    `)

    read_files_pattern($1,polaris_iosd2iox_tmp_t,polaris_iosd2iox_tmp_t)
)

```

```

#####
## <summary>
## Send messages to iosd unix datagram sockets.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_iosd_dgram_send`,`
    gen_require(`
        type polaris_iosd_t;
    `)

    allow $1 polaris_iosd_t:unix_dgram_socket sendto;
)

```

```

#####
## <summary>
##   Make the specified domain to read /tmp/rp/.iosp_dmiauthd
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_dmiauthd_token_read`,`
    gen_require(`
        type polaris_dmiauthd_token_t;
    `)

    read_files_pattern($1, polaris_dmiauthd_token_t, polaris_dmiauthd_token_t)
)

```

```

#####
## <summary>
##   Make the specified domain to read /tmp/rp/.iosp_gnmib
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_gnmib_token_read`,`
    gen_require(`
        type polaris_gnmib_token_t;
    `)

    manage_files_pattern($1, polaris_gnmib_token_t, polaris_gnmib_token_t)
)

```

```

#####
## <summary>
##   Make the specified domain able to work with files
##   with polaris_iosd_tmp_files_t
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_iosd_tmp_file_use`,`
    gen_require(`
        type polaris_iosd_tmp_files_t;
    `)

    manage_files_pattern($1, polaris_iosd_tmp_files_t, polaris_iosd_tmp_files_t)
    allow $1 polaris_iosd_tmp_files_t:sock_file { manage_sock_file_perms };
)

```

```

#####
## <summary>

```

```

## Manage /bootflash/geodb/ files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface('polaris_geodb_files_manage',`
    gen_require(`
        type polaris_geodb_files_t;
    `)

    manage_files_pattern($1, polaris_geodb_files_t, polaris_geodb_files_t)
    manage_dirs_pattern($1, polaris_geodb_files_t, polaris_geodb_files_t)
    manage_lnk_files_pattern($1, polaris_geodb_files_t, polaris_geodb_files_t)
`)

#####
## <summary>
## Allow the specified domain to read /boot/vcpu_template.txt
## or /csl_p_0/vcpu_template.txt
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface('polaris_iosd_vcpu_read',`
    gen_require(`
        type polaris_iosd_vcpu_t;
        type polaris_disk_varied_t;
        type polaris_disk_csl_p_t;
    `)

    read_files_pattern($1, { polaris_disk_varied_t polaris_disk_csl_p_t }, polaris_iosd_vcpu_t)
`)

#####
## <summary>
## Allow the specified domain to read /tmp/usb-disable
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>

```

```

## </param>
#
interface(`polaris_iosd_usb_disable_tmp_manage`,`
    gen_require(`
        type polaris_iosd_usb_disable_tmp_t;
    `)

    manage_files_pattern($1, polaris_iosd_usb_disable_tmp_t, polaris_iosd_usb_disable_tmp_t)
    files_tmp_filetrans($1, polaris_iosd_usb_disable_tmp_t, file, "usb-disable")
)

```

```

#####
## <summary>
##   Allow the specified domain to access /bootflash/EFI
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_efi_files_list_dirs`,`
    gen_require(`
        type polaris_efi_files_t;
    `)

    list_dirs_pattern($1, polaris_efi_files_t, polaris_efi_files_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiosd.if  
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```

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#

```

# polarissmd file contexts place holder

```

# dc_profile_dir
/mnt/sd3/user/dc_profile_dir(/.*)? gen_context(system_u:object_r:polaris_smd_disk_t,s0)
/flash1/user/dc_profile_dir(/.*)? gen_context(system_u:object_r:polaris_smd_disk_t,s0)
/bootflash/dc_profile_dir(/.*)? gen_context(system_u:object_r:polaris_smd_disk_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissmd.fc

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#

# March 2017, Victor Kamensky

#

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#

# polarismqipc file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismqipc.fc

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#

# July 2017, Victor Kamensky

#

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#

## <summary>Polaris iomd Policy Rules.</summary>

#####

## <summary>

## Work (read, write, ioctl) with /dev/ngio[0-9+] devices

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_ngio\_dev\_use`,`

gen\_require(`

type device\_t;

type polaris\_ngio\_device\_t;

`)

write\_chr\_files\_pattern(\$1, device\_t, polaris\_ngio\_device\_t)

read\_chr\_files\_pattern(\$1, device\_t, polaris\_ngio\_device\_t)

`)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiomd.if

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```

#
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#

policy_module(polarisrepm, 1.0);

gen_require(
    type polaris_repm_t;
)

polaris_btrace_data_manage(polaris_repm_t)
polaris_crft_data_manage(polaris_repm_t)
polaris_chasfs_manage(polaris_repm_t)
polaris_tdlresolve_read(polaris_repm_t)
polaris_tdlldb_list_dirs(polaris_repm_t)
polaris_cpld_read(polaris_repm_t)
polaris_lua_read(polaris_repm_t)
polaris_flashlib_read(polaris_repm_t)

polaris_ripc_sman_ui_serv_connect(polaris_repm_t)

polaris_db_tdlldb_dir_use(polaris_repm_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_repm_t)

allow polaris_repm_t self:capability { sys_resource dac_override };
allow polaris_repm_t self:process setrlimit;

# temporary files created for repm in /tmp/replication
type polaris_repm_tmp_t;
files_tmp_file(polaris_repm_tmp_t)
polaris_systemd_tmpfiles_tmp_filetrans(polaris_repm_tmp_t, dir, "replication")
manage_files_pattern(polaris_repm_t, polaris_repm_tmp_t, polaris_repm_tmp_t)

polaris_dyncfg_tmp_read(polaris_repm_t)

polaris_tdlldbpersist_setup(polaris_repm_t)

polaris_tmp_tdlldb_persist_setup(polaris_repm_t)

# send syslog
logging_send_syslog_msg(polaris_repm_t)

# mq.-local_rp_1_0

```

```

type polaris_repm_local_rp_mqipc_t;
polaris_mqipc_type(polaris_repm_local_rp_mqipc_t)

polaris_mqipc_create_name(polaris_repm_t, polaris_repm_local_rp_mqipc_t, local_rp_1_0)
polaris_mqipc_create_name(polaris_repm_t, polaris_repm_local_rp_mqipc_t, local_rp_0_0)

# repm peer mqipc queues under /dev/shm/repm_peer_mq folder
type polaris_repm_peer_mqipc_t;
polaris_mqipc_type(polaris_repm_peer_mqipc_t)
polaris_mqipc_create_name_dir(polaris_repm_t, polaris_repm_peer_mqipc_t, repm_peer_mq)

# repm invokes installer_api_* api's which need access to /bootflash/.installer/install_issu_state
polaris_install_disk_read(polaris_repm_t)

ifdef(^petra_platform',
#allow access to polaris_cm_rp sem for chasfs
polaris_cm_rp_sem_use(polaris_repm_t)
#allow access to /flash12/moncfg/cfg.dat for config
polaris_swipedrive_file_manage(polaris_repm_t)

')

# execute /bin/tar
corecmd_exec_bin(polaris_repm_t)
# tar reads /etc/passwd
auth_use_nsswitch(polaris_repm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrepm.te
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#

## <summary>Polaris NGWC Platform Policy Rules.</summary>

#####
## <summary>
##   Manage ngwc shared memory /dev/shm/ngwc_shm.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>

```



```

## </param>
#
interface(`polaris_ngwc_shm_manage',`
    gen_require(`
        type tmpfs_t;
        type polaris_ngwc_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_ngwc_shm_t)
    allow $1 polaris_ngwc_shm_t:file map;
    filetrans_pattern($1, tmpfs_t, polaris_ngwc_shm_t, file, "ngwc_shm")
)

#####
## <summary>
##   Manage ngwc shared memory /dev/shm/ngwc_scc_shm.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ngwc_scc_shm_manage',`
    gen_require(`
        type tmpfs_t;
        type polaris_ngwc_scc_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_ngwc_scc_shm_t)
    allow $1 polaris_ngwc_scc_shm_t:file map;
    filetrans_pattern($1, tmpfs_t, polaris_ngwc_scc_shm_t, file, "ngwc_scc_shm")
)

#####
## <summary>
##   Manage ngwc shared memory /dev/shm/iomd_to_fed_ptp_offload.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ngwc_itfpo_manage',`
    gen_require(`
        type tmpfs_t;

```

```

        type polaris_ngwc_itfpo_t;
    ')
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_ngwc_itfpo_t)
    allow $1 polaris_ngwc_itfpo_t:file map;
    filetrans_pattern($1, tmpfs_t, polaris_ngwc_itfpo_t, file, "iomd_to_fed_ptp_offload")
')

```

```
#####
```

```

## <summary>
##   Manage ngwc sdm shared memory /dev/shm/sdm.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_sdm_shm_manage`,`
    gen_require(`
        type tmpfs_t;
        type polaris_sdm_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_sdm_shm_t)
    filetrans_pattern($1, tmpfs_t, polaris_sdm_shm_t, file, "sdm")
    allow $1 polaris_sdm_shm_t:file map;
')

```

```
#####
```

```
# MMAP Driver for mapping ASIC Memory space
```

```
#####
```

```
#####
```

```

## <summary>
##   Work (read, write, ioctl) with /dev/chdrvmmmap
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_chdrvmmmap_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_chdrvmmmap_device_t;
    `)

```

```

read_chr_files_pattern($1, device_t, polaris_chdrvmmmap_device_t)
write_chr_files_pattern($1, device_t, polaris_chdrvmmmap_device_t)
allow $1 polaris_chdrvmmmap_device_t:chr_file map;
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/gettysburg_dev1
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_gettysburg_fpga_dev_use`,`
gen_require(`
    type device_t;
    type polaris_gettysburg_fpga_device_t;
)
write_chr_files_pattern($1, device_t, polaris_gettysburg_fpga_device_t)
read_chr_files_pattern($1, device_t, polaris_gettysburg_fpga_device_t)
mmap_chr_files_pattern($1, device_t, polaris_gettysburg_fpga_device_t)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/cisco/dplriomem
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dplr_iomem_mmapdrv_dev_use`,`
gen_require(`
    type device_t;
    type polaris_dplr_iomem_mmapdrv_device_t;
)
write_chr_files_pattern($1, device_t, polaris_dplr_iomem_mmapdrv_device_t)
read_chr_files_pattern($1, device_t, polaris_dplr_iomem_mmapdrv_device_t)
allow $1 polaris_dplr_iomem_mmapdrv_device_t:chr_file map;
)

#####
## <summary>
##   Allow access to semaphore of quake flashlib. Pure hack

```

```

## semaphore got created by dyncfg accidently, need to change to
## POSIX semaphore code ASAP.
## LOOK AT ME
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_quake_flashlib_sem_use`,`
    gen_require(`
        type polaris_dyncfg_t;
    `)
    allow $1 polaris_dyncfg_t:sem rw_sem_perms;
`)

#####
## <summary>
##   Manage quake i2c semaphores /dev/shm/sem.i2c_sem00N
## and work with corresponding i2c devices (/dev/i2c-XXX)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_quake_i2c_manage`,`
    gen_require(`
        type tmpfs_t;
        type polaris_quake_i2c_t;
    `)
    manage_files_pattern($1, tmpfs_t, polaris_quake_i2c_t)
    polaris_i2c_use($1)
`)

#####
## <summary>
## Allow caller to read or write the exiting_bays file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
interface(`polaris_rw_exiting_bays`,`
    gen_require(`

```

```

type polaris_proc_exiting_bays_t;
type proc_t;
)

rw_files_pattern($1, polaris_proc_exiting_bays_t, polaris_proc_exiting_bays_t)
# FIXME/TODO:
# The kernel does not reliably create /proc/exiting_bays on all platforms
# The following lines should be removed when CSCvv27097 is addressed
allow $1 polaris_proc_exiting_bays_t:file create;
allow $1 proc_t:file create;
allow $1 proc_t:dir { add_name write };
)

```

```
#####
```

```

## <summary>
## Allow caller to create open write /tmp/fpga_upgrade
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_fpga_upgrade_tmp_use`,`
  gen_require(`
    type polaris_fpga_upgrade_tmp_t;
  `)
  allow $1 polaris_fpga_upgrade_tmp_t:file { create open write };
)

```

```
#####
```

```

## <summary>
## Execute a domain transition to run cat9k_ssd_unmount.sh
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_ssd_unmount_domtrans`,`
  gen_require(`
    type polaris_ssd_unmount_t, polaris_ssd_unmount_exec_t;
  `)
  domtrans_pattern($1, polaris_ssd_unmount_exec_t, polaris_ssd_unmount_t)
)

```

```
#####
```

```

## <summary>
## Read lnk_file /ucode0, polaris_disk_ucode0_t.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_ucode0_read_lnk`,`
    gen_require(`
        type polaris_disk_ucode0_t;
    `)
    read_lnk_files_pattern($1, polaris_disk_ucode0_t, polaris_disk_ucode0_t)
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/cisco/fpga_iomem
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_fpga_iomem_mmapfpga_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_fpga_iomem_mmapfpga_device_t;
    `)
    allow $1 polaris_fpga_iomem_mmapfpga_device_t:chr_file map;
    write_chr_files_pattern($1, device_t, polaris_fpga_iomem_mmapfpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_fpga_iomem_mmapfpga_device_t)
`)

#####
## <summary>
## Read Write access to /bootflash/nplasm-power
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_nplasm_power_manage`,`
    gen_require(`

```

```
type polaris_nplusm_power_file_t;
type polaris_disk_bootflash_t;
)
filetrans_pattern($1, polaris_disk_bootflash_t, polaris_nplusm_power_file_t, file, "nplusm-power")
allow $1 polaris_nplusm_power_file_t:file { write create read open getattr unlink };
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwc.if

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```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
/usr/binos/conf/boothelper_evt.sh -- gen_context(system_u:object_r:polaris_boothelper_evt_exec_t,s0)
/tmp/udev(/.*)?          gen_context(system_u:object_r:polaris_udev_tmp_files_t,s0)
```

```
/tmp/rommon_upgrade_ngwc(/.*)?    gen_context(system_u:object_r:polaris_boothelper_tmp_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboothelper.fc

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```
#
# December 2018, Victor Kamensky
#
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# All rights reserved
#
```

```
## <summary>Polaris ezman_cc Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisezmancc.if

No license file was found, but licenses were detected in source scan.

```
dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
define(`polaris_lipc_service_server',`)
define(`polaris_lipc_service_client',`')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_lipc\_fc.m4

No license file was found, but licenses were detected in source scan.

#

# July 2019, Victor Kamensky

#

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#

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisgrmgr.fc

No license file was found, but licenses were detected in source scan.

#

# July 2017, Victor Kamensky

#

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#

/usr/binos/conf/install\_issu\_monitor.sh -- gen\_context(system\_u:object\_r:polaris\_issu\_monitor\_exec\_t,s0)

/tmp/rp/issu\_mon\_dir -d gen\_context(system\_u:object\_r:polaris\_issu\_monitor\_tmp\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisissumonitor.fc

No license file was found, but licenses were detected in source scan.

#

# March 2019, Shikhar Dogra

#

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#

## <summary>Polaris fman\_cc Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfmancc.if

No license file was found, but licenses were detected in source scan.

#

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#

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```

#

## <summary>Polaris smand Policy Rules.</summary>

#####
## <summary>
## Allow domain to be started by smand with
##   transition into specific service domain.
## </summary>
## <param name="domain">
## <summary>
## Type to be used to run utility.
## </summary>
## </param>
## <param name="entry_point">
## <summary>
## Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
interface(`polaris_smand_domain`,`
gen_require(`
type polaris_smand_t;
`)

domtrans_pattern(polaris_smand_t, $2, $1)
`)

#####
## <summary>
## Write into fifo file created by smand, typical case when
##   smand starts script under popen.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_smand_use_fifo`,`
gen_require(`
type polaris_smand_t;
`)

write_fifo_files_pattern($1, polaris_smand_t, polaris_smand_t)
`)

#####

```

```

## <summary>
##  Read access to CRDU fifo file created by smand
## </summary>
## <param name="domain">
##  <summary>
##  Domain allowed access.
##  </summary>
## </param>
## <rolecap/>
#
interface(`polaris_smand_crdu_pipe_read`,`
    gen_require(`
        type polaris_crdu_pipe_tmp_t;
    `)

    read_fifo_files_pattern($1, polaris_crdu_pipe_tmp_t, polaris_crdu_pipe_tmp_t)
`)

#####
## <summary>
##  Manage CRDU fifo file created by smand
## </summary>
## <param name="domain">
##  <summary>
##  Domain allowed access.
##  </summary>
## </param>
## <rolecap/>
#
interface(`polaris_smand_crdu_pipe_manage`,`
    gen_require(`
        type polaris_crdu_pipe_tmp_t;
    `)

    manage_fifo_files_pattern($1, polaris_crdu_pipe_tmp_t, polaris_crdu_pipe_tmp_t)
`)

#####
## <summary>
##  Write to polaris_sman_bshell_serv_lipc_t
## </summary>
## <param name="domain">
##  <summary>
##  Domain allowed to connect and write into this lipc file.
##  </summary>
## </param>
#
interface(`polaris_sman_bshell_serv_lipc_write`,`

```

```

gen_require(
    type polaris_sman_bshell_serv_lipc_t;
    type polaris_smand_t;
)
polaris_lipc_write($1, polaris_sman_bshell_serv_lipc_t, polaris_smand_t)
)

#####
## <summary>
## Manage /tmp/show_ports_tmp
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to manage tmp files.
## </summary>
## </param>
## <rolecap/>
interface(`polaris_trans_ports_tmp_manage`,
    gen_require(
        type polaris_trans_stats_tmp_t;
    )
    manage_files_pattern($1, polaris_trans_ports_tmp_t, polaris_trans_ports_tmp_t)
)

#####
## <summary>
## create /tmp/trans_tmp and /tmp/trans_tmp.1 to store lsof output
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to manage tmp files.
## </summary>
## </param>
## <rolecap/>
interface(`polaris_trans_stats_tmp_manage`,
    gen_require(
        type polaris_trans_stats_tmp_t;
    )
    manage_files_pattern($1, polaris_trans_stats_tmp_t, polaris_trans_stats_tmp_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissmand.if

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# July 2017, Victor Kamensky

#

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```
# All rights reserved
#

/usr/cpp/bin/cpp_cdm_svr -- gen_context(system_u:object_r:polaris_cpp_cdm_exec_t,s0)
```

```
Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppcdm.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris Flashlib Policy Rules.</summary>
```

```
#####
# Flashlib policy (infra/flashlib)
#####
```

```
#####
```

```
## <summary>
## Read Polaris /tmp/.flashlock file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
```

```
#
interface(`polaris_flashlib_lock',`
gen_require(`
    type tmp_t;
    type polaris_flashlib_lock_t;
`)
```

```
manage_files_pattern($1, tmp_t, polaris_flashlib_lock_t)
allow $1 self:capability dac_override;
```

```
ifdef(`quake_platform',`
    polaris_quake_flashlib_sem_use($1)
`)
```

```
# access of .flashlock on ultra
ifdef(`vxe_family',`
    allow $1 self:capability dac_override;
`)
```

```

)

#####
## <summary>
## Write Polaris /tmp/flashdev.log file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_flashlib_log',`
gen_require(`
    type tmp_t;
    type polaris_flashlib_log_t;
)

    manage_files_pattern($1, tmp_t, polaris_flashlib_log_t)
)

#####
## <summary>
## Read partition disk device that contains rommon variables.
## C8KV reads object store and reads grub files in BIOS and EFI partitions.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_flashlib_read',`
gen_require(`
    type device_t;
    type polaris_flashlib_device_t;
)

    polaris_flashlib_lock($1)
    polaris_flashlib_log($1)
    read_blk_files_pattern($1, device_t, polaris_flashlib_device_t)
    read_chr_files_pattern($1, device_t, polaris_flashlib_device_t)
    ifdef(`vxe_family',`
        polaris_vxeinstall_info_read($1)
        polaris_grub_info_read($1)
    )
    ifdef(`vwlc_platform',`
        polaris_vwlcinstall_info_read($1)
        polaris_vwlc_grub_info_read($1)

```

```

    )

    # processes that use tdllib/DB will access romvar
    # via flashlib mcp_getmonvar API which read /objstore.
    optional_policy(`
        polaris_disk_objstore_read($1)
    `)
    polaris_flash_shm_manage($1)
)

#####
## <summary>
## Write partition disk device that contains rommon variables.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_flashlib_write`,`
    gen_require(`
        type device_t;
        type polaris_flashlib_device_t;
    `)

    polaris_flashlib_lock($1)
    write_blk_files_pattern($1, device_t, polaris_flashlib_device_t)
    polaris_flash_shm_manage($1)
)

#####
## <summary>
## Manage ngwc shared memory /dev/shm/flash_shm.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_flash_shm_manage`,`
    gen_require(`
        type tmpfs_t;
        type polaris_flash_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_flash_shm_t)
)

```

```
    allow $1 polaris_flash_shm_t:file map;
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisflashlib.if
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
## <summary>Polaris LUA Policy Rules.</summary>
```

```
#####
# Lua policy
#####
```

```
#####
```

```
## <summary>
## Read Polaris lua files (/lua)
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
```

```
interface(`polaris_lua_read`,
    gen_require(`
        type polaris_lua_file_t;
    `)
)
```

```
allow $1 polaris_lua_file_t:file read_file_perms;
allow $1 polaris_lua_file_t:dir { read_file_perms search_dir_perms };
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislua.if
No license file was found, but licenses were detected in source scan.
```

```
#
# July 2017, Victor Kamensky
#
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```

#

## <summary>Polaris tamd\_rp Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristamdrp.if

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris polarisiptbl Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiptbl.if

No license file was found, but licenses were detected in source scan.

#

# April 2018, Victor Kamensky

#

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#

# autopolarisplatformipcbase file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/autopolarisplatformipcbase.fc

No license file was found, but licenses were detected in source scan.

#

# February 2020, Victor Kamensky

#

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#

policy\_module(polarisdmiportsfetch, 1.0);

gen\_require(`

    type polaris\_dmi\_ports\_fetch\_t;

`)

polaris\_chasfs\_manage(polaris\_dmi\_ports\_fetch\_t)

polaris\_tdlresolve\_read(polaris\_dmi\_ports\_fetch\_t)



```
polaris_cpld_read(polaris_dmi_ports_fetch_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiportsfetch.te
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# July 2018, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2018-2020 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisngwcfeddebug, 1.0);
```

```
gen_require(^
```

```
    type polaris_ngwc_fed_debug_mgr_t;
```

```
')
```

```
polaris_bootflash_manage(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_btrace_data_manage(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_cpld_read(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_flashlib_read(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_chasfs_read(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_tdlresolve_read(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_disk_bootflash_read_lnk(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_dmammap_dev_use(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_chdrvmmmap_dev_use(polaris_ngwc_fed_debug_mgr_t)
```

```
polaris_dplr_iomem_mmapdrv_dev_use(polaris_ngwc_fed_debug_mgr_t)
```

```
# opens /proc/pid/net/dev
```

```
kernel_read_network_state(polaris_ngwc_fed_debug_mgr_t)
```

```
# calls tcpdump, let it run in its own domain
```

```
netutils_domtrans(polaris_ngwc_fed_debug_mgr_t)
```

```
# calls system function
```

```
corecmd_exec_shell(polaris_ngwc_fed_debug_mgr_t)
```

```
# calls lspci and other utilities
```

```
corecmd_exec_bin(polaris_ngwc_fed_debug_mgr_t)
```

```
auth_use_nsswitch(polaris_ngwc_fed_debug_mgr_t)
```

```
# lspci needs sysfs access
```

```
dev_list_sysfs(polaris_ngwc_fed_debug_mgr_t)
```

```
dev_read_sysfs(polaris_ngwc_fed_debug_mgr_t)
```

```

# dope.py /tmp/idope_svr, /tmp/shfwd_svr socket files
type polaris_fed_debug_sock_t;
files_tmp_file(polaris_fed_debug_sock_t)

files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_sock_t, sock_file, "idope_svr")
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_sock_t, sock_file, "shfwd_svr")

gen_require(
    type tmp_t;
)
manage_sock_files_pattern(polaris_ngwc_fed_debug_mgr_t, tmp_t, polaris_fed_debug_sock_t)

# allow show-forward to use following temp files in /tmp dir
type polaris_fed_debug_tmp_t;
files_tmp_file(polaris_fed_debug_tmp_t)
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_tmp_t, file, "pktgen.txt")
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_tmp_t, file, "DopeElam.sh")
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_tmp_t, file, "MemDumpElam.sh")
gen_require(
    type tmp_t;
)
manage_files_pattern(polaris_ngwc_fed_debug_mgr_t, { tmp_t polaris_fed_debug_tmp_t},
polaris_fed_debug_tmp_t)

# talk to fed over unix sockets
polaris_fed_sock_write(polaris_ngwc_fed_debug_mgr_t)

# /dcmlog.txt
type polaris_fed_debug_dcmlog_t;
files_type(polaris_fed_debug_dcmlog_t)
gen_require(
    type root_t;
)
filetrans_pattern(polaris_ngwc_fed_debug_mgr_t, root_t, polaris_fed_debug_dcmlog_t, file, "dcmlog.txt")
manage_files_pattern(polaris_ngwc_fed_debug_mgr_t, root_t, polaris_fed_debug_dcmlog_t)

# dope.py listens on port 12255
corenet_tcp_bind_generic_node(polaris_ngwc_fed_debug_mgr_t)
allow polaris_ngwc_fed_debug_mgr_t self:tcp_socket { getattr setopt ioctl getopt bind create listen accept connect
read write };
corenet_tcp_bind_polaris_fed_debug_trace_rpc_port(polaris_ngwc_fed_debug_mgr_t)
corenet_tcp_connect_polaris_fed_debug_trace_rpc_port(polaris_ngwc_fed_debug_mgr_t)

# dope.py listens on port 5389 for shfwd commands
corenet_tcp_bind_polaris_fed_debug_shfwd_command_port(polaris_ngwc_fed_debug_mgr_t)

# LOOK AT ME: /dev/mem access restriction remove after fix for CSCvm07702 is

```

```

# committed.
ifdef(`nyquist_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_debug_mgr_t)
`)
ifdef(`starfleet_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_debug_mgr_t)
`)
ifdef(`quake_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_debug_mgr_t)
`)

# /tmp/asic_config.pickle file access
type polaris_fed_debug_asic_config_t;
files_tmp_file(polaris_fed_debug_asic_config_t);
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_asic_config_t, file, "asic_config.pickle")
gen_require(`
    type tmp_t;
`)
manage_files_pattern(polaris_ngwc_fed_debug_mgr_t, tmp_t, polaris_fed_debug_asic_config_t)

# dope.py invokes scapy.py for DP trace which needs to create socket to seek
# interface info via ioctl ifreq
allow polaris_ngwc_fed_debug_mgr_t self:udp_socket { create ioctl };

# /tmp/rdope_ffi handle directory where libffi will create file with execute
# mapping. Files system should be executable and /tmp so far is. Note TMPDIR
# environment variable is the first choice where to create libffi executable
# mapped files.
type polaris_fed_debug_ffi_t;
files_tmp_file(polaris_fed_debug_ffi_t);
files_tmp_filetrans(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_ffi_t, dir, "rdope_ffi")
gen_require(`
    type tmp_t;
`)
manage_dirs_pattern(polaris_ngwc_fed_debug_mgr_t, tmp_t, polaris_fed_debug_ffi_t)
manage_files_pattern(polaris_ngwc_fed_debug_mgr_t, polaris_fed_debug_ffi_t, polaris_fed_debug_ffi_t)
allow polaris_ngwc_fed_debug_mgr_t polaris_fed_debug_ffi_t:file { execute map };

# allow to read /proc/mtd called from mcp_getmonvar
kernel_read_system_state(polaris_ngwc_fed_debug_mgr_t)

polaris_remap_mem_dev_use(polaris_ngwc_fed_debug_mgr_t)

allow polaris_ngwc_fed_debug_mgr_t self:capability sys_resource;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwcfeddebug.te

```

No license file was found, but licenses were detected in source scan.

```
dnl
dnl April 2018, Victor Kamensky
dnl
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dnl All rights reserved
dnl
dnl Process Names Map
define(^process_map', `defn(format(`process_map[%s]", ` $1'))')
define(^process_map_set', `define(format(`process_map[%s]", ` $1), ` $2'))

dnl Process Names and Labels
define(^process_short_name', `patsubst($1, `^BPROC_', `'))
define(^process_default_stem', `translit(process_short_name($1), `A-Z', `a-z'))
define(^process_stem', `ifelse(process_map(process_short_name($1)), `', process_default_stem($1),
process_map(process_short_name($1)))')
define(^process_label', `format(`polaris_%s_t', process_stem($1))')
define(^process_exec_label', `format(`polaris_%s_exec_t', process_stem($1))')

dnl Process Type Map: track that type declations unique
define(^process_type_map', `defn(format(`process_type_map[%s]", ` $1'))')
define(^process_type_map_set', `define(format(`process_type_map[%s]", ` $1), ` $2'))
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_process.m4
```

No license file was found, but licenses were detected in source scan.

```
dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2021 by Cisco Systems, Inc.
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dnl
process_map_set(AUTO_UPGRADE_CLIENT_RP, autoupgrade)
process_map_set(BSM_RP, bsm)
process_map_set(BTM_CC, btman)
process_map_set(BTM_FP, btman)
process_map_set(BTM_RP, btman)
process_map_set(BTM_BP, btman)
process_map_set(CCD_RP, caf)
process_map_set(DMI_CONFD, confd)
process_map_set(DMI_PTTCD, pttcd)
process_map_set(SDWAN_CONFD, confd)
process_map_set(EMD_CC, emd)
process_map_set(EMD_FP, emd)
process_map_set(EMD_RP, emd)
process_map_set(FCD_RP, flashcheck)
```

```
process_map_set(FM_FP, fman_fp)
process_map_set(FM_CC, fman_cc)
process_map_set(FM_RP, fman_rp)
process_map_set(HM_CC, hm)
process_map_set(HM_FP, hm)
process_map_set(HM_RP, hm)
process_map_set(IOMD_CC, iomd)
process_map_set(IOSD_CC, iosd)
process_map_set(IOSD_RP, iosd)
process_map_set(IOSD_BP, iosd)
process_map_set(IOXM_RP, ioxman)
process_map_set(ISSU_STK, issu_stack)
process_map_set(LM_RP, lm)
process_map_set(MAINT_RP, periodic)
process_map_set(PLOGD_CC, plogd)
process_map_set(PLOGD_FP, plogd)
process_map_set(PLOGD_RP, plogd)
process_map_set(REPM_RP, repm)
process_map_set(SERVICE_MGR_RP, service_mgr)
process_map_set(SERVICE_MGR_FP, service_mgr)
process_map_set(SM, smand)
process_map_set(SORT_RP, sort_files)
process_map_set(VMAN_RP, vman)
process_map_set(POLJVM, jvm)
process_map_set(CLUSTERMGR, clustermgr)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/processmap.m4

No license file was found, but licenses were detected in source scan.

dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

divert(-1)

include(`polaris\_process.m4')

include(`polaris\_database\_db.m4')

include(`polaris\_database\_db\_if.m4')

include(`polaris\_max\_scope.m4')

divert(0)dnl

#

# This is a generated file! Instead of modifying this file,

```
# modify proper platform TDL file.
#
## <summary>Polaris Platform DB Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_database_if.m4
```

No license file was found, but licenses were detected in source scan.

```
dnl
```

```
dnl April 2018, Victor Kamensky
```

```
dnl
```

```
dnl Copyright (c) 2018-2020 by Cisco Systems, Inc.
```

```
dnl All rights reserved
```

```
dnl
```

```
dnl VXE Platform Max Bay Limits
```

```
max_bay_map_set(`rp', `per_bay', 0)
```

```
max_bay_map_set(`cc', `per_bay', 0)
```

```
max_bay_map_set(`fp', `per_bay', 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/vxemaps.m4
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# January 2021, Gabriel Lee, Shawn Liu
```

```
#
```

```
# Copyright (c) 2021 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
/ezManage_v1/ezManage_sms_handler.py -- gen_context(system_u:object_r:polaris_ezmanage_exec_t,s0)
```

```
/ezManage_v1(/.*)?          gen_context(system_u:object_r:polaris_ezmanage_file_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisezmanage.fc
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# April 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris dmi_vtyserverutild Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmiptyserverutild.if

No license file was found, but licenses were detected in source scan.

#

# August 2017, Victor Kamensky

#

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#

# polarisbsm file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbsm.fc

No license file was found, but licenses were detected in source scan.

#

# February 2020, Victor Kamensky

#

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#

## <summary>Polaris dmi\_ports\_fetch Policy Rules.</summary>

#####

## <summary>

## Work with /bootflash/sdavc

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_sdavc\_proxy\_manage`,`

gen\_require(`

type polaris\_sdavc\_proxy\_files\_t;

`)

manage\_files\_pattern(\$1, polaris\_sdavc\_proxy\_files\_t, polaris\_sdavc\_proxy\_files\_t)

manage\_dirs\_pattern(\$1, polaris\_sdavc\_proxy\_files\_t, polaris\_sdavc\_proxy\_files\_t)

`)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarissdavcproxy.if

No license file was found, but licenses were detected in source scan.

#

```

# March 2017, Victor Kamensky
#
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#

/usr/binos/bin/cman_fp_ledp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
/usr/binos/bin/cman_fp_us_ledp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
/usr/binos/bin/cman_fp_vwlc -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
/usr/binos/bin/cman_fp_vwlc_ledp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)
/usr/binos/bin/cman_fp_sumatra_ledp -- gen_context(system_u:object_r:polaris_cm_fp_exec_t,s0)

/usr/binos/conf/mcp_pcie_status_cmd.sh -- gen_context(system_u:object_r:polaris_pcie_status_cmd_exec_t,s0)

/dev/hkp -c gen_context(system_u:object_r:polaris_hkp_device_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmfp.fc
No license file was found, but licenses were detected in source scan.

#
# June 2020, Manu Roy
#
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#

# /bootflash labels
/bootflash(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/bootflash/.ssh(/.*)?     gen_context(system_u:object_r:ssh_home_t,s0)
/bootflash/.ssh/ssh_host.*_key\pub  gen_context(system_u:object_r:sshd_key_t,s0)
/bootflash/.ssh/ssh_host.*_key     gen_context(system_u:object_r:sshd_key_t,s0)
/bootflash/core(/.*)?     gen_context(system_u:object_r:polaris_core_file_t,s0)

# /flash is symbolic link /flash10/USER
/flash                    gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

#/flash1
/flash1(/.*)?            gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
/flash1/CRASH(/.*)?     gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)
/flash1/CRASH/tracelogs(/.*)?  gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/flash7(/.*)?           gen_context(system_u:object_r:polaris_disk_license_t,s0)
/flash8(/.*)?           gen_context(system_u:object_r:polaris_disk_license_t,s0)
/flash9(/.*)?           gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /flash10
# USER is a reserved selinux keyword - escape it like this
/flash10(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

```



```

/flash10/USE[R]/core(/.*)?      gen_context(system_u:object_r:polaris_core_file_t,s0)
/flash10/USE[R]/nvram_config --  gen_context(system_u:object_r:polaris_nvram_file_t,s0)
/flash10/USER/.ssh/ssh_host_rsa_key -- gen_context(system_u:object_r:sshd_key_t,s0)

#sdflash
/dev/mmcblk1p1 -b                gen_context(system_u:object_r:polaris_iots_swipedrive_device_t,s0)
/dev/sdflash                      gen_context(system_u:object_r:polaris_iots_swipedrive_file_t,s0)
/sdflash                          gen_context(system_u:object_r:polaris_iots_swipedrive_file_t,s0)
#usb device
/dev/sda1 -b                      gen_context(system_u:object_r:polaris_iots_swipedrive_device_t,s0)

#DMA ASIC driver
/dev/mvDmaDrv                     gen_context(system_u:object_r:polaris_iots_mvDmaDrv_device_t,s0)
/dev/mvIntDrv                     gen_context(system_u:object_r:polaris_iots_mvIntDrv_device_t,s0)

# /crashinfo is symbolic link to /mnt/sd1 created by systemd-tmpfiles
/crashinfo                        gen_context(system_u:object_r:polaris_disk_crashinfo_t,s0)

#/dev
/dev/petra-fpga -c                gen_context(system_u:object_r:polaris_iots_fpga_device_t,s0)
/dev/petra-zynq-ps-gpio -c        gen_context(system_u:object_r:polaris_iots_fpga_device_t,s0)
/dev/petra-gpio-pc3 -c            gen_context(system_u:object_r:polaris_iots_fpga_device_t,s0)
#Line card fpga driver for mmap
/dev/petra-lc-fpga -c             gen_context(system_u:object_r:polaris_iots_fpga_device_t,s0)

#memory devices
/dev/tm -c                        gen_context(system_u:object_r:polaris_iots_tm_device_t,s0)
/dev/hcam -c                      gen_context(system_u:object_r:polaris_iots_tm_device_t,s0)
#vlan-virtual ethernet
/dev/petra-krport -c             gen_context(system_u:object_r:polaris_iots_tm_device_t,s0)

/tmp/udev/etc/udev/sdflash/udev-info gen_context(system_u:object_r:polaris_udev_tmp_files_t,s0)

# hellcat
/dev/spidev0.0 -c                 gen_context(system_u:object_r:polaris_iots_led_device_t,s0)
/dev/spidev0.1 -c                 gen_context(system_u:object_r:polaris_iots_led_device_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiots/switch.fc

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```

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#

```

```

policy_module(polarisngwcfed, 1.0);

gen_require(
    type polaris_ngwc_fed_t;
)

polaris_btrace_data_manage(polaris_ngwc_fed_t)
polaris_chasfs_manage(polaris_ngwc_fed_t)
polaris_tdlresolve_read(polaris_ngwc_fed_t)
polaris_tdlldb_list_dirs(polaris_ngwc_fed_t)
polaris_lua_read(polaris_ngwc_fed_t)
polaris_flashlib_read(polaris_ngwc_fed_t)
polaris_chasync_files_manage(polaris_ngwc_fed_t)

# LOOK AT ME: system() call restriction remove after
# CSCvn19282 is fixed using CSCvn19287.
#
# fed executes cp_trace_request.sh when a sv stack split occurs.
# cp_trace_request.sh does source of pglobals.sh which requires the
# access of /crashinfo.
polaris_disk_crashinfo_getattr(polaris_ngwc_fed_t)

polaris_ripc_sman_ui_serv_connect(polaris_ngwc_fed_t)

polaris_db_tdlldb_dir_use(polaris_ngwc_fed_t)

corecmd_exec_bin(polaris_ngwc_fed_t)
corecmd_exec_shell(polaris_ngwc_fed_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_ngwc_fed_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_ngwc_fed_t)

# allow read/write to /proc/irq/N/irq files
kernel_rw_irq_sysctls(polaris_ngwc_fed_t)

polaris_obfl_data_manage(polaris_ngwc_fed_t)
polaris_lsmpi_dev_use(polaris_ngwc_fed_t)

allow polaris_ngwc_fed_t self:capability { sys_rawio dac_override ipc_owner sys_nice ipc_lock };
allow polaris_ngwc_fed_t self:capability2 block_suspend;

polaris_dyncfg_tmp_read(polaris_ngwc_fed_t)

optional_policy(
    polaris_ngwc_shm_manage(polaris_ngwc_fed_t)
)

```

```

)

optional_policy(
polaris_ngwc_scc_shm_manage(polaris_ngwc_fed_t)
)

# cpp bleeds into switching platforms through fman_fp and fed
# apparently even on nyquist fed creates /tmp/cpp_anon_db
polaris_cpp_process(polaris_ngwc_fed_t)
polaris_cpp_tmp_files_use(polaris_ngwc_fed_t)

optional_policy(
# /dev/dplr_intrpt usage
polaris_dplr_dev_use(polaris_ngwc_fed_t)

# /dev/dmammap usage
polaris_dmammap_dev_use(polaris_ngwc_fed_t)

# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_ngwc_fed_t)
)

# /dev/cli2xcvr_pipe and /dev/xcvr2cli_pipe
type polaris_fed_xcvr_pipe_t;
files_type(polaris_fed_xcvr_pipe_t)
dev_associate(polaris_fed_xcvr_pipe_t)
gen_require(
    type device_t;
)
filetrans_pattern(polaris_ngwc_fed_t, device_t, polaris_fed_xcvr_pipe_t, fifo_file, "cli2xcvr_pipe")
filetrans_pattern(polaris_ngwc_fed_t, device_t, polaris_fed_xcvr_pipe_t, fifo_file, "xcvr2cli_pipe")
manage_fifo_files_pattern(polaris_ngwc_fed_t, device_t, polaris_fed_xcvr_pipe_t)

polaris_disk_bootflash_search(polaris_ngwc_fed_t)

allow polaris_ngwc_fed_t self:process setsched;

# work with /dev/msi/Slot0/Doppler0/GroupN files
dev_rw_generic_chr_files(polaris_ngwc_fed_t)

# read /sys/devices/system/cpu/online
dev_read_sysfs(polaris_ngwc_fed_t)

# bind to shfwd port
corenet_udp_bind_polaris_ngwc_fed_shfwd_port(polaris_ngwc_fed_t)

# connect to shfwd port
corenet_tcp_connect_polaris_fed_debug_shfwd_command_port(polaris_ngwc_fed_t)

```

```

# creates and write /flash/shfwd_params.txt file
polaris_bootflash_manage(polaris_ngwc_fed_t)

# use polaris_ngwc_fed_t as syslog_client_type
logging_send_syslog_msg(polaris_ngwc_fed_t)

# bind to dbgmn port
corenet_udp_bind_polaris_ngwc_fed_dbgmn_port(polaris_ngwc_fed_t)

corenet_udp_bind_generic_node(polaris_ngwc_fed_t)
allow polaris_ngwc_fed_t self:udp_socket { bind create getopt };

optional_policy(`
# on macallan cman_fp needs access to /dev/cisco/dplriomem
# for mapping dplr io memory to application space.
polaris_dplr_iomem_mmapdrv_dev_use(polaris_ngwc_fed_t);
`)

# On Macallan as part of doppler sdk_asic_init(), a
# rw call is made to /dev/cpld
polaris_cpld_dev_use(polaris_ngwc_fed_t)
polaris_cpld_read(polaris_ngwc_fed_t)
#ptp_init_systemclock() called during fed process init writes
# /sys/devices/platform/cpld/reg_doppe_1588_sync
polaris_cpld_write(polaris_ngwc_fed_t)

optional_policy(`
# In Macallan cards which use Doppler ASIC,
# ngmod_doppler_mmap() api is called to get hold of
# MMapped Asic address. As part of the operation it uses
# /dev/chdrvmmmap device.
polaris_chdrvmmmap_dev_use(polaris_ngwc_fed_t)
`)

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvk00737 is fixed using CSCvk00741
#ifdef(`nyquist_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_t)
`)

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvm34589 is fixed using CSCvm34617
#ifdef(`starfleet_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_t)
`)

```

```

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvn64182 is fixed using CSCvn64184
ifdef(`quake_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_t)
')

ifdef(`sumatra_platform',`
# LOOK AT ME: After direct usage of /dev/mem is removed (CSCvw80796)
polaris_dev_mem_use(polaris_ngwc_fed_t)
polaris_sumatra_doppler_dev_use(polaris_ngwc_fed_t)
')

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvn08008 is fixed using CSCvn08019.
# FED accesses raw memory (/dev/mem) for sending/receiving OOB
# traffic on an FSS interface.
ifdef(`passport_platform',`
polaris_dev_mem_use(polaris_ngwc_fed_t)
')

#Entropy number is read from ACT2 and stored in /tmp/hw_entropy
#Allow sesa library read from /tmp/hw_entropy to update random
#number seed.
polaris_hw_entropy_read(polaris_ngwc_fed_t)

# fed is server for /tmp/dbgmn_log_svr socket file
type polaris_fed_sock_t;
files_tmp_file(polaris_fed_sock_t)

files_tmp_filetrans(polaris_ngwc_fed_t, polaris_fed_sock_t, sock_file, "dbgmn_log_svr")

gen_require(`
    type tmp_t;
')
manage_sock_files_pattern(polaris_ngwc_fed_t, tmp_t, polaris_fed_sock_t)

optional_policy(`
# talk to rdope.sh over unix sockets
polaris_fed_debug_sock_write(polaris_ngwc_fed_t)
')

# /dev/shm/sdm access
optional_policy(`
polaris_sdm_shm_manage(polaris_ngwc_fed_t)
')

# creates few files under /tmp/installer (e.g like

```

```

# /tmp/installer/phy_shannon_ver_1) to indicate current h/w conditions
polaris_install_tmp_manage(polaris_ngwc_fed_t)

# communication between the nif manager and fed use directories under /tmp/sv
polaris_sv_tmp_use(polaris_ngwc_fed_t)

optional_policy(
    polaris_quake_i2c_manage(polaris_ngwc_fed_t)
)

# work with /tmp files (/tmp/fed_post_results)
type polaris_fed_tmp_t;
files_tmp_file(polaris_fed_tmp_t)
files_tmp_filetrans(polaris_ngwc_fed_t, polaris_fed_tmp_t, file, "fed_post_result")
files_tmp_filetrans(polaris_ngwc_fed_t, polaris_fed_tmp_t, dir, "test_mrvlphy")
manage_files_pattern(polaris_ngwc_fed_t, polaris_fed_tmp_t, polaris_fed_tmp_t)
manage_dirs_pattern(polaris_ngwc_fed_t, polaris_fed_tmp_t, polaris_fed_tmp_t)
manage_fifo_files_pattern(polaris_ngwc_fed_t, polaris_fed_tmp_t, polaris_fed_tmp_t)
polaris_cm_rp_tmp_manage(polaris_ngwc_fed_t)

# Allow write to flash. Needed for template support.
polaris_flashlib_write(polaris_ngwc_fed_t)

# CSCvo78054 will be used to fix fed policies on crankshaft properly.
# Below policy is just to unblock Nightwatch boot issue on ISR in
# enforcing mode.
ifdef(^crankshaft_family',`
# ISR Nightwatch module accesses libraries compiled with icc
polaris_icc_broken_relocations(polaris_ngwc_fed_t)

#ISR Nightwatch module creates softlink /flash -> /bootflash
gen_require(
    type root_t;
)
filetrans_pattern(polaris_ngwc_fed_t, root_t, polaris_disk_bootflash_t, lnk_file, "flash")

)

optional_policy(
polaris_epc_ws_liaison_tmp_read(polaris_ngwc_fed_t)
)

# ngwc-fed manage /tmp/epc_ws/fed_to_wif_pipe file fifo_file.
optional_policy(
polaris_epc_ws_liaison_fifo_manage(polaris_ngwc_fed_t)
)

optional_policy(

```

```
polaris_ngwc_itfpo_manage(polaris_ngwc_fed_t)
')

# access SERDES /tmp/serdes_asic_key_dir/*
optional_policy(
polaris_serdes_asic_key_tmp_manage(polaris_ngwc_fed_t)
')

# ngwc-fed creates /tmp/epc_ws dir
optional_policy(
polaris_epc_ws_liaison_tmp_file(polaris_ngwc_fed_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcfed.te

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```
#
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#
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#
```

```
/usr/bin/sbin/ncsshd -- gen_context(system_u:object_r:polaris_dmi_ncsshd_mgmt_exec_t,s0)
/var/run/ncsshd_mgmt\pid -- gen_context(system_u:object_r:polaris_dmi_ncsshd_mgmt_var_run_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmincsshdmgmt.fc

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```
#
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#
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#
```

```
/usr/bin/conf/mcp_smartctl_cmds.sh -- gen_context(system_u:object_r:polaris_smartctl_exec_t,s0)
```

```
/tmp/smart.pid -- gen_context(system_u:object_r:polaris_smartctl_tmp_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngiolite.fc

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```
#
# May 2017, Victor Kamensky
```

```

#
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#

/tmp/tmp/pub/interceptor(/.*)?          gen_context(system_u:object_r:polaris_pttcd_tmp_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispttcd.fc
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#
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#

## <summary>Polaris Cfg Policy Rules.</summary>

#####
# Cfg files policy
#####

#####
## <summary>
##   Manage cfg files (under /tmp/sw/cfg)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_cfg_data_manage`,`
gen_require(`
type polaris_cfg_data_t;
`)

manage_dirs_pattern($1, polaris_cfg_data_t, polaris_cfg_data_t)
manage_files_pattern($1, polaris_cfg_data_t, polaris_cfg_data_t)
manage_lnk_files_pattern($1, polaris_cfg_data_t, polaris_cfg_data_t)
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscfg.if

```



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```
#
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#

policy_module(polarisngiolite, 1.0);

gen_require(`
    type polaris_ngiolite_t;
`)

polaris_btrace_data_manage(polaris_ngiolite_t)
polaris_crft_data_manage(polaris_ngiolite_t)
polaris_chasfs_manage(polaris_ngiolite_t)
polaris_tdlresolve_read(polaris_ngiolite_t)
polaris_tdlldb_list_dirs(polaris_ngiolite_t)
polaris_cpld_read(polaris_ngiolite_t)
polaris_flashlib_read(polaris_ngiolite_t)

optional_policy(`
polaris_cpp_tmp_ifdev_use(polaris_ngiolite_t)
`)

# In the file of radium_xcvr.c allow access to create and bind
# the socket using the API bnxt_impl_init_netlink.
allow polaris_ngiolite_t self:netlink_generic_socket { bind create getattr setopt };

# in iot platforms, ngiolite needs access to /proc/sys/net/ipv6/conf/mvsw/disable_ipv6
optional_policy(`
kernel_rw_net_sysctls(polaris_ngiolite_t)
kernel_search_network_sysctl(polaris_ngiolite_t)
`)

# PLEASE LOOK AT code should not use sysv IPC ARIs,
# instead POSIX variants must be used. Remove after
# code changed in proper way
# allow access sysv semaphor created by qfp process
ifdef(`crankshaft_family',`
polaris_qfp_sem_use(polaris_ngiolite_t)
polaris_ggpio_dev_read_write(polaris_ngiolite_t)
polaris_dplr_dev_use(polaris_ngiolite_t)
`)

ifdef(`fugazi_platform',`
```

```

polaris_qfp_sem_use(polaris_ngiolite_t)
')

# write access to /sys/bus/pci/rescan
dev_rw_sysfs(polaris_ngiolite_t)
# LOOK AT ME ngiolite does it through "echo 1 > /sys/bus/pci/rescan" seems to much
# to grunt shell and bin access just to write "1" string into the file
corecmd_exec_bin(polaris_ngiolite_t)
corecmd_exec_shell(polaris_ngiolite_t)
# allow read of /etc/passwd
auth_use_nsswitch(polaris_ngiolite_t)

polaris_firmware_read(polaris_ngiolite_t)

polaris_udev_tmp_list_dirs(polaris_ngiolite_t)

# allow access to read the file cman rommon file.
polaris_proc_rmonbifo_getattr(polaris_ngiolite_t)
polaris_proc_rmonbifo_read(polaris_ngiolite_t)

allow polaris_ngiolite_t self:capability { net_admin sys_rawio };

# allow system time capability to check for system timeout
# while checking the state using API cwan_modem_check_ready_state
allow polaris_ngiolite_t self:capability sys_time;

# allow access to nim_xxd file created by cmcc
polaris_nim_xxd_tmp_open_unlink(polaris_ngiolite_t);

# ngiolite needs to work with /dev/sd /dev/sg devices to figure out disk driver
# paramters. drivers/userspace/nim_xxd library
storage_raw_read_fixed_disk(polaris_ngiolite_t)
storage_read_scsi_generic(polaris_ngiolite_t)
storage_write_scsi_generic(polaris_ngiolite_t)

polaris_sysfs_platform_dev_use(polaris_ngiolite_t)

# LOOK AT ME: ngiolite needs to work with /dev/ds31408, which is generic device_t now
gen_require(
    type device_t;
)
rw_chr_files_pattern(polaris_ngiolite_t, device_t, device_t)

# modprobe nim_dm dm_drv_log_level=0x01
ifdef(`crankshaft_family',`
    modutils_domtrans_insmod(polaris_ngiolite_t)
)

```

```

polaris_smartctl_domtrans(polaris_ngiolite_t)

# utah_fpge_driver.c needs socket to configure interface parameters
allow polaris_ngiolite_t self:udp_socket create_socket_perms;

polaris_utility_domain_template(smartctl)

corecmd_exec_bin(polaris_smartctl_t)
corecmd_exec_shell(polaris_smartctl_t)

# allow access to polaris_cpp_tmpfs_t file
# Example is ifdev shared memory /dev/shm//cpp_ifdev_shmem
# The ngiolite init function calls the api ifdev_init
# to initialize shared memory control info.
fs_getattr_tmpfs(polaris_ngiolite_t)
polaris_cpp_tmpfs_ifdev_rw(polaris_ngiolite_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_smartctl_t)

logging_send_syslog_msg(polaris_smartctl_t)

fstools_domtrans(polaris_smartctl_t)

# runs tar /bin/tar -xvzf /firmware/MicronP400m-MTFDDAK200MAN.pkg -C /firmware
polaris_firmware_manage(polaris_smartctl_t)
files_getattr_all_dirs(polaris_smartctl_t)
files_read_all_symlinks(polaris_smartctl_t)

# work with /dev/sgX
storage_read_scsi_generic(polaris_smartctl_t)
storage_write_scsi_generic(polaris_smartctl_t)

allow polaris_smartctl_t self:capability { chown dac_override fowner fsetid };

type polaris_smartctl_tmp_t;
files_tmp_file(polaris_smartctl_tmp_t)
files_tmp_filetrans(polaris_smartctl_t, polaris_smartctl_tmp_t, file, "smart.pid")
manage_files_pattern(polaris_smartctl_t, polaris_smartctl_tmp_t, polaris_smartctl_tmp_t)

# script inherits stdout from ngiolite, needs permission to append to it
polaris_use_btrace_fifo(polaris_smartctl_t)

# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh55517)
ifdef(^crankshaft_family',`
polaris_dev_mem_use(polaris_ngiolite_t)

```

```

)

ifdef(`sparrow_platform',`
polaris_cm_cc_tmpfs_manage(polaris_ngiolite_t)
polaris_tty_NMEA_dev_use(polaris_ngiolite_t)
`)

ifdef(`blackheart_platform',`
polaris_cm_cc_tmpfs_manage(polaris_ngiolite_t)
`)

ifdef(`cabo_platform',`
polaris_cm_cc_tmpfs_manage(polaris_ngiolite_t)
`)

ifdef(`aventus_platform',`
polaris_cm_cc_tmpfs_manage(polaris_ngiolite_t)
polaris_tty_NMEA_dev_use(polaris_ngiolite_t)
`)

ifdef(`crankshaft_family',`
# allow scan pci/devices proc dir
# The ngiolite init function makes call to o2_cvmx_remote_open to
# open the remote library connection to cavium chip in FFP.
# The octeon library call invokes pci_get_device, which needs to
# access /proc .
kernel_getattr_proc_files(polaris_ngiolite_t)
kernel_write_proc_files(polaris_ngiolite_t)
kernel_read_system_state(polaris_ngiolite_t)

# allow access to /tmp/octeon-remote-lock-pci***
# This is required as part of ngiolite access of octeon chip.
# As part of the init, call is made to octeon_remote_lock()
# which requires access to the /tmp file.
polaris_cm_fp_tmp_filetrans(polaris_ngiolite_t)
polaris_cm_fp_tmp_manage(polaris_ngiolite_t)

#####
## CWAN NGIOLITE process policies start#####
#####
#cwan running as a ngiolite process needs to be able to RW/IOCTL to qcqmiX files
polaris_qcqmi_dev_use(polaris_ngiolite_t)

#RDM thread in CWAN running as ngiolite process needs access to ttyUSB0 for DM logging
term_use_usb_ttys(polaris_ngiolite_t)

#RDM/Event thread needs to add a newly generated DM log file/Crash dump file to/from bootflash directory
polaris_bootflash_manage(polaris_ngiolite_t)

```

```

#Modem Monitor thread uses sendto over a Datagram socket to send datato Turing Thread
allow polaris_ngiolite_t self:unix_dgram_socket sendto;

#Modem Monitor thread opens a socket to UDEV to process Modem USB addition/disconnection events
allow polaris_ngiolite_t self:netlink_kobject_uevent_socket create_socket_perms;

#Modem Monitor thread needs to be able to open/Read and GetAttributes to differentiate between Telit/SWI vendor
udev_rw_db(polaris_ngiolite_t)

#Turing thread needs to gather stats as well as set the IP address to /proc/net/cwan_modem0/cwan0/src_ip
kernel_search_network_state(polaris_ngiolite_t)
polaris_kernel_rw_network_state_files(polaris_ngiolite_t)

#####
## CWAN NGIOLITE process policies end#####
#####
)

# on tsn need access to /sys/devices/platform/moka_fpga
# /sys/devices/platform/moka_fpga/external_int_pending dev
optional_policy(`
polaris_mokafpga_rw(polaris_ngiolite_t)
`)

# on radium need to get model info
optional_policy(`
polaris_dash_dev_use(polaris_ngiolite_t)
`)

# work with contdev sysfs files
polaris_contdev_dev_read(polaris_ngiolite_t)

sysnet_domtrans_ifconfig(polaris_ngiolite_t)

logging_send_syslog_msg(polaris_ngiolite_t)

ifdef(`neptune_platform',`
polaris_cpp_cavium_sdk_ipc_use(polaris_ngiolite_t)
`)

optional_policy(`
polaris_nim_dm_dev_use(polaris_ngiolite_t)
`)

ifdef(`radium_platform',`
#allow ngiolite to access nim_phy_device
polaris_nim_phy_dev_use(polaris_ngiolite_t)
`)

```

```

)

# TODO/FIXME, Need to review this permission, this is related to
# the call "echo 1 > /sys/bus/pci/rescan"
dev_manage_sysfs_dirs(polaris_ngiolite_t)
allow polaris_ngiolite_t sysfs_t:file create;

# allow ngiolite to access sfp over i2c bus
polaris_i2c_use(polaris_ngiolite_t)

# on neptune, cavium library in o2_cavm_mem_map wants access to
# /sys/devices/pci0000:00/0000:00:01.0/0000:01:00.0/resource0
optional_policy(`
polaris_cpp_cavium_dma_map(polaris_ngiolite_t)
`)

# /dev/sfp-ktr & qfp sem access on Katar
ifdef(`katar_platform',`
polaris_sfp_katar_dev_use(polaris_ngiolite_t)
polaris_qfp_sem_use(polaris_ngiolite_t)
fs_getattr_tmpfs(polaris_ngiolite_t)
polaris_cpp_tmpfs_ifdev_rw(polaris_ngiolite_t)
`)

# allow /usr/binos/bin/ngiolite to access /tmp/nim_xxd_present
gen_require(`
    type polaris_cmrp_nim_xxd_tmp_t;
`)
files_tmp_file(polaris_cmrp_nim_xxd_tmp_t)
files_tmp_filetrans(polaris_ngiolite_t, polaris_cmrp_nim_xxd_tmp_t, file, "nim_xxd_present")
manage_files_pattern(polaris_ngiolite_t, polaris_cmrp_nim_xxd_tmp_t, polaris_cmrp_nim_xxd_tmp_t)

# allow /usr/binos/bin/ngiolite to access /tmp/hd_sz
gen_require(`
    type udev_tmp_t;
`)
read_files_pattern(polaris_ngiolite_t, udev_tmp_t, udev_tmp_t)

# allow /usr/sbin/lvm to be executed and to be operated
lvm_domtrans(polaris_ngiolite_t)

# allow /usr/binos/bin/ngiolite to manage /tmp
type polaris_ngiolite_tmp_t;
files_tmp_file(polaris_ngiolite_tmp_t)
# allow /usr/binos/bin/ngiolite to manage /tmp/smartctl.out and
# /tmp/xxdisplay.ouT
files_tmp_filetrans(polaris_ngiolite_t, polaris_ngiolite_tmp_t, file)
manage_files_pattern(polaris_ngiolite_t, polaris_ngiolite_tmp_t, polaris_ngiolite_tmp_t)

```

```

# allow /usr/sbin/smartctl to operate on fsadm_exec_t
fstools_domtrans(polaris_ngiolite_t)

# allow /usr/sbin/smartctl to access nvme device in chr and blk
dev_nvme_chr_files_manage(polaris_ngiolite_t)
dev_nvme_blk_files_manage(polaris_ngiolite_t)

ifdef(`sumatra_platform',`
# dev/cpld
polaris_cpld_dev_use(polaris_ngiolite_t)

# manage "sysctrl_i2c.lck"
gen_require(`
    type polaris_cm_rp_tmp_t;
    ')
files_tmp_filetrans(polaris_ngiolite_t, polaris_cm_rp_tmp_t, file, "sysctrl_i2c.lck")
polaris_cm_rp_tmp_manage(polaris_ngiolite_t)

# access /dev/huron_fpga
polaris_huron_dev_use(polaris_ngiolite_t)

')

ifdef(`crankshaft_family',`
# /var/run/cwan socket and pid
gen_require(`
    type polaris_cwan_svr_var_run_t;
    ')
files_pid_filetrans(polaris_ngiolite_t, polaris_cwan_svr_var_run_t, sock_file, "cwan_ezmanage_cwan_server")
create_sock_files_pattern(polaris_ngiolite_t, polaris_cwan_svr_var_run_t, polaris_cwan_svr_var_run_t)
delete_sock_files_pattern(polaris_ngiolite_t, polaris_cwan_svr_var_run_t, polaris_cwan_svr_var_run_t)
    ')

# allow /usr/binos/bin/ngiolite to access the the following interface
fs_unmount_xattr_fs(polaris_ngiolite_t)
dev_manage_generic_symlinks(polaris_ngiolite_t)
polaris_udev_tmp_manage(polaris_ngiolite_t)

# ngiolite/ezManage access rules - currently only applies to TSN
optional_policy(`
# Allow ngiolite to access ezManage dgram socket
gen_require(`
    type polaris_ezmanage_t;
    ')
allow polaris_ngiolite_t polaris_ezmanage_t:unix_dgram_socket sendto;

# Allow ngiolite to access ezManage socket file in /var/run

```

```
polaris_manage_ezmanage_var_run_files(polaris_ngiolite_t)
')

# allow ngiolite to access /dev/nim_phy
ifdef(`crankshaft_family',`
polaris_nim_phy_dev_use(polaris_ngiolite_t)
')
```

```
# allow ioctl, read, wr permission for ds31408 device
optional_policy(`
polaris_ds31408_dev_use(polaris_ngiolite_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngiolite.te

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```
#
# April 2017, Victor Kamensky
#
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#
```

```
/tmp/.ncsshd_bp\sock -s gen_context(system_u:object_r:polaris_dmi_ncsshd_log_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdmincshdfwd.fc

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```
#
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#
```

```
## <summary>Polaris vdaemon Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Write vdaemon /var/run socket file
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```



```
#
interface(`polaris_vdaemon_var_sock_write`,
    gen_require(`
        type polaris_vdaemon_t;
        type polaris_vdaemon_var_run_t;
        type var_run_t;
    `)
    write_sock_files_pattern($1, var_run_t, polaris_vdaemon_var_run_t)
    allow $1 polaris_vdaemon_t:unix_stream_socket { connectto };
)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvdaemon.if
```

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```
#
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#
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#

```

```
policy_module(polarisboothelper, 1.0);
```

```
polaris_process_domain_template(boothelper_evt)
```

```
corecmd_exec_bin(polaris_boothelper_evt_t)
```

```
# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_boothelper_evt_t)
```

```
# allow to read /proc/meminfo
kernel_read_system_state(polaris_boothelper_evt_t)
```

```
polaris_cpld_read(polaris_boothelper_evt_t)
```

```
#####
```

```
# work with /tmp/udev/.
```

```
type polaris_udev_tmp_files_t;
files_tmp_file(polaris_udev_tmp_files_t)
```

```
polaris_systemd_tmpfiles_tmp_filetrans(polaris_udev_tmp_files_t, dir, "udev")
```

```
polaris_bootflash_manage(polaris_boothelper_evt_t)
```

```
type polaris_boothelper_tmp_t;
files_tmp_file(polaris_boothelper_tmp_t)
```

```
files_tmp_filetrans(polaris_boothelper_evt_t, polaris_boothelper_tmp_t, dir, "rommon_upgrade_ngwc")
manage_files_pattern(polaris_boothelper_evt_t, polaris_boothelper_tmp_t, polaris_boothelper_tmp_t)
manage_dirs_pattern(polaris_boothelper_evt_t, polaris_boothelper_tmp_t, polaris_boothelper_tmp_t)
# watch over /tmp/rommon_upgrade_ngwc
allow polaris_boothelper_evt_t polaris_boothelper_tmp_t:dir watch;
```

```
# nyquist creates /tmp/udev_ssd.log
gen_require(
    type udev_t;
)
files_tmp_filetrans(udev_t, polaris_udev_tmp_files_t, file, "udev_ssd.log")
fs_tmpfs_filetrans(udev_t, polaris_udev_tmp_files_t, file, "udev_ssd.log")
```

```
# create /dev/harddisk1 softlink during bootup
ifdef(`crankshaft_family',`
gen_require(
    type device_t;
    type initrc_t;
    type fixed_disk_device_t;
)
filetrans_pattern(initrc_t, device_t, fixed_disk_device_t, lnk_file, "harddisk1")
)
# restorecon under setfiles_t appends to /tmp/udev_ssd.log
gen_require(
    type setfiles_t;
)
polaris_udev_tmp_manage(setfiles_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboothelper.te

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```
#
# August 2017, Shawn Lu
#
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#
```

```
policy_module(polarisnmspd, 1.0);
```

```
gen_require(
    type polaris_nmspd_t;
)
```

```
polaris_btrace_data_manage(polaris_nmspd_t)
polaris_crft_data_manage(polaris_nmspd_t)
polaris_chasfs_manage(polaris_nmspd_t)
```

```

polaris_tdlresolve_read(polaris_nmspd_t)
polaris_tdlldb_list_dirs(polaris_nmspd_t)
polaris_cpld_read(polaris_nmspd_t)
polaris_lua_read(polaris_nmspd_t)
polaris_flashlib_read(polaris_nmspd_t)

polaris_ripc_sman_ui_serv_connect(polaris_nmspd_t)

polaris_db_tdlldb_dir_use(polaris_nmspd_t)

#####
# mqipc manual, one that missing in platform tdl file\n
#####
type polaris_nmspd_testclient1_mqipc_t;
polaris_mqipc_type(polaris_nmspd_testclient1_mqipc_t)

type polaris_nmspd_testclient2_mqipc_t;
polaris_mqipc_type(polaris_nmspd_testclient2_mqipc_t)

type polaris_testclient1_nmspd_mqipc_t;
polaris_mqipc_type(polaris_testclient1_nmspd_mqipc_t)

type polaris_testclient2_nmspd_mqipc_t;
polaris_mqipc_type(polaris_testclient2_nmspd_mqipc_t);

polaris_mqipc_create_name(polaris_nmspd_t, polaris_nmspd_testclient1_mqipc_t, nmspd-testclient1)
polaris_mqipc_use(polaris_nmspd_t, polaris_testclient1_nmspd_mqipc_t)

polaris_mqipc_create_name(polaris_nmspd_t, polaris_nmspd_testclient2_mqipc_t, nmspd-testclient2)
polaris_mqipc_use(polaris_nmspd_t, polaris_testclient2_nmspd_mqipc_t)

#stuff related to vrf support of the socket
polaris_lfts_dev_use(polaris_nmspd_t)
polaris_socketat_nsfs_read(polaris_nmspd_t)
# enable listen on tcp port 16113
corenet_tcp_bind_polaris_nmspd_port(polaris_nmspd_t)

allow polaris_nmspd_t self:capability dac_override;

# Allow IPC messages to Btrace Process from NMSPD Process
logging_send_syslog_msg(polaris_nmspd_t)
# Allow NMSPD to read DNS file for namerresolution
sysnet_read_config(polaris_nmspd_t)

# NMSPD uses cURL to open HTTP coonections and SSL to open TLS Connections
# to DNASpaces and CMX respectively
gen_require(
    type node_t;

```

```

')
allow polaris_nmspd_t node_t:udp_socket node_bind;
allow polaris_nmspd_t self:udp_socket { bind connect getattr };
corenet_tcp_connect_http_port(polaris_nmspd_t)
polaris_odm_clnt2svr_mqipc_create(polaris_nmspd_t)

#DB persistence
polaris_tdlpersist_setup(polaris_nmspd_t)
polaris_tmp_tdlpersist_setup(polaris_nmspd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnmspd.te
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#
# February 2020, Victor Kamensky
#
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#

policy_module(polarisftm, 1.0);

gen_require(^
    type polaris_ftm_t;
)
polaris_chasfs_manage(polaris_ftm_t)
polaris_cpld_read(polaris_ftm_t)
polaris_flashlib_read(polaris_ftm_t)
polaris_tdlresolve_read(polaris_ftm_t)

polaris_ripc_sman_ui_serv_connect(polaris_ftm_t)

polaris_db_tdlpersist_dir_use(polaris_ftm_t)

logging_send_syslog_msg(polaris_ftm_t)

corecmd_exec_bin(polaris_ftm_t)
corecmd_exec_shell(polaris_ftm_t)
auth_use_nsswitch(polaris_ftm_t)

# vconfd_load_shared_schemas
polaris_vconfd_shared_schema_read(polaris_ftm_t)

# work with /tmp/xml
polaris_cedge_xml_tmp_manage(polaris_ftm_t)

# work with /tmp/tmp

```

```

polaris_cedge_tmp_manage(polaris_ftm_t)

polaris_cedge_reset_ns(polaris_ftm_t)

# /var/run/.ftmd-xxx sockets and pid
type polaris_ftm_var_run_t;
files_pid_file(polaris_ftm_var_run_t)
manage_files_pattern(polaris_ftm_t, polaris_ftm_var_run_t, polaris_ftm_var_run_t)
manage_sock_files_pattern(polaris_ftm_t, polaris_ftm_var_run_t, polaris_ftm_var_run_t)
files_pid_filetrans(polaris_ftm_t, polaris_ftm_var_run_t, { file sock_file })

polaris_cfgmgr_var_sock_write(polaris_ftm_t)
polaris_dbgd_var_sock_write(polaris_ftm_t)
polaris_fpm_var_sock_write(polaris_ftm_t)
polaris_ttm_var_sock_write(polaris_ftm_t)
polaris_vdaemon_var_sock_write(polaris_ftm_t)

# PLEASE LOOK AT ME: write access to /boot/hugepage.conf
# which on ultra translates into /varied/hugepage.conf access
# But no code in polaris uses it
polaris_disk_varied_manage(polaris_ftm_t)
files_manage_boot_files(polaris_ftm_t)

# fp_scaling_init calls posix_sysconf
dev_read_sysfs(polaris_ftm_t)

# vip_execute_nowait uses setpgid
allow polaris_ftm_t self:process setpgid;

polaris_cedge_tmpfs_manage(polaris_ftm_t)

# raw socket access from trace_tunnel_socket_icmp_init ftm_binos_trace.c
allow polaris_ftm_t self:rawip_socket create_socket_perms;
allow polaris_ftm_t self:capability net_raw;

# bind to ftm fnf port
corenet_udp_bind_polaris_ftm_fnf_port(polaris_ftm_t)
corenet_udp_bind_generic_node(polaris_ftm_t)

# ftm may create vrf-based netns on demand, vrf.65528
polaris_vrf_netns_manage(polaris_ftm_t)

# creates /tmp/HTX-IOX/sw-htx-service
optional_policy(
    polaris_htx_iox_tmp_manage(polaris_ftm_t)
)

# fp_scaling_read_core_count accesses cgroups file at

```

```
# /sys/fs/cgroup/cpuset/iosxe_control_processes/cpuset.cpus
fs_read_cgroup_files(polaris_ftm_t)
```

```
# ftm_change_default_gw_src_ip calls ip utility
sysnet_domtrans_ifconfig(polaris_ftm_t)
```

```
# ftm process periodically call nice utility to gzip some xml file
allow polaris_ftm_t self:process setsched;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisftm.te
```

No license file was found, but licenses were detected in source scan.

```
#
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#
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#
```

```
## <summary>Polaris fman_fp Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmanfp.if
```

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
/tmp/replication(/.*)?          gen_context(system_u:object_r:polaris_repm_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrepm.fc
```

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```
#
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#
```

```
## <summary>Polaris Btrace Policy Rules.</summary>
```

```

#####
# Polaris cpp (ultra)
#####

#####
## <summary>
##   Work (read, write, ioctl) with /dev/cpp_dev_info and /dev/cpp_vxe_rsrc
##   devices.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_cpp_dev_use',`
  gen_require(`
    type device_t;
    type polaris_cpp_device_t;
  `)
  write_chr_files_pattern($1, device_t, polaris_cpp_device_t)
  read_chr_files_pattern($1, device_t, polaris_cpp_device_t)
  allow $1 polaris_cpp_device_t:chr_file map;
  polaris_i95_dev_use($1)
`)

#####
## <summary>
##   Make the specified domain as polaris cpp process.
## </summary>
## <param name="type">
##   <summary>
##     Type to be used as a cpp process.
##   </summary>
## </param>
#
interface(`polaris_cpp_process',`
  gen_require(`
    attribute polaris_cpp_domain;
  `)

  typeattribute $1 polaris_cpp_domain;
`)

#####
## <summary>
##   Make the specified domain able to use cpp /tmp files.

```

```

## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     File name in /tmp that domains creates and other cpp process
##     access.
##   </summary>
## </param>
#
interface(`polaris_cpp_tmp_files_use`,`
    gen_require(`
        type polaris_cpp_tmp_t;
    `)

    files_tmp_filetrans($1, polaris_cpp_tmp_t, file, $2)
    manage_files_pattern($1, tmp_t, polaris_cpp_tmp_t)
    allow $1 polaris_cpp_tmp_t:file map;
)

#####
## <summary>
##   Specified domain can execute polaris_cpp_tmpifs_t code
##   which resides in /dev/shm/cpp_ucose_dram
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cpp_tmpifs_exec`,`
    gen_require(`
        type polaris_cpp_tmpifs_t;
    `)

    allow $1 polaris_cpp_tmpifs_t:file execute;
)

#####
## <summary>
##   Read write from polaris_cpp_tmpifs_t file
##   Example is ifdev shared memory /dev/shm//cpp_ifdev_shmem
## </summary>
## <param name="domain">

```



```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cpp_tmpfs_ifdev_rw`,`
    gen_require(`
        type tmpfs_t;
        type polaris_cpp_tmpfs_t;
    `)

    rw_files_pattern($1, tmpfs_t, polaris_cpp_tmpfs_t)
    allow $1 polaris_cpp_tmpfs_t:file map;
)

#####
## <summary>
## Make the specified domain able to work with cpp /tmp/cpp_ifdev_rep and
## /tmp/cpp_ifdev_req pipe files.
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cpp_tmp_ifdev_use`,`
    gen_require(`
        type polaris_cpp_tmp_t;
    `)

    manage_fifo_files_pattern($1, tmp_t, polaris_cpp_tmp_t)
    allow $1 polaris_cpp_tmp_t:file map;
)

#####
## <summary>
## Make the specified domain able to getattr of /tmp/cpp_ifdev_rep and
## /tmp/cpp_ifdev_req pipe files.
## </summary>
## <param name="type">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cpp_tmp_ifdev_getattr`,`

```

```

gen_require(
    type polaris_cpp_tmp_t;
)

getattr_fifo_files_pattern($1, tmp_t, polaris_cpp_tmp_t)
)

#####
## <summary>
##   Allow process to use Cavium SDK sysv IPC primitives
##   created by octeon_pci_dmap.c. Those could be created either
##   by cpp_driver (usually) or by cpp_cdm on utah and overlord,
##   and by cm_fp on neptune.
##
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface( polaris_cpp_cavium_sdk_ipc_use,`
    ifdef( crankshaft_family,`
        polaris_cpp_driver_sem_use($1)
        polaris_cpp_driver_shm_use($1)
optional_policy(
    polaris_cpp_cdm_sem_use($1)
    polaris_cpp_cdm_shm_use($1)
)
optional_policy(
    polaris_cm_fp_sem_use($1)
    polaris_cm_fp_shm_use($1)
)
    # allow scan pci/devices proc dir
    kernel_getattr_proc_files($1)
    kernel_write_proc_files($1)
    kernel_read_system_state($1)
)
)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/i95 devices
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>

```

```

## </param>
#
interface(`polaris_i95_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_i95_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_i95_device_t)
    read_chr_files_pattern($1, device_t, polaris_i95_device_t)
    allow $1 polaris_i95_device_t:chr_file map;
`)

```

```

#####
## <summary>
##   Work (read, write, map) with sysfs files required
##   by cavium library in o2_cavm_mem_map.
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_cpp_cavium_dma_map`,`
    gen_require(`
        type sysfs_t;
    `)

    mmap_files_pattern($1, sysfs_t, sysfs_t)
    dev_rw_sysfs($1)
`)

```

```

#####
## <summary>
##   Manage /dev/shm files
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#

```

```

interface(`polaris_cpp_tmpfs_manage`,`
    gen_require(`
        type polaris_cpp_tmpfs_t;
        type tmpfs_t;
    `)

```

```
fs_tmpfs_filetrans($1, polaris_cpp_tmpfs_t, file)
manage_files_pattern($1, tmpfs_t, polaris_cpp_tmpfs_t)
allow $1 polaris_cpp_tmpfs_t:file map;
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpp.if

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris bt_logger Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtlogger.if

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```
#
# August 2017, Shawn Lu
#
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#
```

```
# /bootflash labels
```

```
/bootflash(/.*)?          gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
/bootflash/.ssh(/.*)?      gen_context(system_u:object_r:ssh_home_t,s0)
/bootflash/.ssh/ssh_host.*_key\pub  gen_context(system_u:object_r:ssh_key_t,s0)
/bootflash/.ssh/ssh_host.*_key      gen_context(system_u:object_r:ssh_key_t,s0)
/bootflash/tracelogs(/.*)?    gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/tan(/.*)?         gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/bootflash/core(/.*)?       gen_context(system_u:object_r:polaris_core_file_t,s0)
/bootflash/debug.conf        gen_context(system_u:object_r:polaris_debug_conf_t,s0)
/bootflash/packages.conf     gen_context(system_u:object_r:polaris_packages_conf_t,s0)
```

```
# /csl_p_0
```

```
/csl_p_0(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
```

```
# /csl_p_1.context
```

```
/csl_p_1(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
```

```
# /csl_s_0.context
```

```

/csl_s_0(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)

# /csl_s_1.context
/csl_s_1(/.*)?          gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)

# /obfl is separate on qwlc
/obfl(/.*)?             gen_context(system_u:object_r:polaris_obfl_data_t,s0)

# /varied
/varied(/.*)?           gen_context(system_u:object_r:polaris_disk_varied_t,s0)
/varied/.install_info   gen_context(system_u:object_r:polaris_vwlcinstall_info_t,s0)
/varied/obfl_*          gen_context(system_u:object_r:polaris_obfl_data_t,s0)
/varied/grub_cisco_version gen_context(system_u:object_r:polaris_grubver_t,s0)
/varied/grub(/.*)?      gen_context(system_u:object_r:boot_t,s0)
/varied/grub2(/.*)?     gen_context(system_u:object_r:polaris_grub_bios_t,s0)
/varied/grub/menu.*     gen_context(system_u:object_r:bootloader_etc_t, s0)
/sbin/grub*             gen_context(system_u:object_r:bootloader_exec_t,s0)

# /grubenv
/bootefi(/.*)?          gen_context(system_u:object_r:polaris_grub_efi_t, s0)

# hanet driver used by vwlc and ultra, is there better place for it?
/dev/hanet -c gen_context(system_u:object_r:polaris_hanet_device_t,s0)

# from /lib/tmpfiles.d/binos-vxe.conf
/lic0 -l                gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/lic1 -l                gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)

# /harddisk labels (qwlc)
/vol/harddisk(/.*)?     gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
/vol/harddisk/tracelogs(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/vol/harddisk/tan(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)
/vol/harddisk/core(/.*)? gen_context(system_u:object_r:polaris_core_file_t,s0)
/vol/harddisk/debug.conf gen_context(system_u:object_r:polaris_debug_conf_t,s0)

# /init is symbolic link to /lib/systemd/systemd
/init -l gen_context(system_u:object_r:init_exec_t,s0)
# /disk0 is symbolic link to /vol/disk0
/disk0 -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# /dev/epa device on qwlc
/dev/epa[0-9]*          -c gen_context(system_u:object_r:polaris_epa_device_t,s0)
/dev/epactrl[0-9]*     -c gen_context(system_u:object_r:polaris_epa_device_t,s0)

# /dev/luna_fpga on qwlc
/dev/luna_mbfpga        -c gen_context(system_u:object_r:polaris_luna_mbfpga_device_t,s0)

# /dev/astro on qwlc

```

```

/dev/astro          -c gen_context(system_u:object_r:polaris_astro_device_t,s0)

# /dev/cpp_il on qwlc
/dev/cpp_il         -c gen_context(system_u:object_r:polaris_cpp_il_device_t,s0)

# /flash is symbolic link to /bootflash on qwlc
/flash             gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# /dev/oob_evfc on qwlc
/dev/oob_evfc      -c gen_context(system_u:object_r:polaris_oob_evfc_device_t,s0)

# /dev/sfp-ktr on katar
/dev/sfp-ktr       -c gen_context(system_u:object_r:polaris_sfp_katar_device_t,s0)

# To store tcpdump output in file haIntCaptureLo.pcap
/bootflash/haIntCaptureLo.pcap  gen_context(system_u:object_r:polaris_netutils_data_t,s0)
/objstore(/.*)?    gen_context(system_u:object_r:polaris_disk_objstore_t,s0)

# /config labels
/config(/.*)?      gen_context(system_u:object_r:polaris_disk_config_t,s0)
/config/.ssh(/.*)?  gen_context(system_u:object_r:ssh_home_t,s0)
/config/.ssh/ssh_host.*_key\*.pub  gen_context(system_u:object_r:sshd_key_t,s0)
/config/.ssh/ssh_host.*_key    gen_context(system_u:object_r:sshd_key_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswlc.fc

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dnl

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dnl

dnl WLC Platform Max Bay Limits

max\_bay\_map\_set(rp, `per\_bay', 0)

max\_bay\_map\_set(cc, `per\_bay', 0)

max\_bay\_map\_set(fp, `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(rp, `elastic', BPROC\_ODM, 1)

max\_elastic\_map\_set(cc, `elastic', BPROC\_ODM, 1)

max\_elastic\_map\_set(fp, `elasitc', BPROC\_ODM, 1)

max\_elastic\_map\_set(rp, `elastic', BPROC\_WNCD, 7)

max\_elastic\_map\_set(cc, `elastic', BPROC\_WNCD, 7)

max\_elastic\_map\_set(fp, `elastic', BPROC\_WNCD, 7)

max\_elastic\_ripc\_map\_set(rp, `elastic', BPROC\_ODM, 1)

max\_elastic\_ripc\_map\_set(cc, `elastic', BPROC\_ODM, 1)

```
max_elastic_ripc_map_set(`fp', `elasitc', BPROC_ODM, 1)
```

```
max_elastic_ripc_map_set(`rp', `elastic', BPROC_WNCD, 7)
```

```
max_elastic_ripc_map_set(`cc', `elastic', BPROC_WNCD, 7)
```

```
max_elastic_ripc_map_set(`fp', `elastic', BPROC_WNCD, 7)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/vwlcmaps.m4
```

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```
#
```

```
# June 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polariswebui, 1.0);
```

```
type polaris_webui_file_t;
```

```
files_type(polaris_webui_file_t)
```

```
polaris_pfile_type(polaris_webui_file_t)
```

```
polaris_process_domain_template(webui_lighttpd)
```

```
polaris_process_domain_template(webui)
```

```
gen_require(`
```

```
    type initrc_t;
```

```
`)
```

```
manage_dirs_pattern(initrc_t, polaris_webui_file_t, polaris_webui_file_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswebui.te
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2021 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polariscmrp, 1.0);
```

```
gen_require(`
```

```
    type polaris_cm_rp_t;
```

```
`)
```

```

polaris_btrace_data_manage(polaris_cm_rp_t)
polaris_crft_data_manage(polaris_cm_rp_t)
polaris_chasfs_manage(polaris_cm_rp_t)
polaris_tdlresolve_read(polaris_cm_rp_t)
polaris_tdlldb_list_dirs(polaris_cm_rp_t)
polaris_cpld_read(polaris_cm_rp_t)
polaris_lua_read(polaris_cm_rp_t)
polaris_flashlib_read(polaris_cm_rp_t)
polaris_flashlib_write(polaris_cm_rp_t)
#
# cm_rp opens log file to collect required RP, CC, FP and rommon details
# and write into /vol/harddisk/.inv/inv_log_file
# This file is accessed by crashinfo collecting script and others
type polaris_cm_rp_inv_log_file_t;
polaris_disk_type(polaris_cm_rp_inv_log_file_t)
polaris_cm_rp_inv_log_setup(polaris_cm_rp_t)

polaris_ripc_sman_ui_serv_connect(polaris_cm_rp_t)

polaris_cpld_dev_use(polaris_cm_rp_t)
polaris_lfts_dev_use(polaris_cm_rp_t)
polaris_proc_rmonbifo_read(polaris_cm_rp_t)
polaris_obfl_data_read(polaris_cm_rp_t)

polaris_db_tdlldb_dir_use(polaris_cm_rp_t)
# cman_rp needs read access to cpu identity
# /dev/cpu/0/msr
dev_read_cpuid(polaris_cm_rp_t)
allow polaris_cm_rp_t self:capability { sys_rawio dac_override chown sys_resource };

allow polaris_cm_rp_t self:process setsched;

# on ultra read eeprom through i2c
# type=AVC msg=audit(1479569571.044:3): avc: denied { getattr } for pid=5283 comm="cmand"
path="/sys/devices/i2c-0/i2c-1/1-0056/eeprom" dev="sysfs" ino=25556
scontext=system_u:system_r:polaris_cm_rp_t:s0 tcontext=system_u:object_r:sysfs_t:s0 tclass=file
# type=AVC msg=audit(1479569571.045:4): avc: denied { read write } for pid=5283 comm="cmand"
name="eeprom" dev="sysfs" ino=25556 sccontext=system_u:system_r:polaris_cm_rp_t:s0
tcontext=system_u:object_r:sysfs_t:s0 tclass=file
dev_rw_sysfs(polaris_cm_rp_t)

polaris_ggpio_dev_read_write(polaris_cm_rp_t)

# accessing obfl files like /obfl/obfl_uptime_v2.log
polaris_bootflash_read(polaris_cm_rp_t)
polaris_obfl_data_manage(polaris_cm_rp_t)

```



```

corecmd_exec_shell(polaris_cm_rp_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_cm_rp_t)

# cman_data_chasfs_mgmt_eth_override (cman/rp/src/cman_data.c:1096) tries to do
# ioctl(sk, SIOCGIFHWADDR, &ifr) for "eth2", which is not present on ultra, but
# such ioctl in kernel triggers dev_load attempt in kernel. Since interface
# and module does exist anyway, it is OK to deny it
kernel_dontaudit_request_load_module(polaris_cm_rp_t)

# cmand creates udp socket to get interface hw address cmlib_if_config_addr
allow polaris_cm_rp_t self:udp_socket create_socket_perms;

# dyncfg_setup.sh is started by cmand
polaris_dyncfg_domtrans(polaris_cm_rp_t)
polaris_dyncfg_tmp_read(polaris_cm_rp_t)
# on crankshaft cm_rp does init directly
polaris_dyncfg_setup(polaris_cm_rp_t)

# denied { search read open } subject: polaris_cm_rp_t; object: polaris_disk_varied_t
# name="/" dev="sda5"; path="/varied"
polaris_disk_varied_manage(polaris_cm_rp_t)

#allow polaris_cm_rp_t polaris_udev_tmp_files_t:dir { read search };
polaris_udev_tmp_list_dirs(polaris_cm_rp_t)

# LOOK AT ME: /tmp/rp/chasfs/inventory has symbolic links back to
# /bootflash/core/modules and /bootflash/tracelogs/modules cman_inv_restart_init
# calls chasfs_properties_internal over this node and as result it tries to
# access those directories
polaris_core_file_search(polaris_cm_rp_t)
polaris_disk_bootflash_search(polaris_cm_rp_t)
polaris_btrace_persistent_data_search(polaris_cm_rp_t)

polaris_dyncfg_tmp_manage(polaris_cm_rp_t)

ifdef(^mcp_family',`
polaris_scooby_dev_use(polaris_cm_rp_t)
# read/write /dev/ds3100 chr device
dev_rw_generic_chr_files(polaris_cm_rp_t)
polaris_spa_dev_use(polaris_cm_rp_t)
`)

# temporary files created for repm in /tmp/replication
type polaris_cm_rp_tmp_t;
files_tmp_file(polaris_cm_rp_tmp_t)

```

```

gen_require(
    type tmp_t;
)
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "sysctrl_i2c.lck")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "pfu_overtime.lock")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "golden_boot")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "sr_message_debug.txt")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "ngwc_sudi_auth_done")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "codesign.txt")
polaris_cm_rp_tmp_manage(polaris_cm_rp_t)

logging_send_syslog_msg(polaris_cm_rp_t)

# work with /dev/i2c devices
polaris_i2c_use(polaris_cm_rp_t)
dev_getattr_sysfs_fs(polaris_cm_rp_t)

# /var files
gen_require(
    type var_log_t;
)
type polaris_cm_rp_var_log_t;
logging_log_file(polaris_cm_rp_var_log_t)
logging_log_filetrans(polaris_cm_rp_t, polaris_cm_rp_var_log_t, file, "obfl_uptime_v2.log")
manage_files_pattern(polaris_cm_rp_t, var_log_t, polaris_cm_rp_var_log_t)

# needed for "show platform hardware slot R0 eobc interface primary status"
kernel_read_network_state(polaris_cm_rp_t)

#####
# show platform hardware slot R0 pcie status
# mcp_pcie_status_cmd.sh
# /bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/mcp_pcie_status_cmd.sh
#####

polaris_utility_domain_template(pcie_status_cmd)

polaris_bexecute_domtrans(polaris_cm_rp_t)
polaris_bexecute_domain(polaris_pcie_status_cmd_t, polaris_pcie_status_cmd_exec_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_pcie_status_cmd_t)

# "lspci" needs access to files like /sys/devices/pci0000:00/0000:00:00.0/resource
dev_read_sysfs(polaris_pcie_status_cmd_t)

polaris_send_signal_to_bexecute(polaris_cm_rp_t)

```

```
# need write/getattr access for pipes like "pipe:[118396]"
polaris_cmrp_use_fifo(polaris_pcie_status_cmd_t)

corecmd_exec_bin(polaris_pcie_status_cmd_t)

# on utah need to get model info
optional_policy(`
    polaris_dash_dev_use(polaris_cm_rp_t)
    polaris_nios_dev_use(polaris_cm_rp_t)
`)

#access to /dev/dash_fpga device on fugazi platform
ifdef(`fugazi_platform',`
    polaris_dash_dev_mcp_use(polaris_cm_rp_t)
`)

ifdef(`crankshaft_family',`
    polaris_quack_dev_use(polaris_cm_rp_t)
`)

ifdef(`sparrow_platform',`
    polaris_cm_cc_tmpfs_manage(polaris_cm_rp_t)
`)

ifdef(`blackheart_platform',`
    polaris_cm_cc_tmpfs_manage(polaris_cm_rp_t)
`)

ifdef(`cabo_platform',`
    polaris_cm_cc_tmpfs_manage(polaris_cm_rp_t)
`)

ifdef(`aventus_platform',`
    polaris_cm_cc_tmpfs_manage(polaris_cm_rp_t)
    polaris_dio_dev_use(polaris_cm_rp_t)
`)

ifdef(`qwlc_platform',`
    polaris_quack_dev_use(polaris_cm_rp_t)
`)

ifdef(`katar_platform',`
    polaris_quack_dev_use(polaris_cm_rp_t)
`)

ifdef(`wlc_family',`
    netutils_domtrans_ping(polaris_cm_rp_t)
`)
```

```

)

ifdef(^ngwc_family',`
# In cman_rp module fips/entropy component
# calls cman_ngwc_tam_platform_get_act2_entropy() to
# retrieve entropy from ACT2 chip.
polaris_act2_dev_use(polaris_cm_rp_t)

# cman-rp init needs access to quack chip
polaris_quack_dev_use(polaris_cm_rp_t)

# read /proc/cmdline
kernel_read_system_state(polaris_cm_rp_t)

#on macallan and nyquist cman_rp needs to access /flash<#>/lic0/sudi_cert_data_v3
polaris_disk_license_read(polaris_cm_rp_t)

#on macallan and starfleet cli "show firmware version lan_spi" triggers ethtool usage
sysnet_domtrans_ifconfig(polaris_cm_rp_t)
)

# cman-rp needs to read /tmp/fed_post_result and /tmp/sm_post_result
# on ngwc platforms
optional_policy(`
polaris_fed_tmp_files_read(polaris_cm_rp_t)
)
optional_policy(`
polaris_sif_mgr_tmp_files_read(polaris_cm_rp_t)
)

ifdef(^starfleet_platform',`
polaris_dmammap_dev_use(polaris_cm_rp_t)
)

ifdef(^nyquist_platform',`
polaris_ngwc_shm_manage(polaris_cm_rp_t)

# /dev/dmammap usage
polaris_dmammap_dev_use(polaris_cm_rp_t)

# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_cm_rp_t)

files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "pm_post_result")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, dir, "microcode_update")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "mcu_upgrading")

```

```

# executes tar for microcode
allow polaris_cm_rp_t self:capability { fowner fsetid };
')

ifdef(`radium_platform',`
# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_cm_rp_t)
')

ifdef(`sumatra_platform',`
# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_cm_rp_t)
# LOOK AT ME: After direct usage of /dev/mem is removed (CSCvw80796)
polaris_dev_mem_use(polaris_cm_rp_t)
# access huron FPGA
polaris_huron_dev_use(polaris_cm_rp_t)
')

ifdef(`quake_platform',`
polaris_ngwc_shm_manage(polaris_cm_rp_t)

# /dev/dmammap usage
polaris_dmammap_dev_use(polaris_cm_rp_t)

files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "pm_post_result")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, dir, "microcode_update")
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "mcu_upgrading")
')

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvm48950 is fixed using CSCvm48953
ifdef(`nyquist_platform',`
polaris_dev_mem_use(polaris_cm_rp_t)
')

# LOOK AT ME: /dev/mem access restriction remove after
# CSCvn64182 is fixed using CSCvn64184
ifdef(`quake_platform',`
polaris_dev_mem_use(polaris_cm_rp_t)
')

#####
# CLI: "show platform hardware slot R0 xaui statistics"
# this results in cman (/usr/binos/bin/cmand) invoking
# "/bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/dash_fpga_xaui.py show".

```

```

# The python script dash_fpga_xaui.py runs in polaris_bexecute_t domain
# and as part of its functionality it needs to create an UDP socket and make an ioctl call.
#####

polaris_utility_domain_template(dash_fpga_xaui)

polaris_bexecute_domain(polaris_dash_fpga_xaui_t, polaris_dash_fpga_xaui_exec_t)
polaris_cmrp_use_fifo(polaris_dash_fpga_xaui_t)
allow polaris_dash_fpga_xaui_t self:udp_socket { create ioctl };

#####
# CLI: show plat soft cpu share
# - invokes functions in binos/tools/bin/cgroup_reports.sh
# - also cman_cli_show_cpu_share_cb in binos/cman/rp/src/cman_cli.c
# allow open/read/search cgroup files like
# /sys/fs/cgroup/cpu,cpuacct/iosxe_control_processes/cpu.shares
#####
fs_read_cgroup_files(polaris_cm_rp_t)
fs_list_cgroup_dirs(polaris_cm_rp_t)

# on tsn need access to /dev/moka_fpga
optional_policy(`
polaris_mokafpga_dev_use(polaris_cm_rp_t)
`)

optional_policy(`
# betelgeuse need access to /dev/sirius_fpga
polaris_sirius_fpga_dev_use(polaris_cm_rp_t)
`)

# on tsn read access to /sys/devices/platform/moka_fpga
optional_policy(`
polaris_mokafpga_read(polaris_cm_rp_t)
`)

optional_policy(`
polaris_tam_getattrs_tmp_dirs(polaris_cm_rp_t)
`)

# on vwlc/macallan, cmand creates /tmp/hw_entropy
polaris_hw_entropy_create(polaris_cm_rp_t)

# on tsn need write access to
# sys/devices/platform/cpld/reg_rp_sku_register
# on starfleet need write access to
# sys/devices/platform/cpld/reg_fan_fault_shutdown
optional_policy(`
polaris_cpld_write(polaris_cm_rp_t)
`)

```

```

)

# LOOK AT ME: /dev/mem access restriction
ifdef(^tsn_platform',`
polaris_dev_mem_use(polaris_cm_rp_t)
`)

# reads from, populates chasfs with values and deletes /tmp/package_biv_sums
polaris_kgv_data_manage(polaris_cm_rp_t)

optional_policy(`
    polaris_quake_i2c_manage(polaris_cm_rp_t)
`)

ifdef(^qwlc_platform',`
# read/write /dev/ds3100 chr device
dev_rw_generic_chr_files(polaris_cm_rp_t)
`)

ifdef(^katar_platform',`
# read/write /dev/ds3100 chr device
dev_rw_generic_chr_files(polaris_cm_rp_t)
# Read access to /tmp/ldwm_envelope file
polaris_ldwm_envelope_read(polaris_cm_rp_t)
`)

ifdef(^mcp_family',`
# Read access to /tmp/ldwm_envelope file
polaris_ldwm_envelope_read(polaris_cm_rp_t)
`)

# /dev/luna_fpga on qwlc
optional_policy(`
polaris_luna_mbfpga_dev_use(polaris_cm_rp_t)
`)

# open /dev/ttyS0
term_use_unallocated_ttys(polaris_cm_rp_t)

optional_policy(`
polaris_ngwc_scc_shm_manage(polaris_cm_rp_t)
`)

ifdef(^ngwc_family',`
# on nyquist in ngwc_update_member_config nvram_config is
# copied from /tmp/chassis/local/rp/tam/00001.nvram_config
polaris_nvram_manage(polaris_cm_rp_t)
# CMAN needs to create nvram_config with the right label instead of bootflash_t

```

```

gen_require(
    type polaris_nvram_file_t;
    type polaris_disk_bootflash_t;
)
filetrans_pattern(polaris_cm_rp_t, polaris_disk_bootflash_t, polaris_nvram_file_t, file, "nvram_config")
)

# CMANRP needs to create right label instead of bootflash_t
type polaris_user_file_t;
files_type(polaris_user_file_t);
polaris_bootflash_filetrans(polaris_cm_rp_t, polaris_user_file_t, file);
manage_files_pattern(polaris_cm_rp_t, polaris_disk_bootflash_t, polaris_user_file_t)

# on virtual platforms cman reads virtual sudi file /csl_p_0/vudi.pri
ifdef(^vxe_family',`
polaris_disk_csl_read(polaris_cm_rp_t)
)
ifdef(^wlc_family',`
polaris_disk_csl_read(polaris_cm_rp_t)
)

# from cman_util_chasfs_watch_stby_harddisk
polaris_udev_tmp_watch(polaris_cm_rp_t)

# watch read over /tmp/chassis/local/rp/tam by cman_nyq_board_auth_init
polaris_chasfs_watch_read(polaris_cm_rp_t)

# /dev/aikido access
polaris_aikido_dev_use(polaris_cm_rp_t)

# access SERDES /tmp/serdes_asic_key_dir/*
optional_policy(
polaris_serdes_asic_key_tmp_manage(polaris_cm_rp_t)
)

# run /sbin/hwclock in its own domain
clock_domtrans(polaris_cm_rp_t)

ifdef(^crankshaft_family',`
# modprobe sm_nim_adpt.ko for Switzer-CC
modutils_domtrans_insmod(polaris_cm_rp_t)
# /dev/sm_nim_adpt device files for Switzer-CC
polaris_sm_nim_adpt_dev_use(polaris_cm_rp_t)

# "show platform hardware subslot <slot/card> backplane statistics"
# triggers ethtool with ifconfig_t using fifo_file (pipe) on polaris_cm_rp_t.
gen_require(
    type ifconfig_t;

```



```

)

polaris_cmrp_use_fifo(ifconfig_t)
)

polaris_iosd_vcpu_read(polaris_cm_rp_t)

#####
# show platform hardware slot R0 fpga
# mcp_fpga_status_cmd.sh
# /bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/mcp_fpga_status_cmd.sh
#####

polaris_utility_domain_template(fpga_status_cmd)

polaris_bexecute_domtrans(polaris_cm_rp_t)
polaris_bexecute_domain(polaris_fpga_status_cmd_t, polaris_fpga_status_cmd_exec_t)
polaris_cmrp_use_fifo(polaris_fpga_status_cmd_t)

auth_use_nsswitch(polaris_fpga_status_cmd_t)
corecmd_exec_bin(polaris_fpga_status_cmd_t)

# PLEASE LOOK AT ME: /sys/devices/platform/nios should have Cisco specific label
# read content under /sys/devices/platform/nios
dev_read_sysfs(polaris_fpga_status_cmd_t)

ifdef(^sparrow_platform',`
polaris_dio_dev_use(polaris_cm_rp_t)
)

ifdef(^cabo_platform',`
polaris_dio_dev_use(polaris_cm_rp_t)
)

ifdef(^starfleet_platform',`
polaris_fpga_upgrade_tmp_use(polaris_cm_rp_t)
)

type polaris_fpga_upgrade_tmp_t;
files_tmp_file(polaris_fpga_upgrade_tmp_t)
files_tmp_filetrans(polaris_cm_rp_t, polaris_fpga_upgrade_tmp_t, file, "fpga_upgrade")
# cman_rp needs read access to cpu identity
# /dev/cpu/0/msr
dev_read_cpuid(polaris_cm_rp_t)

# cman_rp needs read/write access to cpu msr
# /dev/cpu/0/msr
# following definition provides that

```

```

dev_rw_cpu_microcode(polaris_cm_rp_t)

type polaris_cmrp_nim_xxd_tmp_t;
files_tmp_file(polaris_cmrp_nim_xxd_tmp_t)
files_tmp_filetrans(polaris_cm_rp_t, polaris_cmrp_nim_xxd_tmp_t, file, "nim_xxd_present")
manage_files_pattern(polaris_cm_rp_t, polaris_cmrp_nim_xxd_tmp_t, polaris_cmrp_nim_xxd_tmp_t)

ifdef(`2kp_platform',`
# blzi device
polaris_blzi_dev_use(polaris_cm_rp_t)
')

#tamlib debug file access
polaris_tamlib_dbg_file_manage(polaris_cm_rp_t)

ifdef(`wlc_family',`
# tcpdump access for RP
# packet dump is stored in file /bootflash/haIntCaptureLo.pcap
type polaris_netutils_data_t;
polaris_pfile_type(polaris_netutils_data_t)
gen_require(`
type polaris_disk_bootflash_t;
type netutils_t;
')
filetrans_pattern(netutils_t, polaris_disk_bootflash_t, polaris_netutils_data_t, file, "haIntCaptureLo.pcap")
manage_files_pattern(netutils_t, polaris_netutils_data_t, polaris_netutils_data_t)

# tcpdump access
netutils_run(polaris_cm_rp_t, system_r)

# pidof access
dev_read_sysfs(polaris_cm_rp_t)
kernel_read_system_state(polaris_cm_rp_t)
domain_read_all_domains_state(polaris_cm_rp_t)

# /usr/sbin/ethtool access for show platform hardware slot x ha_port interface stats command
sysnet_domtrans_ifconfig(polaris_cm_rp_t)
')

optional_policy(`
polaris_ds31408_dev_use(polaris_cm_rp_t)
')

polaris_ddr_dev_use(polaris_cm_rp_t)

# allow /usr/sbin/smartctl to be operated on fsadm_exec_t
fstools_exec(polaris_cm_rp_t)

```

```

# allow access to /tmp/cmlib_eeprom_sim_smartctl.out
files_tmp_filetrans(polaris_cm_rp_t, polaris_cm_rp_tmp_t, file, "cmlib_eeprom_sim_smartctl.out")

# allow access to /dev/nvme*
dev_nvme_chr_files_manage(polaris_cm_rp_t)
dev_nvme_blk_files_manage(polaris_cm_rp_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_cm_rp_t)
polaris_tmp_tdlldb_persist_setup(polaris_cm_rp_t)

#code_sign_verify is started by cmand
polaris_code_verify_domtrans(polaris_cm_rp_t)

ifdef(^ngwc_family',`
# SELINUX Mismatch warning when doing power redundancy configuration commands
# Allow access /bootflash/nplusm-power
polaris_nplusm_power_manage(polaris_cm_rp_t)
`)

ifdef(^crankshaft_family',`
# For USB disable feature, /sys/bus/usb/drivers/usb/*/authorized is accessed
gen_require(
type sysfs_t;
)
allow polaris_cm_rp_t sysfs_t:file create;
dev_manage_sysfs_dirs(polaris_cm_rp_t)
)

ifdef(^petra_platform',`
#allow access to /dev/petra-fpga
polaris_iots_fpga_dev_use(polaris_cm_rp_t)
#allow access to /flash6/moncfg/cfg.dat
polaris_nvram_read(polaris_cm_rp_t)
)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmrp.te
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dnl
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dnl
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dnl
dnl divert(-1)

```

```

include(`polaris_process.m4')
dnl Stub out plaris process
define(`polaris_process',`)

dnl Stub out mqipc
define(`polaris_mqipc_service_server',`)
define(`polaris_mqipc_service_client',`)
define(`polaris_mqipc_service_server_elastic_client',`)

dnl Stub out lipc
define(`polaris_lipc_service_server',`)
define(`polaris_lipc_service_client',`)

include(`polaris_ipc_ripc.m4')
include(`polaris_ipc_base_ripc_if.m4')

dnl Stub out non existent one
define(`polaris_websocket_service_server',`)
define(`polaris_cipc_service_server',`)

include(`polaris_max_scope.m4')

divert(0)dnl
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#
## <summary>Polaris Platform Base IPC Policy Rules.</summary>
## <required val="true">
##   Needed for each polaris platform
## </required>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_base_if.m4
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#
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#
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#

policy_module(polarisplogd, 1.0);

gen_require(
    type polaris_plogd_t;
)

```

```

polaris_btrace_data_manage(polaris_plogd_t)
polaris_crft_data_manage(polaris_plogd_t)
polaris_chasfs_manage(polaris_plogd_t)
polaris_tdlresolve_read(polaris_plogd_t)
polaris_tdlldb_list_dirs(polaris_plogd_t)
polaris_cpld_read(polaris_plogd_t)
polaris_flashlib_read(polaris_plogd_t)

polaris_ripc_sman_ui_serv_connect(polaris_plogd_t)

# originally when box starts /dev/log is symbolic link to /run/systemd/journal/dev-log
# but latter plogd reset links to its own socket: make sure that we have proper
# transition
gen_require(
    type devlog_t;
        type syslogd_t;
    )
allow polaris_plogd_t devlog_t:sock_file manage_sock_file_perms;
allow polaris_plogd_t devlog_t:lnk_file manage_lnk_file_perms;
dev_filetrans(polaris_plogd_t, devlog_t, sock_file, "log")
# make sure that unix_dgram_socket got transitioned into syslogd_t
type_transition polaris_plogd_t polaris_plogd_t:unix_dgram_socket syslogd_t;
allow polaris_plogd_t syslogd_t:unix_dgram_socket { bind create read };

# autogen script misses connection between plogd
polaris_ripc_plog_serv_connect(polaris_plogd_t)

# why plogd needs dac_override capability?
allow polaris_plogd_t self:capability { dac_override };
allow polaris_plogd_t self:capability2 block_suspend;

polaris_dyncfg_tmp_read(polaris_plogd_t)

# plogd calls journalctl -f to get system logs including our AVC messages
# plogd also signals running journalctl to manage the buffer queues
gen_require(
    type journalctl_t;
    )
journalctl_domtrans(polaris_plogd_t)
allow polaris_plogd_t journalctl_t:process signal;

# should be moved into contrib journalctl.te? journalctl tries to read
# /proc/1/environ
gen_require(
    type journalctl_t;
    )
init_read_state(journalctl_t)

```

```

allow journalctl_t self:capability sys_resource;
allow journalctl_t self:process setrlimit;

# plogd calls stdbuf to set up journalctl buffering
corecmd_exec_bin(polaris_plogd_t)

# writes into pman fifo stdout
polaris_use_btrace_fifo(journalctl_t)

# /dev/log is symbolic link to /run/systemd/journal/dev-log
# need ability to search in init_var_run_t /run/systemd
# some of subjects that use syslog may not have it
gen_require(
    attribute syslog_client_type;
)
init_search_pid_dirs(syslog_client_type)
#plog_d calls journalctl to get system log including AVC message.
allow polaris_plogd_t journalctl_t:process signal;

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplogd.te
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```

```

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#

```

```

# polaristamsrp file contexts place holder

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristamsrp.fc
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```

```

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#

```

```

## <summary>Polaris ftm Policy Rules.</summary>

```

```

#####

```

```

## <summary>

```

```

## Write ttm /var/run socket file

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_ftm_var_sock_write`,`
    gen_require(`
        type polaris_ftm_t;
        type polaris_ftm_var_run_t;
        type var_run_t;
    `)
    write_sock_files_pattern($1, var_run_t, polaris_ftm_var_run_t)
    allow $1 polaris_ftm_t:unix_stream_socket { connectto };
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisftm.if

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```

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#

```

```

/usr/binos/conf/iptables.sh -- gen_context(system_u:object_r:polaris_iptables_exec_t,s0)

```

```

/tmp/rp/iptables -d gen_context(system_u:object_r:polaris_iptables_tmp_t,s0)
/tmp/rp/iptables/inot_fifo -p gen_context(system_u:object_r:polaris_iptables_tmp_t,s0)

```

# in polaris we have xtables-multi at wrong location

```

/usr/bin/xtables-multi -- gen_context(system_u:object_r:iptables_exec_t,s0)

```

#fman (rp/fp) acl mgmt and iptbl modules dependency

```

/tmp/iptables.v4          gen_context(system_u:object_r:polaris_iptables_tmp_t,s0)
/tmp/iptables.v6          gen_context(system_u:object_r:polaris_iptables_tmp_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisiptables.fc

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```

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```

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#

## <summary>Polaris cpp\_sp Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppsp.if

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#

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#

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#

# polarisngwctblmgr file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwctblmgr.fc

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#

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#

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#

/tmp/sysctrl\_i2c.lck gen\_context(system\_u:object\_r:polaris\_cm\_rp\_tmp\_t,s0)

/tmp/pfu\_overtime.lock gen\_context(system\_u:object\_r:polaris\_cm\_rp\_tmp\_t,s0)

/tmp/golden\_boot gen\_context(system\_u:object\_r:polaris\_cm\_rp\_tmp\_t,s0)

# dash\_fpga\_xaui.py is the backend python code for

# the cli "show platform hardware slot R0 xaui statistics"

/usr/binos/conf/dash\_fpga\_xaui.py -- gen\_context(system\_u:object\_r:polaris\_dash\_fpga\_xaui\_exec\_t,s0)

/usr/binos/bin/cmand\_us -- gen\_context(system\_u:object\_r:polaris\_cm\_rp\_exec\_t,s0)

# relabel /vol/harddisk/.inv

/vol/harddisk/.inv(/.\*)? gen\_context(system\_u:object\_r:polaris\_cm\_rp\_inv\_log\_file\_t,s0)

/vol/harddisk\_internal/.inv(/.\*)? gen\_context(system\_u:object\_r:polaris\_cm\_rp\_inv\_log\_file\_t,s0)

# .inv dir is in /bootflash in Katar eWLC

/bootflash/.inv(/.\*)? gen\_context(system\_u:object\_r:polaris\_cm\_rp\_inv\_log\_file\_t,s0)

/usr/binos/conf/mcp\_fpga\_status\_cmd.sh -- gen\_context(system\_u:object\_r:polaris\_fpga\_status\_cmd\_exec\_t,s0)

Found in path(s):



\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmrp.fc

No license file was found, but licenses were detected in source scan.

#

# August 2017, Shawn Lu

#

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#

## <summary>Polaris rrm\_mgr Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrrmmgr.if

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#

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#

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#

## <summary>Polaris LIPC Policy Rules.</summary>

#####

# LIPC policy

#####

#####

## <summary>

## Manage lipc files

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

## <rolebase/>

#

interface(`polaris\_lipc\_manage`,`

gen\_require(`

type polaris\_lipc\_t;

`)

manage\_dirs\_pattern(\$1, polaris\_lipc\_t, polaris\_lipc\_t)

manage\_files\_pattern(\$1, polaris\_lipc\_t, polaris\_lipc\_t)

manage\_lnk\_files\_pattern(\$1, polaris\_lipc\_t, polaris\_lipc\_t)

manage\_fifo\_files\_pattern(\$1, polaris\_lipc\_t, polaris\_lipc\_t)

```

        manage_sock_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
    ')

#####
## <summary>
##   Getattr of lipc files directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_lipc_getattr`,`
gen_require(`
type polaris_lipc_t;
`)
    getattr_dirs_pattern($1, polaris_lipc_t, polaris_lipc_t)
    getattr_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
    getattr_lnk_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
    getattr_fifo_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
    getattr_sock_files_pattern($1, polaris_lipc_t, polaris_lipc_t)
)

```

```

#####
## <summary>
##   Create lipc file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed creating lipc channel.
##   </summary>
## </param>
## <param name="channel_domain">
##   <summary>
##     Domain assigned to lipc channel.
##   </summary>
## </param>
## <param name="channel_name">
##   <summary>
##     File name of lipc channel.
##   </summary>
## </param>
#
interface(`polaris_lipc_create_name`,`
gen_require(`

```

```

type polaris_lipc_t;
)
    type_transition $1 polaris_lipc_t : sock_file $2 $3;
    manage_sock_files_pattern($1, polaris_lipc_t, $2)

    polaris_socketat_nsfs_read($1)

#   not specific enough
#   type_transition $1 $1 : unix_stream_socket $2;
#   allow $1 $2:unix_stream_socket { listen accept bind create write read };
)

#####
## <summary>
##   Write lipc file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to connect and write into lipc file.
##   </summary>
## </param>
## <param name="channel_domain">
##   <summary>
##     Domain assigned to lipc channel.
##   </summary>
## </param>
## <param name="server">
##   <summary>
##     Domain of owner of lipc channel.
##   </summary>
## </param>
#
interface(`polaris_lipc_write',`
    gen_require(`
        type polaris_lipc_t;
    `)
    write_sock_files_pattern($1, polaris_lipc_t, $2)
    allow $1 $3:unix_stream_socket { connectto };

    polaris_socketat_nsfs_read($1)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislipc.if

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dnl April 2018, Victor Kamensky

```

dnl
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dnl
define(`polaris_lipc_service_server_aux',`dnl
type $1;
files_type($1)
polaris_lipc_$2_create_name($3)

define(`polaris_lipc_service_server_full',`dnl
polaris_lipc_service_server_aux(lipc_label($1), lipc_stem($1), process_label($2))dnl
')

define(`polaris_lipc_service_server',`dnl
ifndef(lipc_type_map($1),`,`,`polaris_lipc_service_server_full($1, $2)')
lipc_type_map_set(lipc_label($1), process_label($2))
')

define(`polaris_lipc_service_client_aux',`dnl
polaris_lipc_$2_write($3, $4)')

define(`polaris_lipc_service_client',`dnl
polaris_lipc_service_client_aux(lipc_label($1), lipc_stem($1), process_label($2), lipc_type_map(lipc_label($1)))dnl
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_lipc\_te.m4

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```

#
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#

```

```

policy_module(polarisbtman, 1.0);

```

```

gen_require(
    type polaris_btman_t;
)

```

```

polaris_crft_data_manage(polaris_btman_t)
polaris_chasfs_manage(polaris_btman_t)
polaris_tdlresolve_read(polaris_btman_t)
polaris_tdlldb_list_dirs(polaris_btman_t)
polaris_cpld_read(polaris_btman_t)

```

```

polaris_flashlib_read(polaris_btman_t)

polaris_ripc_sman_ui_serv_connect(polaris_btman_t)

polaris_db_tlddb_dir_use(polaris_btman_t)

polaris_bexecute_domtrans(polaris_btman_t)

# script starts rsync with mcp_chvrf.sh
polaris_chvrf_domtrans(polaris_btman_t)
polaris_send_signal_to_bexecute(polaris_btman_t)

corecmd_exec_bin(polaris_btman_t)
corecmd_exec_shell(polaris_btman_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_btman_t)

allow polaris_btman_t self:capability { dac_override fsetid };

polaris_cpld_read(polaris_btman_t)

# operate on all btrace files
polaris_btrace_data_manage_all(polaris_btman_t)

# btman operated on /tmp/tmppub files
type polaris_btrace_tmppub_t;
files_tmp_file(polaris_btrace_tmppub_t)

polaris_systemd_tmpfiles_tmp_filetrans(polaris_btrace_tmppub_t, dir, "tmppub")
filetrans_pattern(polaris_btman_t, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t, { file dir })
manage_files_pattern(polaris_btman_t, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
manage_dirs_pattern(polaris_btman_t, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)

polaris_persistent_read(polaris_btman_t)

# in purge_old_core_files_from_harddisk function of btrace_rotate_util.c
# script removes outdated core files, so it needs read/write permission
# to polaris_core_file_t files.
polaris_core_file_manage(polaris_btman_t)

fs_getattr_xattr_fs(polaris_btman_t)

# btman checks for presence of /tmp/udev/etc/udev/harddisk
# through hwutil_is_harddisk_present function of hwutil-common.sh
polaris_udev_tmp_list_dirs(polaris_btman_t)

# when /bootflash or /harddisk are 100% full

```

```

allow polaris_btman_t self:capability sys_resource;

# access to /tmp/sw/boot/dmesg
polaris_boot_tmp_read(polaris_btman_t)

polaris_create_ldb_domtrans(polaris_btman_t)

# btman calls update_resolver_luid_paths which eventually calls open_brand function for
# given polaris executable (build_crdu_luid_file_paths, bcrdu_get_proc_path_internal,
# brand_type_string)
polaris_read_exec_domain(polaris_btman_t)

# btman create transitional files in /tmp directory
type polaris_btman_tmp_t;
files_tmp_file(polaris_btman_tmp_t)
files_tmp_filetrans(polaris_btman_t, polaris_btman_tmp_t, file)
manage_files_pattern(polaris_btman_t, polaris_btman_tmp_t, polaris_btman_tmp_t)

# use syslog
logging_send_syslog_msg(polaris_btman_t)

# btman unlink /tmp/rp/pvp/work/btman_first_inst
polaris_pvp_manage_tmp_files(polaris_btman_t)

# operate on btrace file in /bootflash
polaris_btrace_persistent_data_manage(polaris_btman_t)

gen_require(
    type polaris_btrace_data_t;
)
polaris_bootflash_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tracelogs")
polaris_harddisk_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tracelogs")
polaris_crashinfo_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tracelogs")
polaris_bootflash_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tan")
polaris_harddisk_filetrans(polaris_btman_t, polaris_btrace_data_t, dir, "tan")

# btman creates /tmp/rp//pvp/work/btman_first_inst directory in is_first_incarnation
# function called by btrace_rotate_init
polaris_pvp_manage_tmp_files(polaris_btman_t)

#####
# This block is policies for "request platform software system shell" CLI

# /tmp/sw/rp/0/0/rp_security/mount/usr/binos/bin/btman -f rp
# -s /tmp/rp/trace/stage -w /tmp/rp/trace
# - needs to read/getattr on
# /tmp/sw/mount/*universalk9.*.SSA.pkg/usr/binos/sbin/in.telnetd
gen_require(

```

```

    type telnetd_exec_t;
)
allow polaris_btman_t telnetd_exec_t:file { getattr open read };

# btman establishes leases for trace files
allow polaris_btman_t self:capability lease;

# dump_btrace_meta walks all files with nftw
files_getattr_all_files(polaris_btman_t)
files_getattr_all_dirs(polaris_btman_t)
files_read_all_symlinks(polaris_btman_t)
files_list_non_security(polaris_btman_t)
files_read_all_files(polaris_btman_t)
files_mmap_all_files(polaris_btman_t)

# btman exports data through http protocol btm_trigger_export and schedule_newfile_export
corenet_tcp_connect_http_port(polaris_btman_t)

# LOOK AT ME: incorrect iosd-tps service_def. It should be renamed
# iosd_tps_socket-b0 in all platform.tdl files. Remove the following
# policy when CSCvp89498 is fixed.
gen_require(^
    type polaris_lipc_t;
    type polaris_pman_t;
)
polaris_lipc_write(polaris_btman_t, polaris_lipc_t, polaris_pman_t)

# btman manages some persistent crashinfo files
polaris_disk_crashinfo_manage(polaris_btman_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_btman_t)

polaris_tmp_tdlldb_persist_setup(polaris_btman_t)

polaris_btrace_data_watch(polaris_btman_t)

# dump_btrace_meta writes to /tmp/binary_trace.1605747053/.pkginfo
polaris_install_tmp_manage(polaris_btman_t)

#allow polaris_btman_t access to polaris_cm_rp semaphore
polaris_cm_rp_sem_use(polaris_btman_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbtman.te
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#

```

```
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#
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#
```

```
policy_module(polarisfmanrp, 1.0);
```

```
gen_require(
    type polaris_fman_rp_t;
)
```

```
#####
# mqipc manual, one that missing in platform tdl file
#####
```

```
# mq.-fman-log-bay0-peer0
type polaris_fman_log_bay0_peer0_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer0_mqipc_t)
```

```
# mq.-fman-log-bay0-peer1
type polaris_fman_log_bay0_peer1_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer1_mqipc_t)
```

```
# mq.-fman-log-bay0-peer2
type polaris_fman_log_bay0_peer2_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer2_mqipc_t)
```

```
# mq.-fman-log-bay0-peer3
type polaris_fman_log_bay0_peer3_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer3_mqipc_t)
```

```
# mq.-fman-log-bay0-peer4
type polaris_fman_log_bay0_peer4_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer4_mqipc_t)
```

```
# mq.-fman-log-bay0-peer5
type polaris_fman_log_bay0_peer5_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer5_mqipc_t)
```

```
# mq.-fman-log-bay0-peer6
type polaris_fman_log_bay0_peer6_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer6_mqipc_t)
```

```
# mq.-fman-log-bay0-peer7
type polaris_fman_log_bay0_peer7_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer7_mqipc_t)
```



```

# mq.-fman-log-bay0-peer8
type polaris_fman_log_bay0_peer8_mqipc_t;
polaris_mqipc_type(polaris_fman_log_bay0_peer8_mqipc_t)

polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer0_mqipc_t, fman-log-bay0-peer0)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer1_mqipc_t, fman-log-bay0-peer1)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer2_mqipc_t, fman-log-bay0-peer2)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer3_mqipc_t, fman-log-bay0-peer3)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer4_mqipc_t, fman-log-bay0-peer4)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer5_mqipc_t, fman-log-bay0-peer5)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer6_mqipc_t, fman-log-bay0-peer6)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer7_mqipc_t, fman-log-bay0-peer7)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fman_log_bay0_peer8_mqipc_t, fman-log-bay0-peer8)

polaris_btrace_data_manage(polaris_fman_rp_t)
polaris_crft_data_manage(polaris_fman_rp_t)
polaris_chasfs_manage(polaris_fman_rp_t)
polaris_tdlresolve_read(polaris_fman_rp_t)
polaris_tdlldb_list_dirs(polaris_fman_rp_t)
polaris_cpld_read(polaris_fman_rp_t)
polaris_flashlib_read(polaris_fman_rp_t)
polaris_lua_read(polaris_fman_rp_t)

polaris_ripc_sman_ui_serv_connect(polaris_fman_rp_t)

polaris_db_tdlldb_dir_use(polaris_fman_rp_t)

ifdef(^nyquist_platform',`
gen_require(`
    type polaris_bt_logger_fman_rp_mqipc_t;
`)
# fman_rp may start first and create this mqipc channel
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_bt_logger_fman_rp_mqipc_t, bt_logger_fman-rp)
`)

allow polaris_fman_rp_t self:udp_socket { create ioctl };

allow polaris_fman_rp_t self:capability { dac_override };
allow polaris_fman_rp_t self:capability2 block_suspend;

# not clear why fman_rp tries to load netdev-mgmtbr kernel module
# it does not exist on ultra anyway
# type=AVC msg=audit(1478126742.967:98): avc: denied { module_request } for pid=18020 comm="fman_rp"
kmod="netdev-mgmtbr" scontext=system_u:system_r:polaris_fman_rp_t:s0
tcontext=system_u:system_r:kernel_t:s0 tclass=system
kernel_request_load_module(polaris_fman_rp_t)

polaris_socketat_nsfs_read(polaris_fman_rp_t)

```

```

polaris_dyncfg_tmp_read(polaris_fman_rp_t)

# socketat usage from fman_punt_port_mapping_init for AF_NETLINK, SOCK_DGRAM
polaris_lfts_dev_use(polaris_fman_rp_t)
allow polaris_fman_rp_t self:netlink_tcpdiag_socket {create nlmsg_read };

# fman_rp tries to write to sytemd journal when a peer is stuck
# introduced by CSCvt19772
logging_send_syslog_msg(polaris_fman_rp_t)

optional_policy(`
#fman-rp creates tmp files in acl-mgmt workflow.
polaris_fman_acl iptbl_tmp_file(polaris_fman_rp_t)
')

# manually create mqipc channel: missing in TDL
type polaris_fmrp2fpm_mqipc_t;
polaris_mqipc_type(polaris_fmrp2fpm_mqipc_t)
polaris_mqipc_create_name(polaris_fman_rp_t, polaris_fmrp2fpm_mqipc_t, fmrp2fpm_vulcan_mqipc)

optional_policy(`
polaris_fpm2fmrp_mqipc_use(polaris_fman_rp_t)
')

polaris_issu_tmp_files_read(polaris_fman_rp_t)

polaris_install_tmp_read(polaris_fman_rp_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmanrp.te
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#
# August 2017, Shawn Lu
#
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#

policy_module(polarisrifmgr, 1.0);

gen_require(`
    type polaris_rif_mgr_t;
')

polaris_btrace_data_manage(polaris_rif_mgr_t)
polaris_crft_data_manage(polaris_rif_mgr_t)

```

```

polaris_chasfs_manage(polaris_rif_mgr_t)
polaris_tdlresolve_read(polaris_rif_mgr_t)
polaris_tdlldb_list_dirs(polaris_rif_mgr_t)
polaris_cpld_read(polaris_rif_mgr_t)
polaris_lua_read(polaris_rif_mgr_t)
polaris_flashlib_read(polaris_rif_mgr_t)
polaris_lfts_dev_use(polaris_rif_mgr_t)
logging_send_syslog_msg(polaris_rif_mgr_t)

polaris_rpc_sman_ui_serv_connect(polaris_rif_mgr_t)

allow polaris_rif_mgr_t self:capability { sys_nice dac_override };
allow polaris_rif_mgr_t self:process { setsched };
# open /dev/ttyS0 console in sco_sys_init_sw_params
term_use_unallocated_ttys(polaris_rif_mgr_t)

# work with /dev/hanet device
polaris_hanet_dev_use(polaris_rif_mgr_t)

# update/read chassis serial numer /csl_p_0/vudi.pri
polaris_disk_csl_manage(polaris_rif_mgr_t)

# monitors native interfaces flap over /proc and netlink
kernel_read_network_state(polaris_rif_mgr_t)
allow polaris_rif_mgr_t self:netlink_route_socket rw_netlink_socket_perms;
allow polaris_rif_mgr_t self:unix_dgram_socket create_socket_perms;

# pidof and /proc usage
dev_read_sysfs(polaris_rif_mgr_t)
kernel_read_system_state(polaris_rif_mgr_t)
domain_read_all_domains_state(polaris_rif_mgr_t)

corecmd_exec_bin(polaris_rif_mgr_t)

kernel_dontaudit_request_load_module(polaris_rif_mgr_t)
# rifmgr creates udp socket to get interface flags in rif_rp_init
allow polaris_rif_mgr_t self:udp_socket create_socket_perms;

corenet_tcp_bind_polaris_rif_mgr_port(polaris_rif_mgr_t)
corenet_tcp_connect_polaris_rif_mgr_port(polaris_rif_mgr_t)

corenet_udp_bind_polaris_rif_mgr_port(polaris_rif_mgr_t)
corenet_udp_bind_generic_node(polaris_rif_mgr_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrifmgr.te
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```

```

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#

## <summary>Polaris stack_mgr Policy Rules.</summary>
#####
## <summary>
## Read and write all stack mgr's fifo file, used as
##   standard input/output.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_use_stack_mgr_fifo`,`
gen_require(`
type polaris_stack_mgr_t;
`)

write_fifo_files_pattern($1, polaris_stack_mgr_t, polaris_stack_mgr_t)
`)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisstackmgr.if
```

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```

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#

```

```
/tmp/^.DML_FIFO          gen_context(system_u:object_r:polaris_dmi_vtyserverutild_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmivtyserverutild.fc
```

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```

#
# July 2017, Victor Kamensky
#

```

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#

## <summary>Polaris cm\_cc Policy Rules.</summary>

#####

## <summary>

## Execute cmand\_fp in the polaris\_cm\_fp\_t domain.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed to transition.

## </summary>

## </param>

#

interface(`polaris\_cm\_cc\_domtrans`,`

gen\_require(`

type polaris\_cm\_cc\_t, polaris\_cm\_cc\_exec\_t;

`)

corecmd\_search\_bin(\$1)

domtrans\_pattern(\$1, polaris\_cm\_cc\_exec\_t, polaris\_cm\_cc\_t)

')

#####

## <summary>

## Manage cm\_cc\_tmpfs files.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_cm\_cc\_tmpfs\_manage`,`

gen\_require(`

type polaris\_cm\_cc\_tmpfs\_t;

`)

manage\_files\_pattern(\$1, polaris\_cm\_cc\_tmpfs\_t, polaris\_cm\_cc\_tmpfs\_t)

mmap\_files\_pattern(\$1, polaris\_cm\_cc\_tmpfs\_t, polaris\_cm\_cc\_tmpfs\_t)

')

#####

## <summary>

## Check presence and unlink /tmp/nim\_xxd\_present file created by cman cc.

## </summary>

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_nim_xxd_tmp_open_unlink`,`
    gen_require(`
        type polaris_nim_xxd_tmp_t;
    `)

    allow $1 polaris_nim_xxd_tmp_t:file { open unlink }
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismcc.if

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```

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#

```

```

## <summary>Polaris LUA Policy Rules.</summary>

```

```

#####
# Polaris lfts
#####

```

```

#####
## <summary>
##   Work (read, write, ioctl) with /dev/dev_lfts device.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_lfts_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_lfts_device_t;
    `)

```

```
write_chr_files_pattern($1, device_t, polaris_lfts_device_t)
read_chr_files_pattern($1, device_t, polaris_lfts_device_t)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislfts.if
```

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```
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```

```
## <summary>Polaris ofa Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisofa.if
```

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```
#
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#
```

```
/var/virtual-instance(/.*)? gen_context(system_u:object_r:polaris_var_vman_t,s0)
```

```
/bootflash/virtual-instance(/.*)? gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
/bootflash/virtual-instance.conf -- gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
/bootflash/vman_fdb(/.*)? gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
/vol/harddisk/virtual-instance(/.*)? gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
/vol/harddisk/virtual-instance.conf -- gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
/vol/harddisk/vman_fdb(/.*)? gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
#sparrow, blackheart
```

```
/flash1/virtual-instance(/.*)? gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
/flash1/virtual-instance.conf -- gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
/flash1/vman_fdb(/.*)? gen_context(system_u:object_r:polaris_disk_vman_t,s0)
```

```
/tmp/vman(/.*)? gen_context(system_u:object_r:polaris_vman_tmp_t,s0)
```

```
/tmp/cgroup.log gen_context(system_u:object_r:polaris_vman_tmp_t,s0)
```

```
/tmp/vman_lxc_wdt_[0-9]* gen_context(system_u:object_r:polaris_vman_tmp_t,s0)
```

```
/tmp/trace(/.*)? gen_context(system_u:object_r:polaris_vman_tmp_t,s0)
```

```
/usr/binos/conf/vman_exec.sh -- gen_context(system_u:object_r:polaris_vman_shell_exec_t,s0)
```

```
/usr/binos/conf/cgroup_reports.sh -- gen_context(system_u:object_r:polaris_cgroup_reports_exec_t,s0)
```

```
/usr/binos/conf/vman_techsupport.sh -- gen_context(system_u:object_r:polaris_vman_tech_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvman.fc
```

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```
#
```

```
# August 2017, Shawn Lu
```

```
#
```

```
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```
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```

```
#
```

```
policy_module(polarisodmproxy, 1.0);
```

```
gen_require(^
```

```
    type polaris_odm_proxy_t;
```

```
')
```

```
polaris_btrace_data_manage(polaris_odm_proxy_t)
```

```
polaris_crft_data_manage(polaris_odm_proxy_t)
```

```
polaris_chasfs_manage(polaris_odm_proxy_t)
```

```
polaris_tdlresolve_read(polaris_odm_proxy_t)
```

```
polaris_tdlldb_list_dirs(polaris_odm_proxy_t)
```

```
polaris_cpld_read(polaris_odm_proxy_t)
```

```
polaris_lua_read(polaris_odm_proxy_t)
```

```
polaris_flashlib_read(polaris_odm_proxy_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_odm_proxy_t)
```

```
polaris_db_tdlldb_dir_use(polaris_odm_proxy_t)
```

```
#allow to setrlimit
```

```
allow polaris_odm_proxy_t self:capability sys_resource;
```

```
allow polaris_odm_proxy_t self:process setrlimit;
```

```
allow polaris_odm_proxy_t self:capability dac_override;
```

```
polaris_odm_clnt2svr_mqipc_create(polaris_odm_proxy_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisodmproxy.te
```

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```
#
```

```
# July 2017, Victor Kamensky
```



```

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#

## <summary>Polaris issu_monitor Policy Rules.</summary>
#####
## <summary>
## Execute issumonitor in the polaris_issu_monitor domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_issu_monitor_domtrans`,`
gen_require(`
type polaris_issu_monitor_t, polaris_issu_monitor_exec_t;
`)

domtrans_pattern($1, polaris_issu_monitor_exec_t, polaris_issu_monitor_t)
`)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissumonitor.if
```

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dnl

dnl May 2018, Victor Kamensky

dnl

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dnl

dnl Place holder to let selinux-policy makefile know that this module

dnl is autogenerated, but we have different rules for it

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplatformipcauto.fc.in
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplatformdbauto.te.in
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplatformdbauto.if.in
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/autopolarisplatformipcbase.te.in
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplatformdbauto.fc.in
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplatformipcauto.te.in
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/autopolarisplatformipcbase.if.in
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisplatformipcauto.if.in
```

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```

#
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#
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#

policy_module(polariskeyman, 1.0);

gen_require(
    type polaris_keyman_t;
)

polaris_btrace_data_manage(polaris_keyman_t)
polaris_crft_data_manage(polaris_keyman_t)
polaris_chasfs_manage(polaris_keyman_t)
polaris_tdlresolve_read(polaris_keyman_t)
polaris_tdldb_list_dirs(polaris_keyman_t)
polaris_flashlib_read(polaris_keyman_t)

polaris_ripc_sman_ui_serv_connect(polaris_keyman_t)

allow polaris_keyman_t self:capability net_admin;
# keyman utilizes secure memory via ciscossl libcrypto.so (mlock)
allow polaris_keyman_t self:capability ipc_lock;
polaris_cpld_read(polaris_keyman_t)

# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(^quake_platform',`
dev_read_sysfs(polaris_keyman_t)
)

# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(^supernova_platform',`
dev_read_sysfs(polaris_keyman_t)
)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariskeyman.te
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#

```

# polaristamdrp file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristamdrp.fc

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#

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#

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#

# /bootflash labels

/bootflash(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_bootflash\_t,s0)

/bootflash/.ssh(/.\*)? gen\_context(system\_u:object\_r:ssh\_home\_t,s0)

/bootflash/.ssh/ssh\_host.\*\_key\pub gen\_context(system\_u:object\_r:ssh\_key\_t,s0)

/bootflash/.ssh/ssh\_host.\*\_key gen\_context(system\_u:object\_r:ssh\_key\_t,s0)

/bootflash/tracelogs(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_data\_t,s0)

/bootflash/tan(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_data\_t,s0)

/bootflash/core(/.\*)? gen\_context(system\_u:object\_r:polaris\_core\_file\_t,s0)

/bootflash/debug.conf gen\_context(system\_u:object\_r:polaris\_debug\_conf\_t,s0)

/bootflash/packages.conf gen\_context(system\_u:object\_r:polaris\_packages\_conf\_t,s0)

# /vol/bootflash4 labels

/vol/bootflash4(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_bootflash\_t,s0)

/vol/bootflash4/csl\_p\_0(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_csl\_p\_t,s0)

/vol/bootflash4/csl\_p\_1(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_csl\_p\_t,s0)

/vol/bootflash4/csl\_s\_0(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_csl\_s\_t,s0)

/vol/bootflash4/csl\_s\_1(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_csl\_s\_t,s0)

/vol/bootflash4/obfl\_\* gen\_context(system\_u:object\_r:polaris\_obfl\_data\_t,s0)

# /harddisk labels

/vol/harddisk(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_harddisk\_t,s0)

/vol/harddisk\_internal(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_harddisk\_t,s0)

/vol/harddisk/tracelogs(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_data\_t,s0)

/vol/harddisk/tan(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_data\_t,s0)

/vol/harddisk/core(/.\*)? gen\_context(system\_u:object\_r:polaris\_core\_file\_t,s0)

/vol/harddisk/debug.conf gen\_context(system\_u:object\_r:polaris\_debug\_conf\_t,s0)

/vol/harddisk\_internal/tracelogs(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_data\_t,s0)

/vol/harddisk\_internal/tan(/.\*)? gen\_context(system\_u:object\_r:polaris\_btrace\_data\_t,s0)

/vol/harddisk\_internal/core(/.\*)? gen\_context(system\_u:object\_r:polaris\_core\_file\_t,s0)

/vol/harddisk/packages.conf gen\_context(system\_u:object\_r:polaris\_packages\_conf\_t,s0)

# on lmg persistent storage arranged differently

/csl\_p\_0(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_csl\_p\_t,s0)

/csl\_p\_1(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_csl\_p\_t,s0)

/csl\_s\_0(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_csl\_s\_t,s0)

/csl\_s\_1(/.\*)? gen\_context(system\_u:object\_r:polaris\_disk\_csl\_s\_t,s0)

```

/obfl(/.*)?                gen_context(system_u:object_r:polaris_obfl_data_t,s0)

/vol/disk0(/.*)?           gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
# /init is symbolic link to /lib/systemd/systemd
/init -l gen_context(system_u:object_r:init_exec_t,s0)
# /disk0 is symbolic link to /vol/disk0
/disk0 -l gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)

# scooby device
/dev/scooby -c gen_context(system_u:object_r:polaris_scooby_device_t,s0)

# spa devices handled by sys_platform driver
/dev/spa0 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)
/dev/spa1 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)
/dev/spa2 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)
/dev/spa3 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)
/dev/iocp0 -c gen_context(system_u:object_r:polaris_spa_device_t,s0)

# htdp devices
/dev/htdp[0-9]* -c gen_context(system_u:object_r:polaris_htdp_device_t,s0)

# /dev/epa device on asr1k(mcp)
/dev/epa[0-9]*           -c gen_context(system_u:object_r:polaris_epa_device_t,s0)
/dev/epactrl[0-9]*       -c gen_context(system_u:object_r:polaris_epa_device_t,s0)

# /dev/luna_fpga on asr1k(mcp)
/dev/luna_mbfpga         -c gen_context(system_u:object_r:polaris_luna_mbfpga_device_t,s0)

# /dev/dash_fpga device on fugazi(mcp)
/dev/dash_fpga -c gen_context(system_u:object_r:polaris_dash_device_t,s0)
/dev/dash_fpga_cc0 -c gen_context(system_u:object_r:polaris_dash_device_t,s0)

# /dev/astro on asr1k(mcp)
/dev/astro               -c gen_context(system_u:object_r:polaris_astro_device_t,s0)

# /dev/oob_evfc on asr1k(mcp)
/dev/oob_evfc            -c gen_context(system_u:object_r:polaris_oob_evfc_device_t,s0)

# /dev/cpp_il on asr1k(mcp)
/dev/cpp_il              -c gen_context(system_u:object_r:polaris_cpp_il_device_t,s0)

/dev/icp_adf_ctl -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_adf_gige_wd -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev0_csr -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev0_ring -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_mem -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_mem_page -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_processes -c gen_context(system_u:object_r:polaris_icp_device_t,s0)

```

```
/dev/ds31408 -c gen_context(system_u:object_r:polaris_ds31408_device_t,s0)
/dev/cbdma -c gen_context(system_u:object_r:polaris_cbdma_device_t,s0)
/dev/cpp_htdp -c gen_context(system_u:object_r:polaris_cpp_htdp_device_t,s0)
/dev/n2_device -c gen_context(system_u:object_r:polaris_n2_device_t,s0)
/dev/cy2213 -c gen_context(system_u:object_r:polaris_cy2213_device_t,s0)

/dev/vega -c gen_context(system_u:object_r:polaris_vega_device_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismcp.fc

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dnl April 2018, Victor Kamensky

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dnl

```
define(^max_bay_map', `defn(format(`max_bay_map[%s-%s]", ` $1', ` $2'))')
```

```
define(^max_bay_map_set', `define(format(`max_bay_map[%s-%s]", ` $1', ` $2'), ` $3'))')
```

```
define(^max_elastic_map', `defn(format(`max_elastic_map[%s-%s-%s]", ` $1', ` $2', ` $3'))')
```

```
define(^max_elastic_map_set', `define(format(`max_elastic_map[%s-%s-%s]", ` $1', ` $2', ` $3'), ` $4'))')
```

```
define(^max_scope_map', `ifelse($2, `elastic', `max_elastic_map($1, $2, $3)', `max_bay_map($1, $2))')
```

dnl RICP scope handling

```
define(^min_bay_ripc_map', `defn(format(`min_bay_ripc_map[%s-%s]", ` $1', ` $2'))')
```

```
define(^min_bay_ripc_map_set', `define(format(`min_bay_ripc_map[%s-%s]", ` $1', ` $2'), ` $3'))')
```

```
define(^min_elastic_ripc_map', `defn(format(`min_elastic_ripc_map[%s-%s-%s]", ` $1', ` $2', ` $3'))')
```

```
define(^min_elastic_ripc_map_set', `define(format(`min_elastic_ripc_map[%s-%s-%s]", ` $1', ` $2', ` $3'), ` $4'))')
```

```
define(^min_scope_ripc_map_aux', `ifelse($2, `elastic', `min_elastic_ripc_map($1, $2, $3)', `min_bay_ripc_map($1, $2))')
```

```
define(^min_scope_ripc_map', `ifelse(min_scope_ripc_map_aux($1, $2, $3), `', 0, min_scope_ripc_map_aux($1, $2, $3))')
```

```
define(^max_bay_ripc_map', `defn(format(`max_bay_ripc_map[%s-%s]", ` $1', ` $2'))')
```

```
define(^max_bay_ripc_map_set', `define(format(`max_bay_ripc_map[%s-%s]", ` $1', ` $2'), ` $3'))')
```

```
define(^max_elastic_ripc_map', `defn(format(`max_elastic_ripc_map[%s-%s-%s]", ` $1', ` $2', ` $3'))')
```

```
define(^max_elastic_ripc_map_set', `define(format(`max_elastic_ripc_map[%s-%s-%s]", ` $1', ` $2', ` $3'), ` $4'))')
```

```
define(^max_scope_ripc_map_aux', `ifelse($2, `elastic', `max_elastic_ripc_map($1, $2, $3)', `max_bay_ripc_map($1, $2))')
```

```
define(^max_scope_ripc_map', `ifelse(max_scope_ripc_map_aux($1, $2, $3), `', 0, max_scope_ripc_map_aux($1, $2, $3))')
```

\$2, \$3))'

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_max\_scope.m4

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#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris periodic Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisperiodic.if

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#

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#

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#

## <summary>Polaris service\_mgr Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisservicemgr.if

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#

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#

policy\_module(polariscommon, 1.0);

#####

# Polaris common

#####

# domain that holds all polaris processes

attribute polaris\_domain;

```

# domain that holds all polaris processes executables
attribute polaris_exec_domain;

# domain that holds all polaris processes plus few base types that operates on
# during system start, like initrc_t and unconfined_service_t. Please remove
# unconfined types latter.
attribute polaris_extended_domain;

gen_require(
    type unconfined_t;
    type unconfined_service_t;
    type initrc_t;
    type init_t;
)
typeattribute unconfined_t polaris_extended_domain;
typeattribute unconfined_service_t polaris_extended_domain;
typeattribute initrc_t polaris_extended_domain;
typeattribute init_t polaris_extended_domain;

# common permissions that are safe to grant and hard to root cause.
# these permissions may need to be turned off during development or tightened
# in future releases
gen_require(
    attribute domain;
)
# sys_resource denial is seen due to disk full issue
# and possibly FD exceeding limit
allow domain self:capability sys_resource;

# When management interface is enabled for development Polaris device can be
# access by telnet, which directly drops into shell. It would be desirreably
# to remove telnet functionality att all. But for now we need transition
# rule to get shell running in unconfined domain.
gen_require(
    type telnetd_t;
)

unconfined_shell_domtrans(telnetd_t)

#####
# This block is policies for "request platform software system shell" CLI.
# Execute bexecute in polaris_bexecute domain.
polaris_bexecute_domtrans(telnetd_t)

# /tmp/sw/rp/0/0/rp_security/mount/usr/binos/sbin/in.telnetd
# -L /usr/binos/conf/brelay.sh
# - this needs read/write/create access to /tmp/rp/trace/.in_telnetd_*.bin.tmp
# which later gets renamed to /tmp/rp/trace/telnetd_service_sh_*.bin

```

```

polaris_btrace_data_manage(telnetd_t)
# mcp_telnetd_init through btrace_application_start calls get_chassis_number
# so it needs chasfs access
polaris_chasfs_read(telnetd_t)
polaris_cpld_read(telnetd_t)
polaris_btrace_lvl_config_manage(telnetd_t)
#####

# LOOK AT ME: rsync needs sys_admin capability
# only seen when we boot in enforcing mode, localtime glibc library call
# needs time zone information and through __tz_convert function it eventually
# calls syspage function and that in turns calls Cisco syspage related
# prctl that is protected by CAP_ADMIN now
gen_require(
    type rsync_t;
)
allow rsync_t self:capability sys_admin;

# mount_packages.sh systemd unit runs under init_t and it leaks unix socket
gen_require(
    type rsync_t;
    type init_t;
)
allow rsync_t init_t:unix_stream_socket getattr;

# LOOK AT ME: auditd needs sys_admin capability
# only seen when we boot in enforcing mode, denials happens upon exec of
# auditdsp why is not entirely clear
gen_require(
    type auditd_t;
)
allow auditd_t self:capability sys_admin;

# LOOK AT ME:
# Because Cisco kernel features check for capability sys_admin
# before granting access to it. It turns out to be mistake because
# in SELinux universe beeing root does not mean one have sys_admin
# capability. For now grant sys_admin capability to everyone :(
gen_require(
    attribute domain;
)
allow domain self:capability sys_admin;

# LOOK AT ME:
# all polaris SMU system is based on LD_LIBRARY_PATH passing from
# parent to child, but if auxv AT_SECURE would be set to 1, glibc
# will clean LD_LIBRARY_PATH and other environment variables when
# it execve another process. We need to grant noatsecure to all

```



```

# processes
gen_require(
    attribute domain;
)
allow domain domain:process { noatsecure rlimitinh };

# nfs server exporting some directories like /harddisk
gen_require(
    type nfsd_t;
)
polaris_disk_bootflash_read_lnk(nfsd_t)
polaris_harddisk_read(nfsd_t)

# nfs server check hugetlbfs files system
gen_require(
    type hugetlbfs_t;
)
list_dirs_pattern(nfsd_t, hugetlbfs_t, hugetlbfs_t)

# temporarily addressing denial,
# preferable to turn on nfs_export_all_rw/ro boolean
gen_require(
    type removable_t;
)
list_dirs_pattern(nfsd_t, removable_t, removable_t)

# firmware type
type polaris_firmware_t;
files_type(polaris_firmware_t)

# some systemd unit creates /firmware directory in initramfs
gen_require(
    attribute domain;
    type root_t;
)
filetrans_pattern(domain, root_t, polaris_firmware_t, dir, "firmware")

# handling /tmp/debug.conf, created by systemd unit
gen_require(
    type polaris_debug_conf_t;
    type unconfined_service_t;
)
files_tmp_filetrans(unconfined_service_t, polaris_debug_conf_t, {file lnk_file}, "debug.conf")

# /tmp/etc files; serving as /etc like but sitting in mutable storage
# (assuming that real /etc would become read-only eventually)
type polaris_etc_t;
files_type(polaris_etc_t);

```

```

# /tmp/sv files
type polaris_sv_tmp_t;
files_tmp_file(polaris_sv_tmp_t)

# /dev/i2c-N
type polaris_i2c_device_t;
dev_node(polaris_i2c_device_t)

# remap_mem0 device
type polaris_remap_mem_device_t;
dev_node(polaris_remap_mem_device_t)

type polaris_ebf_t;
files_type(polaris_ebf_t)

# allow all domains map/read ebf files
gen_require(
    attribute domain;
)
polaris_ebf_map(domain)

# btrace files for telnetd, since telnetd is open source label
# and it does not use our domain creation template
gen_require(
    type telnetd_t;
)
type polaris_telnetd_bt_t;
polaris_btrace_data_type(polaris_telnetd_bt_t)
polaris_btrace_data_client(telnetd_t, polaris_telnetd_bt_t)

type polaris_telnetd_maroon_t;
polaris_maroon_data_type(polaris_telnetd_maroon_t)
polaris_maroon_data_client(telnetd_t, polaris_telnetd_maroon_t)

#####
# "install add file" on ULTRA invokes:
# /tmp/sw/rp/0/0/rp_security/mount/usr/binos/sbin/in.telnetd -L /usr/binos/conf/brelay.sh
# That needs getattr on /lib/systemd/system/ksm.service
polaris_ksm_run_check(telnetd_t)

# restorecon needs sys_resource capability
gen_require(
    type setfiles_t;
)
allow setfiles_t self:capability sys_resource;

# accessing /sys/firmware/dmi/tables/DMI

```

```

gen_require(
    type dmidecode_t;
    type sysfs_t;
)
mmap_files_pattern(dmidecode_t, sysfs_t, sysfs_t)
gen_require(
    type dmidecode_t;
    type memory_device_t;
)
allow dmidecode_t memory_device_t:chr_file map;
# called by confd_t label with it is file as stdin
polaris_conf_d_tmp_use_fifo(dmidecode_t)

# rpcbind binds to port
gen_require(
    type rpcbind_t;
)
corenet_udp_bind_generic_port(rpcbind_t)

# when polaris_unconfined we need to mark all subject labels except
# iosd lable to run as unconfined
#ifdef(^polaris_unconfined')
    gen_require(
        type auditd_t;
        type dhcpc_t;
        type getty_t;
        type inetd_t;
        type initrc_t;
        type init_t;
        type journalctl_t;
        type nfsd_t;
        type ntpd_t;
        type rpcbind_t;
        type rpcd_t;
        type rsync_t;
        type setfiles_t;
        type sshd_t;
        type syslogd_t;
        type system_dbusd_t;
        type udev_t;
        type virtfd_t;
        type virtlogd_t;
        type ldconfig_t;
        type hostname_t;
    )
    unconfined_domain(auditd_t)
    unconfined_domain(dhcpc_t)
    unconfined_domain(getty_t)

```

```

unconfined_domain(inetd_t)
unconfined_domain(initrc_t)
unconfined_domain(init_t)
unconfined_domain(journalctl_t)
unconfined_domain(nfsd_t)
unconfined_domain(ntpd_t)
unconfined_domain(rpcbind_t)
unconfined_domain(rpcd_t)
unconfined_domain(rsync_t)
unconfined_domain(setfiles_t)
unconfined_domain(sshd_t)
unconfined_domain(syslogd_t)
unconfined_domain(system_dbusd_t)
unconfined_domain(udev_t)
unconfined_domain(virtfd_t)
unconfined_domain(virtlogd_t)
unconfined_domain(lldconfig_t)
unconfined_domain(hostname_t)
)

ifdef(`polaris_unconfined',`
optional_policy(`
    gen_require(`
        type container_runtime_t;
    ')
    unconfined_domain(container_runtime_t)
)
)

# /tmp/rsync_log_dir files
type polaris_rsync_tmp_t;
files_tmp_file(polaris_rsync_tmp_t)

# activate correct named transition for basic directories
# when code runs under unconfined_service_t, i.e calls ip
# command that runs under ifconfig_t and creates /run/netns
gen_require(`
    type unconfined_service_t;
)
domain_named_filetrans(unconfined_service_t)
gen_require(`
    type ifconfig_t;
    type ifconfig_var_run_t;
)
allow ifconfig_t ifconfig_var_run_t:dir mounton;

# earlier invocation of ifconfig complains about tmp_t mounton
# on /sys directory

```

```

gen_require(
    type tmp_t;
)
allow ifconfig_t tmp_t:dir mounton;

#SERDES library stores info in /tmp/serdes_asic_key_dir/*
type polaris_serdes_asic_key_tmp_t;
files_tmp_file(polaris_serdes_asic_key_tmp_t)

# /dev/shm/vrf_shm access
type polaris_vrf_shm_t;
files_type(polaris_vrf_shm_t)

# /dev/shm/cerrno_dll access
type polaris_cerr_shm_t;
files_tmpfs_file(polaris_cerr_shm_t)

# for /sbin/ip: /dev/shm/vrf_shm access in netns creation
gen_require(
    type ifconfig_t;
)
polaris_vrf_shm_manage(ifconfig_t)

# for /sbin/ip: adds lfts device in netns creation
polaris_lfts_dev_use(ifconfig_t)

# new systemd-tmpfiles needs this permissions
gen_require(
    type systemd_tmpfiles_t;
)
allow systemd_tmpfiles_t self:capability sys_resource;
allow systemd_tmpfiles_t self:process setrlimit;

gen_require(
    type unconfined_service_t;
)
ssh_initrc_domtrans(unconfined_service_t)

#wlc awips
type polaris_awips_signature_file_t;
polaris_pfile_type(polaris_awips_signature_file_t)

# /usr/bin/curl
type polaris_curl_t;
type polaris_curl_exec_t;
init_system_domain(polaris_curl_t, polaris_curl_exec_t)
corenet_udp_bind_generic_node(polaris_curl_t)
auth_use_nsswitch(polaris_curl_t)

```

```

polaris_crft_data_read(polaris_curl_t)

# for ip netns exec X curl
optional_policy(
    polaris_curl_domtrans(ifconfig_t)
)

# /etc/init.d/sshd that runs under initrc_t through ssh-keygen
# creates /config/.ssh directory if does not exist; /config
# directory is typically symlink to /bootflash
gen_require(
    type initrc_t;
    type ssh_home_t;
)
polaris_bootflash_filetrans(initrc_t, ssh_home_t, dir, ".ssh")

# /tmp/ldwm_envelope file
type polaris_ldwm_envelope_tmp_t;
files_tmp_file(polaris_ldwm_envelope_tmp_t)
gen_require(
    type initrc_t;
    type init_t;
)
files_tmp_filetrans({ initrc_t init_t }, polaris_ldwm_envelope_tmp_t, file, "ldwm_envelope")

#####
# CLI: show platform software tech-support
#####
polaris_utility_domain_template(tech_support)
polaris_bexecute_domain(polaris_tech_support_t, polaris_tech_support_exec_t)
polaris_bexecute_domtrans(polaris_tech_support_t)

# allow to run readlink -f /usr/binos/conf/psimple.sh
corecmd_exec_bin(polaris_tech_support_t)

# Additional policies needed for workflow
auth_use_nsswitch(polaris_tech_support_t)
dev_list_sysfs(polaris_tech_support_t)
polaris_chasfs_read(polaris_tech_support_t)
polaris_cpld_read(polaris_tech_support_t)
# scripts stdin is set by hman and needs access to pipes like pipe:[271524]
polaris_hman_use_fifo(polaris_tech_support_t)
# Allow ls to /tmp/ufs/crashinfo
optional_policy(
    polaris_ncd_tmp_read(polaris_tech_support_t)
)

# Allow readlink to /usb0 and /usb1

```

```

optional_policy(
    fs_read_removable_symlinks(polaris_tech_support_t)
)

gen_require(
    type polaris_btrace_tmppub_t;
    type polaris_disk_bootflash_t;
    type polaris_disk_crashinfo_t;
)

# platform_tech_support.sh creates misc files/dirs under /tmp/tmppub
type polaris_tech_support_tmp_t;
files_tmp_file(polaris_tech_support_tmp_t)
filetrans_pattern(polaris_tech_support_t, polaris_btrace_tmppub_t, polaris_tech_support_tmp_t, { file dir })
# misc file directly in /tmp like /tmp/esg_tech_support_command_file_out.txt
files_tmp_filetrans(polaris_tech_support_t, polaris_tech_support_tmp_t, file,
"esg_tech_support_command_file_out.txt")
files_tmp_filetrans(polaris_tech_support_t, polaris_tech_support_tmp_t, file,
"sdwan_tech_support_command_file_out.txt")
manage_files_pattern(polaris_tech_support_t, polaris_tech_support_tmp_t, polaris_tech_support_tmp_t)
manage_dirs_pattern(polaris_tech_support_t, polaris_tech_support_tmp_t, polaris_tech_support_tmp_t)

# /bootflash/certs
type polaris_ap_cert_file_t;
files_type(polaris_ap_cert_file_t)
polaris_pfile_type(polaris_ap_cert_file_t)

# Additional policies needed for workflow when file option is used
# show platform software tech-support file bootflash:show_tech_file
polaris_bootflash_manage(polaris_tech_support_t)
polaris_disk_crashinfo_manage(polaris_tech_support_t)
fs_getattr_tmpfs(polaris_tech_support_t)
polaris_btrace_persistent_data_read(polaris_tech_support_t)

type polaris_rommon_info_tmp_t;
files_tmp_filetrans(initrc_t , polaris_rommon_info_tmp_t, file, "existing_rommon_info")
manage_files_pattern(initrc_t, polaris_rommon_info_tmp_t, polaris_rommon_info_tmp_t)
fs_associate_tmpfs(polaris_rommon_info_tmp_t)

# tmlib debug file
type polaris_tmlib_dbg_file_t;
polaris_pfile_type(polaris_tmlib_dbg_file_t)

# read /proc/cmdline
kernel_read_system_state(polaris_tech_support_t)
# read rmbonbifo files such as env_var.sh
polaris_rmonbifo_tmp_read(polaris_tech_support_t)
# read /tmp/sw/boot/base_pkg

```

```
polaris_boot_tmp_read(polaris_tech_support_t)
```

```
# /dev/DDR
```

```
type polaris_DDR_device_t;
```

```
dev_node(polaris_DDR_device_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscommon.te
```

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```
dnl
```

```
dnl April 2018, Victor Kamensky
```

```
dnl
```

```
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```

```
dnl All rights reserved
```

```
dnl
```

```
dnl RIPC Base Interface Map: track that type declarations unique
```

```
define(^ripC_base_type_map', `defn(format(`ripC_base_type_map[%s]", ` $1'))')
```

```
define(^ripC_base_type_map_set', `define(format(`ripC_base_type_map[%s]", ` $1'), ` $2'))')
```

```
define(^ripC_base_port_map', `defn(format(`ripC_base_port_map[%s]", ` $1'))')
```

```
define(^ripC_base_port_map_set', `define(format(`ripC_base_port_map[%s]", ` $1'), ` $2'))')
```

```
define(^polaris_ripC_portcon', portcon tcp $1 gen_context(system_u:object_r:$2,s0))
```

```
define(^polaris_ripC_portcon_aux', `dnl
```

```
ifelse(ripC_base_port_map($1), `', `polaris_ripC_portcon($1, $2)')
```

```
ripC_base_port_map_set($1, $2)
```

```
')
```

```
define(^polaris_ripC_portcon_many',
```

```
`polaris_ripC_portcon_aux(eval($2 + $3), $1)
```

```
ifelse($4, $3, `', `polaris_ripC_portcon_many($1, $2, eval($3 + 1), $4)')
```

```
define(^polaris_ripC_service_server_aux', `dnl
```

```
type $1, port_type, defined_port_type;
```

```
$4
```

```
')
```

```
define(^polaris_ripC_service_server_full', `dnl
```

```
polaris_ripC_service_server_aux(ripC_label($1), ripC_stem($1), process_label($2),
```

```
                  polaris_ripC_portcon_many(ripC_label($1), $5, min_scope_ripC_map($3, $4, $2),
```

```
max_scope_ripC_map($3, $4, $2)))
```

```
')
```

```
define(^polaris_ripC_service_server', `dnl
```

```
ifelse(ripC_base_type_map($1), `', `polaris_ripC_service_server_full($1, $2, $3, $4, $5)')
```



```
rpc_base_type_map_set($1, 1)
')
```

```
define(`polaris_rpc_service_client',`dnl
ifelse(rpc_base_type_map($1,`, `polaris_rpc_service_server_full($1, $2, $3, $4, $5)')
rpc_base_type_map_set($1, 1)
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_base_rpc_te.m4
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris ngwc_plfm_mgr Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Read /tmp/installer files and directories
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_ngwc_plfm_mgt_tmp_manage',`
```

```
gen_require(`
```

```
type polaris_ngwc_plfm_mgr_tmp_t;
```

```
`)
```

```
manage_dirs_pattern($1, polaris_ngwc_plfm_mgr_tmp_t, polaris_ngwc_plfm_mgr_tmp_t)
```

```
manage_files_pattern($1, polaris_ngwc_plfm_mgr_tmp_t, polaris_ngwc_plfm_mgr_tmp_t)
```

```
')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwcplfmmgr.if
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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```

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#

## <summary>Polaris dmi\_dmiauthd Policy Rules.</summary>

#####

## <summary>

## Connect to and send messages to dmiauthd.

## tmp/.DmiAuth.sock unix datagram sockets.

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_dmi\_dmiauthd\_dgram\_send`,`

gen\_require(`

type polaris\_dmi\_dmiauthd\_tmp\_t;

type polaris\_dmi\_dmiauthd\_t;

`)

allow \$1 self:unix\_stream\_socket {create\_socket\_perms};

allow \$1 polaris\_dmi\_dmiauthd\_t:unix\_stream\_socket { connectto };

write\_sock\_files\_pattern(\$1, polaris\_dmi\_dmiauthd\_tmp\_t,polaris\_dmi\_dmiauthd\_tmp\_t)

')

#####

## <summary>

## Manage dmiauthd fifo files

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_dmiauthd\_tmp\_manage`,`

gen\_require(`

type polaris\_dmi\_dmiauthd\_tmp\_t;

type tmp\_t;

`)

manage\_fifo\_files\_pattern(\$1, tmp\_t, polaris\_dmi\_dmiauthd\_tmp\_t)

')

#####

## <summary>

## Write into fifo file created by dmiauthd, typical case when

## dmiauthd starts script under popen.

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dmiauthd_use_fifo`,`
    gen_require(`
        type polaris_dmi_dmiauthd_t;
    `)
    write_fifo_files_pattern($1, polaris_dmi_dmiauthd_t, polaris_dmi_dmiauthd_t)
`)

#####
## <summary>
## Manage /tmp/netconf-yang-diag/ files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_dmiauthd_tmp_diags_manage`,`
    gen_require(`
        type polaris_dmi_dmiauthd_tmp_diags_t;
    `)
    manage_files_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
    manage_dirs_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
    manage_lnk_files_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)
`)

#####
## <summary>
## Read /tmp/netconf-yang-diag/ files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_dmiauthd_tmp_diags_read`,`
    gen_require(`
        type polaris_dmi_dmiauthd_tmp_diags_t;

```

```
)  
read_files_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)  
list_dirs_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)  
read_lnk_files_pattern($1, polaris_dmi_dmiauthd_tmp_diags_t, polaris_dmi_dmiauthd_tmp_diags_t)  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmidmiauthd.if
```

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```
#  
# March 2019, Shikhar Dogra  
#  
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#
```

```
# polarisfmancc file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfmancc.fc
```

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```
dnl  
dnl April 2018, Victor Kamensky  
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dnl  
define(`lipc_stem', `translit(patsubst($1, `-lipc$', `'), `-', `_)')  
define(`lipc_label', `format(`polaris_%s_lipc_t', lipc_stem($1))')
```

```
dnl Lipc Type Map: track that type declations unique
```

```
define(`lipc_type_map', `defn(format(`lipc_type_map[%s]", `$1'))')  
define(`lipc_type_map_set', `define(format(`lipc_type_map[%s]", `$1'), `$2'))')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_lipc.m4
```

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```
#  
# February 2020, Victor Kamensky  
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#
```

```
policy_module(polariscfgmgr, 1.0);
```

```

gen_require(
    type polaris_cfgmgr_t;
)
polaris_chasfs_manage(polaris_cfgmgr_t)
# read day0_oper.xml and write local.data.tmp
polaris_bootflash_manage(polaris_cfgmgr_t)
polaris_boot_tmp_read(polaris_cfgmgr_t)
polaris_cpld_read(polaris_cfgmgr_t)
polaris_tdlresolve_read(polaris_cfgmgr_t)
polaris_flashlib_read(polaris_cfgmgr_t)

polaris_ripc_sman_ui_serv_connect(polaris_cfgmgr_t)

polaris_db_tlddb_dir_use(polaris_cfgmgr_t)

logging_send_syslog_msg(polaris_cfgmgr_t)

# vconfd_load_shared_schemas
polaris_conf_d_shared_schema_read(polaris_cfgmgr_t)

polaris_cedge_reset_ns(polaris_cfgmgr_t)

polaris_cedge_etc_manage(polaris_cfgmgr_t)

# /etc/version is opened via "show sdwan version"
polaris_conf_d_etc_read(polaris_cfgmgr_t)

# /var/run/.cfgmgr socket and pid
type polaris_cfgmgr_var_run_t;
files_pid_file(polaris_cfgmgr_var_run_t)
manage_files_pattern(polaris_cfgmgr_t, polaris_cfgmgr_var_run_t, polaris_cfgmgr_var_run_t)
manage_sock_files_pattern(polaris_cfgmgr_t, polaris_cfgmgr_var_run_t, polaris_cfgmgr_var_run_t)
files_pid_filetrans(polaris_cfgmgr_t, polaris_cfgmgr_var_run_t, { file sock_file })

# sets up symbloc link /var/run/netns/default to pid 1 netns
sysnet_manage_ifconfig_run(polaris_cfgmgr_t)

# PLEASE LOOK AT ME create_syslog_conf_file function in
# vptela/cfgmgr/cfgmgr_logging.c creates /etc/syslog.conf.sysklogd file
# that nobody uses in polaris
files_manage_etc_files(polaris_cfgmgr_t)

# in cfgmgr_vpn_namespace_add creates udp socket
allow polaris_cfgmgr_t self:udp_socket create_socket_perms;

# watch /bootflash/sdwan/day0_oper.xml
polaris_persistent_watch(polaris_cfgmgr_t)

```

```

# compute_available_memory executes '/bin/df /dev/shm'
corecmd_exec_bin(polaris_cfgmgr_t)
# vip_binos_cpuinfo calls sysconf
dev_read_sysfs(polaris_cfgmgr_t)
# cfgmgr_show_system_get_elem collects SDWAN_DISK_MOUNT (/bootflash) fs info
fs_getattr_xattr_fs(polaris_cfgmgr_t)
# crashlist_refresh collects info about corefiles
polaris_core_file_read(polaris_cfgmgr_t)
# cfgmgr_show_system_get_elem collects info about /bootflash/.installer fs
polaris_disk_install_read(polaris_cfgmgr_t)
# cfgmgr_show_system_get_elem() collects available mem info by executing
# '/bin/df /tmp/rp/tdldb'
polaris_tdldb_list_dirs(polaris_cfgmgr_t)

#vip_binos_cpuinfo() performs file operations on PROC_CPUSTAT_FILE (/proc/stat)
polaris_disk_install_fs_getattr(polaris_cfgmgr_t)
#vip_binos_meminfo() reads PROC_MEMINFO_PATH (/proc/meminfo)
kernel_read_system_state(polaris_cfgmgr_t)

# configure ip address on system interface on vrf 1
sysnet_domtrans_ifconfig(polaris_cfgmgr_t)

# create tunnel interface in cfgmgr_tun_alloc function
corenet_rw_tun_tap_dev(polaris_cfgmgr_t)
allow polaris_cfgmgr_t self:tun_socket create;

# works if /proc accept_source_route file of system interface
kernel_rw_net_sysctls(polaris_cfgmgr_t)

# work with /tmp/xml/geostats
polaris_cedge_xml_tmp_manage(polaris_cfgmgr_t)

# work with /tmp/tmp/geostats
polaris_cedge_tmp_manage(polaris_cfgmgr_t)
allow polaris_cfgmgr_t self:process setpgid;

# map on /etc/passwd
auth_map_passwd(polaris_cfgmgr_t)

# give read permissions for /tmp/GPS_supported file created by iosd
polaris_iosd2iox_tmp_read(polaris_cfgmgr_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscfgmgr.te

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dnl

dnl May 2018, Manohar Hungund

dnl

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dnl

dnl Starfleet Platform Max Bay Limits

```
max_bay_map_set(rp, `per_bay', 0)
```

```
max_bay_map_set(bp, `per_bay', 0)
```

```
max_bay_map_set(cc, `per_bay', 1)
```

```
max_bay_map_set(fp, `per_bay', 1)
```

```
min_bay_ripc_map_set(rp, `per_bay', 0)
```

```
min_bay_ripc_map_set(bp, `per_bay', 0)
```

```
min_bay_ripc_map_set(cc, `per_bay', 1)
```

```
min_bay_ripc_map_set(fp, `per_bay', 0)
```

```
max_bay_ripc_map_set(rp, `per_bay', 1)
```

```
max_bay_ripc_map_set(bp, `per_bay', 1)
```

```
max_bay_ripc_map_set(cc, `per_bay', 1)
```

```
max_bay_ripc_map_set(fp, `per_bay', 1)
```

```
min_bay_ripc_map_set(rp, `global', 0)
```

```
min_bay_ripc_map_set(bp, `global', 0)
```

```
min_bay_ripc_map_set(cc, `global', 1)
```

```
min_bay_ripc_map_set(fp, `global', 0)
```

```
max_bay_ripc_map_set(rp, `global', 1)
```

```
max_bay_ripc_map_set(bp, `global', 1)
```

```
max_bay_ripc_map_set(cc, `global', 1)
```

```
max_bay_ripc_map_set(fp, `global', 1)
```

dnl in elastic scope each process has its own value

```
max_elastic_map_set(rp, `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(cc, `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(fp, `elasitic', BPROC_ODM, 0)
```

```
max_elastic_map_set(rp, `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(cc, `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(fp, `elastic', BPROC_WNCD, 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/bigbangmaps.m4
```

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dnl

dnl Nyquist Platform Max Bay Limits

```
max_bay_map_set(rp, `per_bay', 0)
```

```
max_bay_map_set(cc, `per_bay', 0)
```

```
max_bay_map_set(fp, `per_bay', 0)
```

dnl in elastic scope each process has its own value

```
max_elastic_map_set(rp, `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(cc, `elastic', BPROC_ODM, 0)
```

```
max_elastic_map_set(fp, `elasic', BPROC_ODM, 0)
```

```
max_elastic_map_set(rp, `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(cc, `elastic', BPROC_WNCD, 0)
```

```
max_elastic_map_set(fp, `elastic', BPROC_WNCD, 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/quake2maps.m4
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# August 2017, Shawn Lu
```

```
#
```

```
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
# polarisodmproxy file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisodmproxy.fc
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# August 2017, Shawn Lu
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
### <summary>Polaris rif_mgr Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrifmgr.if
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```



```

# All rights reserved
#

#
# August 2018 Man-Yee Hau
#
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/usr/cpp/bin/qfp-ucode-csr -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-csr-us -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-csx -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-c8kv -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-wlc -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-utah -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-tsn -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-tsn-le -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-supernova -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-blackheart -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-sparrow -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-aventus -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-cabo -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-goldbeach -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-radium -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-fugazi -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-sumatra -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-nanook -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/usr/cpp/bin/qfp-ucode-csr-fb -- gen_context(system_u:object_r:polaris_qfp_exec_t,s0)
/var/run/.rte_config -- gen_context(system_u:object_r:polaris_qfp_var_run_t,s0)

/dev/netmap -c gen_context(system_u:object_r:polaris_netmap_device_t,s0)

/dev/svc_eng_punt[0-9]* -c gen_context(system_u:object_r:polaris_sep_device_t,s0)

# qfp memif interfaces
/bootflash/SHARED-IOX/memif(/.*)? gen_context(system_u:object_r:polaris_qfp_memif_t,s0)
/tmp/memif(/.*)? gen_context(system_u:object_r:polaris_qfp_memif_t,s0)

# CSR & C8KV infiniband devices for Azure
/dev/infiniband/uverbs[0-9]* -c gen_context(system_u:object_r:polaris_infiniband_device_t,s0)

/etc/rc\.\d\init\.\d\iodbd\.\sh -- gen_context(system_u:object_r:polaris_iodbd_exec_t,s0)

# For Intel quickassist (qat) v1.5 - Note that mcp_family also includes this.
# fugazi uses polarismcp.fc and polasrisqfp.fc so need to exclude it here.
ifndef(`mcp_family`,`
/dev/icp_adf_ctl -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/icp_dev_processes -c gen_context(system_u:object_r:polaris_icp_device_t,s)

```

')

```
# For platforms which use Intel quickassist (qat) v1.7
/dev/usdm_drv      -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/qat_adf_ctl   -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
/dev/qat_dev_processes -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
```

```
# For platforms which use the musdk from the Marvell 10.3.x.x SDK
/dev/musdk-cma     -c gen_context(system_u:object_r:polaris_icp_device_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisqfp.fc
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```

```
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# June 2017, Victor Kamensky
#
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#
```

```
/usr/binos/conf/telnetd_service.sh -- gen_context(system_u:object_r:polaris_tservice_telnet_exec_t,s0)
/usr/binos/conf/sshd_service.sh -- gen_context(system_u:object_r:polaris_tservice_ssh_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristbservice.fc
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```

```
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#
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#
```

```
/usr/binos/conf/rollback_timer.sh -- gen_context(system_u:object_r:polaris_rbtimer_exec_t,s0)
```

```
/bootflash/.rollback_timer(/.*)?      gen_context(system_u:object_r:polaris_rbtimer_bootflash_t,s0)
/tmp/rp/rollback_timer(/.*)?          gen_context(system_u:object_r:polaris_rbtimer_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrollbacktimer.fc
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```

```
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
```

## dnl Katar WLC Platform Max Bay Limits

```
max_bay_map_set(rp, `per_bay', 0)
max_bay_map_set(cc, `per_bay', 3)
max_bay_map_set(fp, `per_bay', 0)
```

```
max_bay_ripc_map_set(rp, `per_bay', 0)
max_bay_ripc_map_set(cc, `per_bay', 3)
max_bay_ripc_map_set(fp, `per_bay', 0)
```

```
max_bay_ripc_map_set(rp, `global', 0)
max_bay_ripc_map_set(cc, `global', 3)
max_bay_ripc_map_set(fp, `global', 0)
```

## dnl in elastic scope each process has its own value

```
max_elastic_map_set(rp, `elastic', BPROC_ODM, 1)
max_elastic_map_set(cc, `elastic', BPROC_ODM, 1)
max_elastic_map_set(fp, `elasitc', BPROC_ODM, 1)
```

```
max_elastic_map_set(rp, `elastic', BPROC_WNCD, 7)
max_elastic_map_set(cc, `elastic', BPROC_WNCD, 7)
max_elastic_map_set(fp, `elastic', BPROC_WNCD, 7)
```

```
max_elastic_ripc_map_set(rp, `elastic', BPROC_ODM, 1)
max_elastic_ripc_map_set(cc, `elastic', BPROC_ODM, 1)
max_elastic_ripc_map_set(fp, `elasitc', BPROC_ODM, 1)
```

```
max_elastic_ripc_map_set(rp, `elastic', BPROC_WNCD, 7)
max_elastic_ripc_map_set(cc, `elastic', BPROC_WNCD, 7)
max_elastic_ripc_map_set(fp, `elastic', BPROC_WNCD, 7)
```

## Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/katarmaps.m4
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# June 2017, Victor Kamensky
```

```
#
```

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```
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```

```
#
```

```
# polariscontainer file contexts place holder
```

```
# All the possible IOX flash_dir/harddisk_dir from iox_polaris.conf for docker
```

```
# Expected labels for docker as per container.fc
```

```
/bootflash/docker/(.*)? gen_context(system_u:object_r:container_var_lib_t,s0)
```

```
/bootflash/docker/./config/env gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/docker/./containers/./.*\log gen_context(system_u:object_r:container_log_t,s0)
```

```
/bootflash/docker/./containers/./hostname gen_context(system_u:object_r:container_share_t,s0)
/bootflash/docker/./containers/./hosts gen_context(system_u:object_r:container_share_t,s0)
/bootflash/docker/./init(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/bootflash/docker/./overlay(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/bootflash/docker/./overlay2(/.*)? gen_context(system_u:object_r:container_share_t,s0)
```

```
/bootflash/iox_alt_hdd_mount_dir/docker(/.*)?
gen_context(system_u:object_r:container_var_lib_t,s0)
/bootflash/iox_alt_hdd_mount_dir/docker/./config\env
gen_context(system_u:object_r:container_share_t,s0)
/bootflash/iox_alt_hdd_mount_dir/docker/./containers/./.*\log
gen_context(system_u:object_r:container_log_t,s0)
/bootflash/iox_alt_hdd_mount_dir/docker/./containers/./hostname
gen_context(system_u:object_r:container_share_t,s0)
/bootflash/iox_alt_hdd_mount_dir/docker/./containers/./hosts
gen_context(system_u:object_r:container_share_t,s0)
/bootflash/iox_alt_hdd_mount_dir/docker/./init(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
/bootflash/iox_alt_hdd_mount_dir/docker/./overlay(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
/bootflash/iox_alt_hdd_mount_dir/docker/./overlay2(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
```

```
/mnt/sd3/docker(/.*)? gen_context(system_u:object_r:container_var_lib_t,s0)
/mnt/sd3/docker/./config\env gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./containers/./.*\log gen_context(system_u:object_r:container_log_t,s0)
/mnt/sd3/docker/./containers/./hostname gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./containers/./hosts gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./init(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./overlay(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/docker/./overlay2(/.*)? gen_context(system_u:object_r:container_share_t,s0)
```

```
ifdef(`nyquist_platform',`
/mnt/sd3/iox_alt_hdd_mount_dir/docker(/.*)?
gen_context(system_u:object_r:container_var_lib_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./config\env
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./containers/./.*\log
gen_context(system_u:object_r:container_log_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./containers/./hostname
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./containers/./hosts
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./init(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./overlay(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
/mnt/sd3/iox_alt_hdd_mount_dir/docker/./overlay2(/.*)?
```

```

gen_context(system_u:object_r:container_share_t,s0)
)

#ifdef(`passport_platform',`
/flash1/iox_alt_hdd_mount_dir/docker(/.*)?          gen_context(system_u:object_r:container_var_lib_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/*/config\env
gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/*/containers/*/*\log
gen_context(system_u:object_r:container_log_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/*/containers*/hostname
gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/*/containers*/hosts
gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/*/init(/.*)?      gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/*/overlay(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox_alt_hdd_mount_dir/docker/*/overlay2(/.*)?
gen_context(system_u:object_r:container_share_t,s0)
)

/flash1/iox/docker(/.*)?          gen_context(system_u:object_r:container_var_lib_t,s0)
/flash1/iox/docker/*/config\env      gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker/*/containers/*/*\log  gen_context(system_u:object_r:container_log_t,s0)
/flash1/iox/docker/*/containers*/hostname  gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker/*/containers*/hosts    gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker/*/init(/.*)?          gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker/*/overlay(/.*)?       gen_context(system_u:object_r:container_share_t,s0)
/flash1/iox/docker/*/overlay2(/.*)?      gen_context(system_u:object_r:container_share_t,s0)

/flash11/iox/docker(/.*)?          gen_context(system_u:object_r:container_var_lib_t,s0)
/flash11/iox/docker/*/config\env      gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker/*/containers/*/*\log  gen_context(system_u:object_r:container_log_t,s0)
/flash11/iox/docker/*/containers*/hostname  gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker/*/containers*/hosts    gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker/*/init(/.*)?          gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker/*/overlay(/.*)?       gen_context(system_u:object_r:container_share_t,s0)
/flash11/iox/docker/*/overlay2(/.*)?      gen_context(system_u:object_r:container_share_t,s0)

/vol/harddisk/docker(/.*)?          gen_context(system_u:object_r:container_var_lib_t,s0)
/vol/harddisk/docker/*/config\env      gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker/*/containers/*/*\log  gen_context(system_u:object_r:container_log_t,s0)
/vol/harddisk/docker/*/containers*/hostname  gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker/*/containers*/hosts    gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker/*/init(/.*)?          gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker/*/overlay(/.*)?       gen_context(system_u:object_r:container_share_t,s0)
/vol/harddisk/docker/*/overlay2(/.*)?      gen_context(system_u:object_r:container_share_t,s0)

/vol/disk0/docker(/.*)?          gen_context(system_u:object_r:container_var_lib_t,s0)

```

```
/vol/disk0/docker/./config\env gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker/./containers/./.*\log gen_context(system_u:object_r:container_log_t,s0)
/vol/disk0/docker/./containers/./hostname gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker/./containers/./hosts gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker/./init(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker/./overlay(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/vol/disk0/docker/./overlay2(/.*)? gen_context(system_u:object_r:container_share_t,s0)
```

```
/vol/usb1/docker(/.*)? gen_context(system_u:object_r:container_var_lib_t,s0)
/vol/usb1/docker/./config\env gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker/./containers/./.*\log gen_context(system_u:object_r:container_log_t,s0)
/vol/usb1/docker/./containers/./hostname gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker/./containers/./hosts gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker/./init(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker/./overlay(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/docker/./overlay2(/.*)? gen_context(system_u:object_r:container_share_t,s0)
```

#### #Sumatra

```
/vol/usb1/iox/docker(/.*)? gen_context(system_u:object_r:container_var_lib_t,s0)
/vol/usb1/iox/docker/./config\env gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker/./containers/./.*\log gen_context(system_u:object_r:container_log_t,s0)
/vol/usb1/iox/docker/./containers/./hostname gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker/./containers/./hosts gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker/./init(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker/./overlay(/.*)? gen_context(system_u:object_r:container_share_t,s0)
/vol/usb1/iox/docker/./overlay2(/.*)? gen_context(system_u:object_r:container_share_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscontainer.fc

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polarissortfiles, 1.0);
```

```
gen_require(`
    type polaris_sort_files_t;
`)
```

```
corecmd_exec_bin(polaris_sort_files_t)
```

```
# allow to read /proc/meminfo
kernel_read_system_state(polaris_sort_files_t)
```

```

# allow read of /etc/passwd
auth_use_nsswitch(polaris_sort_files_t)

polaris_btrace_data_manage(polaris_sort_files_t)
polaris_chasfs_manage(polaris_sort_files_t)
polaris_rmonbifo_tmp_read(polaris_sort_files_t)
polaris_read_debug_conf(polaris_sort_files_t)
polaris_persistent_getattr(polaris_sort_files_t)
polaris_persistent_list_dirs(polaris_sort_files_t)
polaris_cpld_read(polaris_sort_files_t)
polaris_capsule_upgrade_log_use(polaris_sort_files_t)
optional_policy(`
polaris_gnmib_gnoi_images_read(polaris_sort_files_t)
`)

# Dontaudit /bootflash/#lost+found avc denials
dontaudit polaris_sort_files_t polaris_disk:chr_file { getattr };
dontaudit polaris_sort_files_t polaris_disk:blk_file { getattr };

#allow polaris_sort_files_t polaris_udev_tmp_files_t:dir { getattr search };
polaris_udev_tmp_list_dirs(polaris_sort_files_t)

optional_policy(`
polaris_iox_dir_list(polaris_sort_files_t)
`)

polaris_sandbox_file_dir_list(polaris_sort_files_t)

polaris_disk_bootflash_read_lnk(polaris_sort_files_t)

polaris_disk_bootflash_fifo_file_getattr(polaris_sort_files_t)
polaris_disk_bootflash_sock_file_getattr(polaris_sort_files_t)

# allow search and read under /tmp/boot directory
polaris_boot_tmp_read(polaris_sort_files_t)

#allow manage the files under /tmp/sort
type polaris_sort_files_tmp_t;
files_tmp_file(polaris_sort_files_tmp_t)
files_tmp_filetrans(polaris_sort_files_t, polaris_sort_files_tmp_t, file)
manage_files_pattern(polaris_sort_files_t, polaris_sort_files_tmp_t, polaris_sort_files_tmp_t)

# for pluggable FS, allow sort to access files on them.
polaris_getattr_removable(polaris_sort_files_t)
polaris_removable_manage(polaris_sort_files_t)
fs_read_removable_symlinks(polaris_sort_files_t)

```

```

# to look at files sort_file sometime needs to violate DAC permissions
allow polaris_sort_files_t self:capability dac_read_search;

optional_policy(`
# LOOK AT ME memif sock_file interface present in /bootflash as
# /bootflash/SHARED-IOX/memif/memif-dp-svr, since class of the
# object is sock_file adding it to polaris_disk does not make much
# sense
gen_require(`
    type polaris_qfp_memif_t;
`)
getattr_sock_files_pattern(polaris_sort_files_t, polaris_qfp_memif_t, polaris_qfp_memif_t)
`)

# find runs fstatfs
fs_getattr_xattr_fs(polaris_sort_files_t)

# allow polaris_sort_files_t fs_t:filesystem getattr
fs_getattr_all_fs(polaris_sort_files_t)

# with "/bootflash"...this needs attr to access for logfile
polaris_user_file_getattr(polaris_sort_files_t)

optional_policy(`
gen_require(`
    type polaris_efi_files_t;
`)
#find /bootflash/ -printf %i %p
allow polaris_sort_files_t polaris_efi_files_t:dir { getattr open read search };

#stat -c %i %f %s %n /bootflash/EFI/UpdateCapsule/UpdateCapsuleFile.bin
allow polaris_sort_files_t polaris_efi_files_t:file getattr;
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissortfiles.te
No license file was found, but licenses were detected in source scan.

#
# June 2017, Victor Kamensky
#
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#

policy_module(polarisioxman, 1.0);

gen_require(`

```



```

    type polaris_ioxman_t;
)

polaris_btrace_data_manage(polaris_ioxman_t)
polaris_chasfs_manage(polaris_ioxman_t)
polaris_tdlresolve_read(polaris_ioxman_t)
polaris_tdlldb_list_dirs(polaris_ioxman_t)
polaris_cpld_read(polaris_ioxman_t)
polaris_lua_read(polaris_ioxman_t)
polaris_flashlib_read(polaris_ioxman_t)

polaris_ripc_sman_ui_serv_connect(polaris_ioxman_t)

polaris_db_tdlldb_dir_use(polaris_ioxman_t)

#allow access to /bootflash/iox/ files
polaris_iox_dir_search(polaris_ioxman_t)

corenet_tcp_connect_polaris_caf_api_port(polaris_ioxman_t)

# allow read permissions for /etc/hosts file
sysnet_read_config(polaris_ioxman_t)

# ioxman interacting with caf through api http interface and
# is uses curl library to send requests to caf. curl wants
# to do getsockopt with SOL_SOCKET,
allow polaris_ioxman_t self:tcp_socket getopt;

# allow to get getattr of /proc file system
domain_read_all_domains_state(polaris_ioxman_t)

corecmd_exec_bin(polaris_ioxman_t)
corecmd_exec_shell(polaris_ioxman_t)

# allow to run mount in its own domain; guestshell_set_netns.sh
# needs it; also, read and exec the set_netns script.
# ioxman_setup_guestshell_namespace invokes the script
# using NAMESPACE_COMMAND
mount_domtrans(polaris_ioxman_t)
polaris_guestshell_files_read(polaris_ioxman_t)
polaris_guestshell_exec_files_exec(polaris_ioxman_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_ioxman_t)

# guestshell_set_netns.sh calls ps command
# ps needs access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_ioxman_t)

```

```

# ps needs access to proc_t
kernel_read_system_state(polaris_ioxman_t)

# modifies /bootflash/iox/iox_app/guestshell_iox.json
polaris_iox_files_manage(polaris_ioxman_t)

# guestshell_set_netns.sh touches /var/run/netns/guestshell
files_pid_filetrans(polaris_ioxman_t, polaris_guestshell_var_run_t, file, "guestshell")
polaris_guestshell_var_run_files_manage(polaris_ioxman_t)

# Read and write the all pty
term_use_generic_ptys(polaris_ioxman_t)

# allow ioxman_syslib.sh to set uid/gid for screen
allow polaris_ioxman_t self:capability { dac_override setgid setuid };

# ioxman execve virsh
gen_require(
    type virsh_t;
    type virsh_exec_t;
)
domtrans_pattern(polaris_ioxman_t, virsh_exec_t, virsh_t)
# virsh needs to write into /tmp/rp/trace/iox_guestshell.log
polaris_btrace_data_manage(virsh_t)

# ioxman is vman client over @vman_domain_socket socket
optional_policy(
    polaris_vman_use_client_socket(polaris_ioxman_t)
)

# ioxman uses VS_OPER_DB from virtual_services_tbl_init
polaris_tdlbpersist_setup(polaris_ioxman_t)

polaris_tmp_tdlb_persist_setup(polaris_ioxman_t)

# ioxman through libcurl library hit c-ares DNS code needs
# udp sockets access
allow polaris_ioxman_t self:udp_socket connect;

logging_send_syslog_msg(polaris_ioxman_t)

# read /opt/cisco/caf/config/system-config.ini
polaris_caf_files_read(polaris_ioxman_t)

virt_manage_sandbox_files(polaris_ioxman_t)

# handle ioxman /tmp files like /tmp/iox_xml.dat
type polaris_iox_tmp_t;

```

```

files_tmp_file(polaris_iox_tmp_t)
polaris_iox_manage_tmp_files(polaris_ioxman_t)

# by some strange reason ioxman munges files in /bootflash/tracelogs
# please see iox_tracefile_restore in ioxman/src/im_serial.c
polaris_btrace_persistent_data_manage(polaris_ioxman_t)

# virsh executed from ioxman inherits stdout from ioxman
gen_require(
    type polaris_ioxman_bt_t;
    type virsh_t;
)
allow virsh_t polaris_ioxman_bt_t:file write;

optional_policy(
gen_require(
    attribute polaris_domain;
    attribute polaris_extended_domain;
    type container_runtime_t;
)
typeattribute container_runtime_t polaris_domain;
typeattribute container_runtime_t polaris_extended_domain;
)

# /usr/bin/conf/shell_exec.sh policy

polaris_utility_domain_template(iox_shell)

polaris_bexecute_domain(polaris_iox_shell_t, polaris_iox_shell_exec_t)
# shell_exec call bexec.sh
polaris_bexecute_domtrans(polaris_iox_shell_t)
corecmd_exec_bin(polaris_iox_shell_t)
polaris_chasfs_read(polaris_iox_shell_t)
auth_use_nsswitch(polaris_iox_shell_t)
fs_getattr_tmpfs(polaris_iox_shell_t)

mount_domtrans(polaris_iox_shell_t)

# inherit stdin from telnetd
telnet_use_ptys(polaris_iox_shell_t)

# create files under /bootflash/iox
polaris_iox_files_manage(polaris_iox_shell_t)

# executing guestshell.sh
polaris_guestshell_exec_files_exec(polaris_iox_shell_t)
polaris_guestshell_files_read(polaris_iox_shell_t)

```

```

# executing "ip netns exec guestshell /usr/bin/ssh ..."
sysnet_exec_ifconfig(polaris_iox_shell_t)
fs_read_nsfs_files(polaris_iox_shell_t)
files_mouton_rootfs(polaris_iox_shell_t)
dev_mouton_sysfs(polaris_iox_shell_t)
allow polaris_iox_shell_t self:netlink_route_socket rw_netlink_socket_perms;
dev_mount_sysfs_fs(polaris_iox_shell_t)
dev_unmount_sysfs_fs(polaris_iox_shell_t)

# executing ssh
corenet_tcp_connect_ssh_port(polaris_iox_shell_t)
ssh_exec(polaris_iox_shell_t)
allow polaris_iox_shell_t self:tcp_socket { connect create getattr getopt setopt shutdown };

# ssh creates /root/.ssh directory
userdom_create_user_home_dirs(polaris_iox_shell_t)

# read /etc/guestshell_rsa_key
polaris_guestshell_key_read(polaris_iox_shell_t)

# work with sandbox files
polaris_sandbox_file_dir_list(polaris_iox_shell_t)

polaris_caf_var_run_files_manage(polaris_iox_shell_t)

# shell_exec.sh invokes:
# mkdir /tmp/.shell_exec
# create /tmp/.shell_exec/*
type polaris_iox2iosd_tmp_t;
files_tmp_file(polaris_iox2iosd_tmp_t)
files_tmp_filetrans(polaris_iox_shell_t, polaris_iox2iosd_tmp_t, dir, ".shell_exec")
files_tmp_filetrans(polaris_iox_shell_t, polaris_iox2iosd_tmp_t, file)
#allow shell_exec to manage /tmp/.ncsshd_authorized_keys
polaris_ncsshd_keys_manage(polaris_iox_shell_t)
# allow shell_exec to manage /tmp/.shell_exec/* files
polaris_iox2iosd_tmp_manage(polaris_iox_shell_t)
# allow shell_exec to work with files created by iosd
polaris_iosd2iox_tmp_manage(polaris_iox_shell_t)
ifdef(^nyquist_platform',`
# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_iox_shell_t)
`)
ifdef(^passport_platform',`
# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_iox_shell_t)
`)

allow polaris_iox_shell_t self:capability { chown dac_override fowner fsetid setgid setuid dac_read_search };

```

```

allow polaris_iox_shell_t self:cap_userns sys_admin;
allow polaris_iox_shell_t self:process setfscreate;

# LOOK AT ME very fishy iox_shell executes
# /bootflash/iox/repo-lxc/guestshell/rootfs_mnt/cisco/shell_exec.sh that
# actually can be modified from container itself. File is recreated
# each guestshell activation and it seems not executed afterwards.
# Grant access for now. Need to look closely whether it could be exploited
# in some way
virt_exec_sandbox_files(polaris_iox_shell_t)

# ip command called from iox_shell, running it under
# iox_shell domain, add required mounton on unlabeled_t
files_mounton_isid(polaris_iox_shell_t)

# read guestshell net namespace file
fs_read_nsfs_files(polaris_ioxman_t)

# need to create /bootflash/gs_script/db.ini file
polaris_bootflash_manage(polaris_ioxman_t)
polaris_harddisk_manage(polaris_ioxman_t)

# run_ioxn_secure_dir.sh policy
gen_require(`
    type polaris_iox_secure_dir_t;
`)
corecmd_exec_bin(polaris_iox_secure_dir_t)
auth_use_nsswitch(polaris_iox_secure_dir_t)
polaris_caf_files_read(polaris_iox_secure_dir_t)
polaris_chasfs_manage(polaris_iox_secure_dir_t)
polaris_bootflash_manage(polaris_iox_secure_dir_t)
polaris_harddisk_manage(polaris_iox_secure_dir_t)
polaris_iox_files_manage(polaris_iox_secure_dir_t)

# /bin/cat9k_ssd_auth_cmds.sh

polaris_utility_domain_template(ssd_auth)

corecmd_exec_bin(polaris_ssd_auth_t)
storage_getattr_fixed_disk_dev(polaris_ssd_auth_t)

#allow to read /etc/passwd
auth_use_nsswitch(polaris_ssd_auth_t)

fs_getattr_tmpfs(polaris_ssd_auth_t)

# execute hdparam in its own domain
fstools_domtrans(polaris_ssd_auth_t)

```

```

polaris_use_btrace_fifo(polaris_ssd_auth_t)

type polaris_ssd_auth_tmp_t;
files_tmp_file(polaris_ssd_auth_tmp_t)
# bash tmp files like /tmp/sh-thd.kxX3sc
files_tmp_filetrans(polaris_ssd_auth_t, polaris_ssd_auth_tmp_t, file)
manage_files_pattern(polaris_ssd_auth_t, polaris_ssd_auth_tmp_t, polaris_ssd_auth_tmp_t)
# /tmp/ssd_blk_device created by udev
gen_require(`
    type udev_t;
    type tmpfs_t;
    type tmp_t;
`)
filetrans_pattern(udev_t, {tmpfs_t tmp_t}, polaris_ssd_auth_tmp_t, file, "ssd_blk_device")
polaris_getattr_harddisk(polaris_ssd_auth_t)

fs_read_cgroup_files(polaris_ioxman_t)

# Allow ioxman to download package files using url
polaris_caf_tmp_files_manage(polaris_ioxman_t)
polaris_cli_fs_cmds_domtrans(polaris_ioxman_t)
# ufs information captured by the chasfs utils
optional_policy(`
polaris_ncd_tmp_read(polaris_ioxman_t)
`)
gen_require(`
    type polaris_fts_client_tmp_t;
`)

manage_files_pattern(polaris_ioxman_t, polaris_fts_client_tmp_t, polaris_fts_client_tmp_t)
manage_dirs_pattern(polaris_ioxman_t, polaris_fts_client_tmp_t, polaris_fts_client_tmp_t)
allow polaris_ioxman_t tmp_t:file { create open unlink write };

# get_orchestration_template in cgroup_init_common.sh reads
# ovf-env.xml file from removable and varied
fs_read_removable_files(polaris_ioxman_t)
polaris_disk_varied_read(polaris_ioxman_t)

# writes into /tmp/trace/resource.log
optional_policy(`
polaris_vman_tmp_manage(polaris_ioxman_t)
`)

# watch over /tmp/udev/etc/udev/usbflash1 in iox_media_chasfs_watch
polaris_udev_tmp_read(polaris_ioxman_t)
polaris_udev_tmp_watch(polaris_ioxman_t)

```

```

ifdef(`nyquist_platform',`
# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_ioxman_t)
')

dev_getattr_fs(polaris_iox_shell_t)
kernel_read_system_state(polaris_iox_shell_t)

gen_require(
    type virt_lxc_var_run_t;
)
read_files_pattern(polaris_ioxman_t, virt_lxc_var_run_t, virt_lxc_var_run_t)

#sys_resource denial is seen even on factory reset
allow polaris_ioxman_t self:capability sys_resource;

ifdef(`passport_platform',`
# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_ioxman_t)
')

polaris_iosd_vcpu_read(polaris_ioxman_t)

# work with files like /tmp/guestinfo_status.txt
polaris_iosd2iox_tmp_manage(polaris_ioxman_t)

gen_require(
    type screen_var_run_t;
    type screen_exec_t;
)

# allow ioxman to set up ttys for screen
polaris_caf_tty_lnk_manage(polaris_ioxman_t)

# allow ioxman_syslib.sh to invoke screen
screen_exec(polaris_ioxman_t)

# add entrypoint to screen_exec/can_exec permissions
allow polaris_ioxman_t screen_exec_t:file entrypoint;

# make sure /tmp/screens is labeled correctly
files_tmp_filetrans(polaris_ioxman_t, screen_var_run_t, dir, "screens")

# allow ioxman to manage /tmp/screens/<appname>_con/aux.sid
manage_files_pattern(polaris_ioxman_t, screen_var_run_t, screen_var_run_t)

# allow ioxman to manage sock_files and unix_stream_socket on screen
allow polaris_ioxman_t self:unix_stream_socket { create_socket_perms connectto };

```

```

manage_dirs_pattern(polaris_ioxman_t, screen_var_run_t, screen_var_run_t)
manage_sock_files_pattern(polaris_ioxman_t, screen_var_run_t, screen_var_run_t)

# allow ioxman to transition into bexecute domain
polaris_bexecute_domtrans(polaris_ioxman_t)
polaris_bexecute_domain(polaris_ioxman_t, screen_exec_t)
# allow bexecute to access the /tmp/screens/*.sid files
gen_require(
    type polaris_bexecute_t;
)
manage_files_pattern(polaris_bexecute_t, screen_var_run_t, screen_var_run_t)

# allow shell_exec to manage /tmp/.ncsshd_authorized_keys
polaris_ncsshd_keys_manage(polaris_iox_shell_t)
polaris_iox2iosd_tmp_manage(polaris_iox_shell_t)

# allow shell_exec to manage guestshell files
gen_require(
    type container_file_t;
)
manage_files_pattern(polaris_iox_shell_t, container_file_t, container_file_t)

# allow ioxman to setattr for /dev/pts relating to screen
gen_require(
    type telnetd_devpts_t;
)
allow polaris_ioxman_t telnetd_devpts_t:chr_file setattr_chr_file_perms;

# allow ioxman to access the /tmp/ttyF*. files
gen_require(
    type fifo_var_run_t;
)
files_tmp_filetrans(polaris_ioxman_t, fifo_var_run_t, fifo_file)
manage_fifo_files_pattern(polaris_ioxman_t, fifo_var_run_t, fifo_var_run_t)

# allow ioxman to access rootfs and sysfs
# The same is needed when guestshell uses a passwordless SSH, when users do
# like "guestshell run bash" from IOS and it provides a bash shell screen
# in IOS.

gen_require(
    type ssh_home_t;
)

ssh_filetrans_admin_home_content(polaris_iox_shell_t)
allow polaris_iox_shell_t ssh_home_t:dir {create search getattr};
dev_getattr_sysfs_fs(polaris_iox_shell_t)

```



Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisioxman.te

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#

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#

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#

policy\_module(polarismqipc, 1.0);

attribute polaris\_mqipc;

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismqipc.te

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#

/var/run/cli\_agent\pid -- gen\_context(system\_u:object\_r:polaris\_cli\_agent\_var\_run\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscliagent.fc

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#

policy\_module(polarisvxe, 1.0);

# hanet driver used by vpcgw platform of VXE family

ifdef(^vpcgw\_platform',`

type polaris\_hanet\_device\_t;

dev\_node(polaris\_hanet\_device\_t)

')

# on ultra in some cloud configuration runs dhclient utility

```

# receive meta information from cloud provider, /var/lib/dhcp
# directory is created by initrc_t
gen_require(
    type dhcp_t;
    type initrc_t;
    type dhcp_state_t;
)
files_var_lib_filetrans({ dhcp_t initrc_t }, dhcp_state_t, dir, "dhcp")

# during boot on misc cloud environment ultra image creates directory
# in /tmp to keep information received from cloud provider. Since latter
# it is copied into /varied directory let's assigned polaris_disk_varied_t
# to them
gen_require(
    type initrc_t;
    type polaris_disk_varied_t;
    type unconfined_service_t;
)
files_tmp_filetrans({ unconfined_service_t initrc_t }, polaris_disk_varied_t, dir, "ami")
files_tmp_filetrans({ unconfined_service_t initrc_t }, polaris_disk_varied_t, dir, "azure")
files_tmp_filetrans({ unconfined_service_t initrc_t }, polaris_disk_varied_t, dir, "gcp")

# park policy for small polaris process umbrella_init.sh here
gen_require(
    type polaris_umbrella_init_t;
)
polaris_bootflash_manage(polaris_umbrella_init_t)
corecmd_exec_bin(polaris_umbrella_init_t)
auth_use_nsswitch(polaris_umbrella_init_t)

# define added to address issues related to dependency
# on mcp-platform-tdl for db defines
# Skip for vpcgw platform
ifndef(`vpcgw_platform`,
type polaris_gnmib_t;
)

type polaris_objstore_sem_t;
files_tmpfs_file(polaris_objstore_sem_t)

# semaphore created by systemd-tmpfiles needs map permission
gen_require(
    type systemd_tmpfiles_t;
)
mmap_files_pattern(systemd_tmpfiles_t, polaris_objstore_sem_t, polaris_objstore_sem_t)

# on vxe all processes read grub_cisco_version in polaris_disk_varied_t
gen_require(

```

```

    attribute polaris_domain;
)
polaris_disk_varied_search(polaris_domain)

type polaris_grub_bios_t;
polaris_pfile_type(polaris_grub_bios_t)

type polaris_grubver_t;
polaris_pfile_type(polaris_grubver_t)

type polaris_vxeinstall_info_t;
polaris_pfile_type(polaris_vxeinstall_info_t)
gen_require(
    type unconfined_service_t;
    type polaris_disk_varied_t;
)
# unconfined service create /boot/.install_info if does not exist yet
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_vxeinstall_info_t, file, ".install_info")

# on C8KV all processes read grubenv in EFI disk partition
gen_require(
    attribute polaris_domain;
)
polaris_grub_efi_search(polaris_domain)

gen_require(
    type unconfined_service_t;
    type polaris_disk_varied_t;
    type polaris_obfl_data_t;
)
# unconfined service create /boot/obfl_temp_k1/2/3 if does not exist yet
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_obfl_data_t, file, "obfl_temp_k1")
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_obfl_data_t, file, "obfl_temp_k2")
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_obfl_data_t, file, "obfl_temp_k3")

# handle /tmp/vxe_disk_XXX_YYY files
gen_require(
    type unconfined_service_t;
)
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v1")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v2")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v3")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v4")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v1")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v2")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v3")
polaris_boot_tmp_manage(unconfined_service_t)

```

```

# /etc/init.d/sshd that runs under initrc_t through ssh-keygen
# creates /config/.ssh directory if does not exist; /config
# directory is typically bootflash, but on MBRv2/MBRv4/GPTv1/GPTv3
# partition layouts it could be separate /config partition that is
# under polaris_disk_config_t label
gen_require(
    type initrc_t;
    type ssh_home_t;
)
polaris_disk_config_filetrans(initrc_t, ssh_home_t, dir, ".ssh")

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvxe.te
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```

```

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#

```

```

policy_module(polarisissumonitor, 1.0);

```

```

#####
# install_issu_monitor
#####

```

```

polaris_process_domain_template(issu_monitor)

```

```

corecmd_exec_bin(polaris_issu_monitor_t)

```

```

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_issu_monitor_t)

```

```

polaris_btrace_data_manage(polaris_issu_monitor_t)
polaris_chasfs_manage(polaris_issu_monitor_t)
polaris_cpld_read(polaris_issu_monitor_t)
polaris_proc_rmonbifo_read(polaris_issu_monitor_t)
polaris_boot_tmp_read(polaris_issu_monitor_t)
polaris_read_debug_conf(polaris_issu_monitor_t)

```

```

# read and possibly create /bootflash/.installer/issu_crash dir
polaris_bootflash_manage(polaris_issu_monitor_t)

```

```

allow polaris_issu_monitor_t self:capability sys_resource;
allow polaris_issu_monitor_t self:process setpgid;

```

```
type polaris_issu_monitor_tmp_t;
files_tmp_file(polaris_issu_monitor_tmp_t)
files_tmp_filetrans(polaris_issu_monitor_t, polaris_issu_monitor_tmp_t, dir, "issu_mon_dir")
manage_files_pattern(polaris_issu_monitor_t, polaris_issu_monitor_tmp_t, polaris_issu_monitor_tmp_t)
manage_dirs_pattern(polaris_issu_monitor_t, polaris_issu_monitor_tmp_t, polaris_issu_monitor_tmp_t)
manage_fifo_files_pattern(polaris_issu_monitor_t, polaris_issu_monitor_tmp_t, polaris_issu_monitor_tmp_t)
```

```
#access to /tmp/ufs/harddisk
optional_policy(`
polaris_ncd_tmp_read(polaris_issu_monitor_t)
`)
```

```
# access to /bootflash/.installer/issu_crash
polaris_disk_install_read(polaris_issu_monitor_t)
```

```
# access to /tmp/sw/boot/rmonbifo/env_var.sh
polaris_rmonbifo_tmp_read(polaris_issu_monitor_t)
```

```
# read /proc/cmdline
kernel_read_system_state(polaris_issu_monitor_t)
```

```
# rm -rf /tmp/rp/issu_mon_dir
fs_getattr_tmpfs(polaris_issu_monitor_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisissumonitor.te

No license file was found, but licenses were detected in source scan.

```
#
# February 2018, Manohar Hungund
#
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#
```

```
policy_module(polarisact2, 1.0);
```

```
#####
# ACT2 Chip Driver policy
#####
```

```
type polaris_act2_device_t;
dev_node(polaris_act2_device_t)
```

```
#####
# /tmp/hw_entropy file.
# Certain platforms save entropy from main board ACT-2 chip in this file.
```

```
type polaris_hw_entropy_t;
files_tmp_file(polaris_hw_entropy_t)
#####
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisact2.te

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
policy_module(polariscppha, 1.0);
```

```
gen_require(`
    type polaris_cpp_ha_t;
`)
```

```
polaris_btrace_data_manage(polaris_cpp_ha_t)
polaris_crft_data_manage(polaris_cpp_ha_t)
polaris_chasfs_manage(polaris_cpp_ha_t)
polaris_tdlresolve_read(polaris_cpp_ha_t)
polaris_tdlldb_list_dirs(polaris_cpp_ha_t)
polaris_cpld_read(polaris_cpp_ha_t)
polaris_flashlib_read(polaris_cpp_ha_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_cpp_ha_t)
```

```
polaris_db_tdlldb_dir_use(polaris_cpp_ha_t)
```

```
polaris_cpp_process(polaris_cpp_ha_t)
polaris_cpp_dev_use(polaris_cpp_ha_t)
```

```
polaris_icc_broken_relocations(polaris_cpp_ha_t)
```

```
polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_ha_t)
```

```
# allow objstore access
polaris_disk_objstore_read(polaris_cpp_ha_t)
```

```
# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(`crankshaft_family',`
polaris_dev_mem_use(polaris_cpp_ha_t)
`)
```

```
# allow syslogging
logging_send_syslog_msg(polaris_cpp_ha_t)
```

```
optional_policy(`
polaris_cbdma_dev_use(polaris_cpp_ha_t)
`)
polaris_cpld_dev_use(polaris_cpp_ha_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppha.te

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polariscppsp, 1.0);
```

```
gen_require(`
    type polaris_cpp_sp_t;
`)
```

```
polaris_btrace_data_manage(polaris_cpp_sp_t)
polaris_crft_data_manage(polaris_cpp_sp_t)
polaris_chasfs_manage(polaris_cpp_sp_t)
polaris_tdlresolve_read(polaris_cpp_sp_t)
polaris_tdlldb_list_dirs(polaris_cpp_sp_t)
polaris_cpld_read(polaris_cpp_sp_t)
polaris_flashlib_read(polaris_cpp_sp_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_cpp_sp_t)
```

```
polaris_db_tdlldb_dir_use(polaris_cpp_sp_t)
```

```
polaris_cpp_process(polaris_cpp_sp_t)
polaris_cpp_dev_use(polaris_cpp_sp_t)
```

```
polaris_icc_broken_relocations(polaris_cpp_sp_t)
```

```
polaris_cpp_cavium_sdk_ipc_use(polaris_cpp_sp_t)
```

```
# LOOK AT ME: raw memory access in cavium vendor SDK
# related to octeon driver (BUG CSCvh58515)
#ifdef(`crankshaft_family',`
```

```
polaris_dev_mem_use(polaris_cpp_sp_t)
```

```
)
```

```
# allow syslogging
```

```
logging_send_syslog_msg(polaris_cpp_sp_t)
```

```
optional_policy(
```

```
polaris_cbdma_dev_use(polaris_cpp_sp_t)
```

```
)
```

```
polaris_cpld_dev_use(polaris_cpp_sp_t)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppsp.te
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
/usr/binos/conf/reflector.sh -- gen_context(system_u:object_r:polaris_reflector_exec_t,s0)
```

```
/tmp/rp/reflector(/.*)? gen_context(system_u:object_r:polaris_reflector_tmp_t,s0)
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisreflector.fc
```

```
No license file was found, but licenses were detected in source scan.
```

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
policy_module(polarissifmgr, 1.0);
```

```
gen_require(
```

```
    type polaris_sif_mgr_t;
```

```
)
```

```
polaris_btrace_data_manage(polaris_sif_mgr_t)
```

```
polaris_crft_data_manage(polaris_sif_mgr_t)
```

```
polaris_chasfs_manage(polaris_sif_mgr_t)
```

```
polaris_tdlresolve_read(polaris_sif_mgr_t)
```

```
polaris_tdlldb_list_dirs(polaris_sif_mgr_t)
```



```

polaris_cpld_read(polaris_sif_mgr_t)
polaris_lua_read(polaris_sif_mgr_t)
polaris_flashlib_read(polaris_sif_mgr_t)

#If romvar is not set, Set Rommon env variable needs write permission
polaris_flashlib_write(polaris_sif_mgr_t)

polaris_ripc_sman_ui_serv_connect(polaris_sif_mgr_t)

corecmd_exec_bin(polaris_sif_mgr_t)
corecmd_exec_shell(polaris_sif_mgr_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_sif_mgr_t)

# allow to read /proc/mtd
kernel_read_system_state(polaris_sif_mgr_t)

#allow write /proc/dplr_sesa
optional_policy(`
    polaris_proc_sesa_create_write(polaris_sif_mgr_t)
`)

# access SERDES /tmp/serdes_asic_key_dir/*
polaris_serdes_asic_key_tmp_manage(polaris_sif_mgr_t)

# allow read/write to /proc/irq/N/irq files
kernel_rw_irq_sysctls(polaris_sif_mgr_t)

# work with /tmp files (/tmp/sm_post_result)
type polaris_sif_mgr_tmp_t;
files_tmp_file(polaris_sif_mgr_tmp_t)
files_tmp_filetrans(polaris_sif_mgr_t, polaris_sif_mgr_tmp_t, file, "sm_post_result")
files_tmp_filetrans(polaris_sif_mgr_t, polaris_sif_mgr_tmp_t, file, "fips_status")
files_tmp_filetrans(polaris_sif_mgr_t, polaris_sif_mgr_tmp_t, file, "sif_regdump_0")
files_tmp_filetrans(polaris_sif_mgr_t, polaris_sif_mgr_tmp_t, file, "sif_regdump_1")
manage_files_pattern(polaris_sif_mgr_t, tmp_t, polaris_sif_mgr_tmp_t)
polaris_cm_rp_tmp_manage(polaris_sif_mgr_t)

#allow ipc_lock when mmap64(..) a shared mememoy with MAP_LOCKED in dplr_pkt_drv_oob.c
allow polaris_sif_mgr_t self:capability { ipc_owner dac_override ipc_lock };

#allow read from /tmp/hw_entropy
polaris_hw_entropy_read(polaris_sif_mgr_t)

polaris_obfl_data_manage(polaris_sif_mgr_t)

```

```

# /dev/dplr_intrpt usage
polaris_dplr_dev_use(polaris_sif_mgr_t)

# /dev/dmammap usage
polaris_dmammap_dev_use(polaris_sif_mgr_t)

# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_sif_mgr_t)

polaris_lsmpi_dev_use(polaris_sif_mgr_t)

# open /dev/ttyS0 console in sco_sys_init_sw_params
term_use_unallocated_ttys(polaris_sif_mgr_t)

polaris_socketat_nsfs_read(polaris_sif_mgr_t)

allow polaris_sif_mgr_t self:process setsched;

# work with /dev/msi/Slot0/Doppler0/GroupN files
dev_rw_generic_chr_files(polaris_sif_mgr_t)
# /dev/msi/Slot0/Doppler0/GroupN gets polaris_dplr_device_t label
# at some point, but need above generic chr permission by some
# reason, not clear need to look a bit more
polaris_dplr_dev_use(polaris_sif_mgr_t)

# set out of band interface mac set_oobndif_mac
allow polaris_sif_mgr_t self:tcp_socket ioctl;

# LOOK AT ME: raw memory write access
polaris_dev_mem_use(polaris_sif_mgr_t)

# /dev/shm/sdm access
optional_policy(`
polaris_sdm_shm_manage(polaris_sif_mgr_t)
`)

# LOOK AT ME: unsolicited creation of file in /bootflash
# by CSCvm43512. Backout when CSCvm99282 is fixed
polaris_bootflash_manage(polaris_sif_mgr_t)
polaris_disk_bootflash_read_lnk(polaris_sif_mgr_t)

optional_policy(`
    polaris_quake_i2c_manage(polaris_sif_mgr_t)
`)

# __get_nprocs opens /sys/devices/system/cpu/online
ifdef(`quake_platform',`
dev_read_sysfs(polaris_sif_mgr_t)

```

)

```
optional_policy(  
polaris_ngwc_scc_shm_manage(polaris_sif_mgr_t)  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissifmgr.te  
No license file was found, but licenses were detected in source scan.
```

```
#  
# August 2017, Shawn Lu  
#  
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#
```

```
# polariswncmgrd file contexts place holder
```

```
#gRPC certificate for ICap, written and read by wncmgrd  
/bootflash/NACert.pem      gen_context(system_u:object_r:polaris_icap_cert_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswncmgrd.fc  
No license file was found, but licenses were detected in source scan.
```

```
dnl  
dnl July 2020, Victor Kamensky  
dnl  
dnl Copyright (c) 2020 by Cisco Systems, Inc.  
dnl All rights reserved  
dnl  
dnl ISRV Platform Max Bay Limits  
max_bay_map_set(`rp', `per_bay', 0)  
max_bay_map_set(`cc', `per_bay', 3)  
max_bay_map_set(`fp', `per_bay', 0)
```

```
max_bay_ripc_map_set(`rp', `per_bay', 0)  
max_bay_ripc_map_set(`cc', `per_bay', 3)  
max_bay_ripc_map_set(`fp', `per_bay', 0)
```

```
max_bay_ripc_map_set(`rp', `global', 0)  
max_bay_ripc_map_set(`cc', `global', 3)  
max_bay_ripc_map_set(`fp', `global', 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/isrvmaps.m4
```

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```
#  
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#  
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#
```

```
policy_module(polarismcp, 1.0);
```

```
# scooby device  
type polaris_scooby_device_t;  
dev_node(polaris_scooby_device_t)
```

```
# spa devices i.e sys_platform_module_1ng  
type polaris_spa_device_t;  
dev_node(polaris_spa_device_t)
```

```
# htdp device  
type polaris_htdp_device_t;  
dev_node(polaris_htdp_device_t)
```

```
# epaN and epactrlN devices  
type polaris_epa_device_t;  
dev_node(polaris_epa_device_t)
```

```
# luna_fpgs device  
type polaris_luna_mbfpga_device_t;  
dev_node(polaris_luna_mbfpga_device_t)
```

```
# dash fpga device (/dev/dash_fpga)  
type polaris_dash_device_t;  
dev_node(polaris_dash_device_t)
```

```
# astro device  
type polaris_astro_device_t;  
dev_node(polaris_astro_device_t)
```

```
# cpp_il device  
type polaris_cpp_il_device_t;  
dev_node(polaris_cpp_il_device_t)
```

```
# blzi_fpga device  
type polaris_blzi_device_t;  
dev_node(polaris_blzi_device_t)
```

```
# oob_evfc device
```

```

type polaris_oob_evfc_device_t;
dev_node(polaris_oob_evfc_device_t)

# ds31408 device
type polaris_ds31408_device_t;
dev_node(polaris_ds31408_device_t)

# icp_ads_ctl device
# Note that fugazi gets this from polarisqfp module
ifndef(`fugazi_platform',`
type polaris_icp_device_t;
dev_node(polaris_icp_device_t)
')

type polaris_cpp_htdp_device_t;
dev_node(polaris_cpp_htdp_device_t)

type polaris_cbdma_device_t;
dev_node(polaris_cbdma_device_t)

type polaris_n2_device_t;
dev_node(polaris_n2_device_t)

type polaris_cy2213_device_t;
dev_node(polaris_cy2213_device_t)

type polaris_vega_device_t;
dev_node(polaris_vega_device_t)

# Fugazi makes use of fugazi_platform.tdl for IPCs and processes definition
# and it uses mcp_platform.tdl for databases definition. The below symbols
# are referred by mcp_platform.tdl but not fugazi_platform.tdl and hence these
# type definitions.
ifdef(`fugazi_platform',`
type polaris_fnf_agg_t;
')

optional_policy(`
# access to /dev/icp_XXX device on asr1k platforms
gen_require(`
    type polaris_cck_qat_t;
')
polaris_icp_dev_use(polaris_cck_qat_t)
dev_list_sysfs(polaris_cck_qat_t)
polaris_chasfs_read(polaris_cck_qat_t)
polaris_cpld_read(polaris_cck_qat_t)
polaris_tdlresolve_read(polaris_cck_qat_t)
')

```

```
# Handling denial for rsync_t for socket -
# comm="rsync" path="socket:[16784]" dev="sockfs" ino=16784
# scontext=system_u:system_r:rsync_t:s0 tcontext=system_u:system_r:init_t:s0
gen_require(
    type rsync_t;
)
init_rw_stream_sockets(rsync_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismcp.te

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```
#
# June 2017, Victor Kamensky
#
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#
```

```
# polarisioxman file contexts place holder
```

```
/usr/binos/conf/shell_exec.sh -- gen_context(system_u:object_r:polaris_iox_shell_exec_t,s0)
```

```
/usr/binos/conf/run_ioxn_secure_dir.sh -- gen_context(system_u:object_r:polaris_iox_secure_dir_exec_t,s0)
```

```
/bin/cat9k_ssd_auth_cmds.sh -- gen_context(system_u:object_r:polaris_ssd_auth_exec_t,s0)
```

```
/tmp/trace/resource.log -- gen_context(system_u:object_r:polaris_iox_tmp_t,s0)
```

```
/tmp/screens(/.*) -- gen_context(system_u:object_r:screen_var_run_t,s0)
```

```
/tmp/.shell_exec(/.*) -- gen_context(system_u:object_r:polaris_iox2iosd_tmp_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisioxman.fc

No license file was found, but licenses were detected in source scan.

```
#
# August 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisbsm, 1.0);
```

```
gen_require(
    type polaris_bsm_t;
```

```

)

polaris_btrace_data_manage(polaris_bsm_t)
polaris_chasfs_manage(polaris_bsm_t)
polaris_tdlresolve_read(polaris_bsm_t)
polaris_tdlldb_list_dirs(polaris_bsm_t)
polaris_cpld_read(polaris_bsm_t)
polaris_flashlib_read(polaris_bsm_t)

polaris_ripc_sman_ui_serv_connect(polaris_bsm_t)

optional_policy(
polaris_bde_dev_use(polaris_bsm_t)
)

allow polaris_bsm_t self:capability sys_nice;
allow polaris_bsm_t self:process setsched;

# need access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_bsm_t)

# handling /var/tmp/bsm_bcm_shell
type polaris_bsm_bcm_shell_t;
files_type(polaris_bsm_bcm_shell_t)
gen_require(
    type tmp_t;
)
filetrans_pattern(polaris_bsm_t, tmp_t, polaris_bsm_bcm_shell_t, fifo_file, "bsm_bcm_shell")
manage_fifo_files_pattern(polaris_bsm_t, tmp_t, polaris_bsm_bcm_shell_t)

ifdef(`vxe_family',`
# bind to BSM_AGENT_CLIENT_PORT port from bsm_tlv_init
corenet_tcp_bind_polaris_bsm_agent_client_port(polaris_bsm_t)
)

# LOOK AT ME: raw memory write access
polaris_dev_mem_use(polaris_bsm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbsm.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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# All rights reserved
#

```

```
/tmp/sm_post_result -- gen_context(system_u:object_r:polaris_sif_mgr_tmp_t,s0)
/tmp/fips_status -- gen_context(system_u:object_r:polaris_sif_mgr_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissifmgr.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# June 2020, Cuiyan Ma
#
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#
```

```
## <summary>Polaris polarisissucompcheck Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissucompcheck.if
```

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polarisngwcplfmmgr, 1.0);
```

```
gen_require(
    type polaris_ngwc_plfm_mgr_t;
)
```

```
polaris_btrace_data_manage(polaris_ngwc_plfm_mgr_t)
polaris_crft_data_manage(polaris_ngwc_plfm_mgr_t)
polaris_chasfs_manage(polaris_ngwc_plfm_mgr_t)
polaris_tdlresolve_read(polaris_ngwc_plfm_mgr_t)
polaris_tdlldb_list_dirs(polaris_ngwc_plfm_mgr_t)
polaris_cpld_read(polaris_ngwc_plfm_mgr_t)
polaris_lua_read(polaris_ngwc_plfm_mgr_t)
polaris_flashlib_read(polaris_ngwc_plfm_mgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_ngwc_plfm_mgr_t)
```

```
corecmd_exec_bin(polaris_ngwc_plfm_mgr_t)
corecmd_exec_shell(polaris_ngwc_plfm_mgr_t)
```



```

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_ngwc_plfm_mgr_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_ngwc_plfm_mgr_t)

allow polaris_ngwc_plfm_mgr_t self:capability { sys_rawio ipc_owner dac_override };
allow polaris_ngwc_plfm_mgr_t self:capability2 block_suspend;

polaris_obfl_data_manage(polaris_ngwc_plfm_mgr_t)

polaris_dyncfg_tmp_read(polaris_ngwc_plfm_mgr_t)

polaris_ngwc_shm_manage(polaris_ngwc_plfm_mgr_t)

# /dev/dmabmap usage
polaris_dmabmap_dev_use(polaris_ngwc_plfm_mgr_t)

# /dev/remap_mem0 usage
polaris_remap_mem_dev_use(polaris_ngwc_plfm_mgr_t)

# open /dev/ttyS0 console in edison_platform_init
term_use_unallocated_ttys(polaris_ngwc_plfm_mgr_t)

polaris_disk_license_read(polaris_ngwc_plfm_mgr_t)

allow polaris_ngwc_plfm_mgr_t self:capability { chown fowner fsetid };

type polaris_ngwc_plfm_mgr_tmp_t;
files_tmp_file(polaris_ngwc_plfm_mgr_tmp_t)
files_tmp_filetrans(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, file, "pm_post_result")
files_tmp_filetrans(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, dir, "microcode_update")
files_tmp_filetrans(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, dir, "mcu_upgrading")
manage_files_pattern(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, polaris_ngwc_plfm_mgr_tmp_t)
manage_dirs_pattern(polaris_ngwc_plfm_mgr_t, polaris_ngwc_plfm_mgr_tmp_t, polaris_ngwc_plfm_mgr_tmp_t)

# LOOK AT ME: raw memory write access
polaris_dev_mem_use(polaris_ngwc_plfm_mgr_t)

# create /tmp/hw_entropy file and fill with info from act2
polaris_hw_entropy_create(polaris_ngwc_plfm_mgr_t)

polaris_boot_tmp_read(polaris_ngwc_plfm_mgr_t)

polaris_flashlib_write(polaris_ngwc_plfm_mgr_t)

# check existence of /tmp/tam_cfg_done
polaris_tam_getattrs_tmp_dirs(polaris_ngwc_plfm_mgr_t)

```

```
# LOOK AT ME: Allow access to bootflash /flash/tam_client_app.log. file access
# remove after CSCvh66533 fixed
polaris_bootflash_manage(polaris_ngwc_plfm_mgr_t)
```

```
# scans /sys/devices/pci0000:00/0000:00:00.0
dev_read_sysfs(polaris_ngwc_plfm_mgr_t)
```

```
# rsync nvram_config file accross stack
#rsync_exec(polaris_ngwc_plfm_mgr_t)
gen_require(
    type rsync_t;
)
rsync_entry_domtrans(polaris_ngwc_plfm_mgr_t, rsync_t)
allow rsync_t polaris_ngwc_plfm_mgr_t:process sigchld;
# write access to /dev/ttyS0
term_write_unallocated_ttys(rsync_t)
```

```
# reads from, populates chasfs with values and deletes /tmp/package_biv_sums
polaris_kgv_data_manage(polaris_ngwc_plfm_mgr_t)
```

```
# /dev/shm/sdm access
optional_policy(
polaris_sdm_shm_manage(polaris_ngwc_plfm_mgr_t)
')
```

```
# platform manager moves 00001.nvram_config file to /bootflash/nvram_config
polaris_nvram_manage(polaris_ngwc_plfm_mgr_t)
allow polaris_ngwc_plfm_mgr_t self:process setfscreate;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwcplfmmgr.te
No license file was found, but licenses were detected in source scan.
```

```
#
# July 2019, Victor Kamensky
#
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# All rights reserved
#
```

```
policy_module(polarisgrmgr, 1.0);
```

```
gen_require(
    type polaris_gr_mgr_t;
)
```

```
polaris_crft_data_manage(polaris_gr_mgr_t)
```

```
polaris_chasfs_manage(polaris_gr_mgr_t)
polaris_tdlresolve_read(polaris_gr_mgr_t)
polaris_cpld_read(polaris_gr_mgr_t)
polaris_lua_read(polaris_gr_mgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_gr_mgr_t)
```

```
allow polaris_gr_mgr_t self:capability { dac_override dac_read_search };
#DB persistence
polaris_tdlpersist_setup(polaris_gr_mgr_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisgrmgr.te
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
# ngio devices
/dev/ngio[0-9]* -c gen_context(system_u:object_r:polaris_ngio_device_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisiomd.fc
No license file was found, but licenses were detected in source scan.
```

```
#
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#
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#
```

```
/tmp/idope_svr gen_context(system_u:object_r:polaris_fed_debug_sock_t,s0)
/tmp/shfwd_svr gen_context(system_u:object_r:polaris_fed_debug_sock_t,s0)

/tmp/pktgen.txt gen_context(system_u:object_r:polaris_fed_debug_tmp_t,s0)
/tmp/DopeElam.sh gen_context(system_u:object_r:polaris_fed_debug_tmp_t,s0)
/tmp/MemDumpElam.sh gen_context(system_u:object_r:polaris_fed_debug_tmp_t,s0)

/dcmlog.txt -- gen_context(system_u:object_r:polaris_fed_debug_dcmlog_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwcfeddebug.fc
```

No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
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#
```

```
policy_module(polariscpld, 1.0);
```

```
#####  
# CPLD Driver policy  
#####
```

```
# note polaris_sysfs_cpdl_t is defined in kernel/devices.te, since genfscon statements  
# could be only in base policy
```

```
type polaris_cpdl_device_t;  
dev_node(polaris_cpdl_device_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscpld.te
```

No license file was found, but licenses were detected in source scan.

```
#  
# August 2017, Shawn Lu  
#  
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#
```

```
policy_module(polarisrogued, 1.0);
```

```
gen_require(  
    type polaris_rogued_t;  
)
```

```
polaris_btrace_data_manage(polaris_rogued_t)  
polaris_chasfs_manage(polaris_rogued_t)  
polaris_tdlresolve_read(polaris_rogued_t)  
polaris_tdlldb_list_dirs(polaris_rogued_t)  
polaris_cpdl_read(polaris_rogued_t)  
polaris_lua_read(polaris_rogued_t)  
polaris_flashlib_read(polaris_rogued_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_rogued_t)
```

```

polaris_db_tdlldb_dir_use(polaris_rogued_t)

# allow to use setrlimit
allow polaris_rogued_t self:process setrlimit;
allow polaris_rogued_t self:capability sys_resource;
allow polaris_rogued_t self:capability dac_override;

# stuff related to vrf support of the socket
polaris_lfts_dev_use(polaris_rogued_t)
polaris_socketat_nsfs_read(polaris_rogued_t)

# # allow to open udp socket on RDLP port 6532
corenet_udp_bind_polaris_rdlp_port(polaris_rogued_t)
corenet_udp_bind_generic_node(polaris_rogued_t)
allow polaris_rogued_t self:udp_socket { create_socket_perms recv_msg send_msg };

# reading images/ap_capabilities.xml
polaris_wlc_ap_images_read(polaris_rogued_t)

# syslogs in RLDP
logging_send_syslog_msg(polaris_rogued_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_rogued_t)
polaris_tmp_tdlldb_persist_setup(polaris_rogued_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisrogued.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

policy_module(polariscmm, 1.0);

gen_require(
    type polaris_cmm_t;
)

polaris_btrace_data_manage(polaris_cmm_t)
polaris_crft_data_manage(polaris_cmm_t)
polaris_chasfs_manage(polaris_cmm_t)
polaris_tdlresolve_read(polaris_cmm_t)

```

polaris\_tdldb\_list\_dirs(polaris\_cmm\_t)

polaris\_cpld\_read(polaris\_cmm\_t)

polaris\_flashlib\_read(polaris\_cmm\_t)

polaris\_ripc\_sman\_ui\_serv\_connect(polaris\_cmm\_t)

allow polaris\_cmm\_t self:capability dac\_override;

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscmm.te

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Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_base\_ripc\_if.m4

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_mqipc\_fc.m4

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_process\_fc.m4

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

# polarisofa file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisofa.fc

No license file was found, but licenses were detected in source scan.

#

# March 2017, Victor Kamensky

#

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#

## <summary>Polaris emd Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisemd.if

No license file was found, but licenses were detected in source scan.

#

# June 2017, Victor Kamensky

```

#
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#

policy_module(polariscaf, 1.0);

gen_require(
    type polaris_caf_t;
    type polaris_caf_exec_t;
    type usr_t;
)

ifdef(`nyquist_platform',`
gen_require(
    type polaris_sioxcd_rp_t;
)
# Allow read of /etc/passwd
auth_map_passwd(polaris_sioxcd_rp_t)

# Allow usage of ls in helper script
corecmd_exec_bin(polaris_sioxcd_rp_t)

# Allow sysfs read
dev_list_sysfs(polaris_sioxcd_rp_t)

# Allow create/write/open of files under tmp
type polaris_sioxcd_rp_tmp_t;
files_tmp_file(polaris_sioxcd_rp_tmp_t)
files_tmp_filetrans(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, { dir file } )
manage_dirs_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)
manage_files_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)
manage_fifo_files_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)

# Allow losetup in helper script to run in its own domain
fstools_domtrans(polaris_sioxcd_rp_t)

# Allow mount/umount in its own domain
mount_domtrans(polaris_sioxcd_rp_t)

# Allow /tmp/sw/boot read
polaris_boot_tmp_read(polaris_sioxcd_rp_t)

# Allow /tmp/tmppub read
polaris_btrace_tmppub_read(polaris_sioxcd_rp_t)

# Allow iox_polaris.conf read
polaris_caf_files_read(polaris_sioxcd_rp_t)

```

```

# Allow chasfs access
polaris_chasfs_manage(polaris_sioxcd_rp_t)

# Allow /sys/devices/platform/cpld/board_vtype read
polaris_cpld_read(polaris_sioxcd_rp_t)

# Allow debug.conf access
polaris_read_debug_conf(polaris_sioxcd_rp_t)

# Allow cats /tmp/sw/boot/rmonbifo/boardsubtype
polaris_rmonbifo_tmp_read(polaris_sioxcd_rp_t)

# Allow console logging
term_open_unallocated_ttys(polaris_sioxcd_rp_t)

# Allow capability 1/24 access
allow polaris_sioxcd_rp_t self:capability { dac_override sys_resource };

# Transition to chvrf domain needed by push_using_rsnc
polaris_chvrf_domtrans(polaris_sioxcd_rp_t)

# Allow flashutil
polaris_flashlib_read(polaris_sioxcd_rp_t)

# logger needs to run pidof
dev_read_sysfs(polaris_sioxcd_rp_t)
kernel_read_system_state(polaris_sioxcd_rp_t)
domain_read_all_domains_state(polaris_sioxcd_rp_t)

# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_sioxcd_rp_t)

# Allow ls /tmp/ufs/crashinfo
optional_policy(`
polaris_ncd_tmp_read(polaris_sioxcd_rp_t)
`)

# Allow logger which is used for syslog messages
allow polaris_sioxcd_rp_t self:unix_dgram_socket { connect create };
logging_send_syslog_msg(polaris_sioxcd_rp_t)

# Allow standby to access /dev/sda3
fs_getattr_xattr_fs(polaris_sioxcd_rp_t)

# Allow getattr under iox_alt_hdd_mount_dir
polaris_iox_alt_hdd_getattr(polaris_sioxcd_rp_t)
`)

```



```

polaris_chasfs_manage(polaris_caf_t)
polaris_btrace_data_manage(polaris_caf_t)
polaris_cpld_read(polaris_caf_t)
polaris_boot_tmp_read(polaris_caf_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_caf_t)

corecmd_exec_bin(polaris_caf_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_caf_t)

# run-caf.sh invokes startup.py. This leads to node_t:tcp_socket node_bind
corenet_tcp_bind_generic_node(polaris_caf_t)

allow polaris_caf_t self:capability { net_admin sys_resource };
allow polaris_caf_t self:tcp_socket { accept listen create_socket_perms };
allow polaris_caf_t self:udp_socket create_socket_perms;
allow polaris_caf_t self:unix_dgram_socket { create_socket_perms sendto };
allow polaris_caf_t self:cap_userns { sys_admin sys_ptrace setgid setuid sys_chroot };

# df needs to have getattr on many file/dir/fs
fs_getattr_all_fs(polaris_caf_t)
fs_getattr_all_files(polaris_caf_t)
files_getattr_all_dirs(polaris_caf_t)
dev_getattr_all_chr_files(polaris_caf_t)
files_getattr_all_mountpoints(polaris_caf_t)

# df on "/" needs fs_t:filesystem getattr
fs_getattr_xattr_fs(polaris_caf_t)

# allow execution of /usr/sbin/brctl
brctl_domtrans(polaris_caf_t)

#allow open/read/search cgroup files like /sys/fs/cgroup/cpu,cpuacct/machine
fs_read_cgroup_files(polaris_caf_t)
fs_list_cgroup_dirs(polaris_caf_t)

# add new type for /guestshell files and allow CAF to manage them
type polaris_guestshell_t;
files_type(polaris_guestshell_t)
manage_files_pattern(polaris_caf_t, polaris_guestshell_t, polaris_guestshell_t)
manage_lnk_files_pattern(polaris_caf_t, polaris_guestshell_t, polaris_guestshell_t)
manage_dirs_pattern(polaris_caf_t, polaris_guestshell_t, polaris_guestshell_t)

#required to support, guestshell enable, which creates <i>i</i>ox-storage>/iox/repo/guestshell

```

```
relabelto_files_pattern(polaris_caf_t, polaris_guestshell_t, polaris_guestshell_t)
```

```
# run_ioxn_caf.sh invokes run-caf.sh which executes "ip"
```

```
sysnet_domtrans_ifconfig(polaris_caf_t)
```

```
# allow netns operations
```

```
sysnet_manage_ifconfig_run(polaris_caf_t)
```

```
libs_domtrans_ldconfig(polaris_caf_t)
```

```
# add new type for /bootflash/iox files and allow CAF to manage them
```

```
type polaris_iox_files_t;
```

```
polaris_disk_type(polaris_iox_files_t)
```

```
polaris_iox_files_manage(polaris_caf_t)
```

```
# need open, read, ioctl, getattr on /bootflash/debug.conf
```

```
polaris_read_debug_conf(polaris_caf_t)
```

```
# run_ioxn_caf.sh cats /tmp/sw/boot/rmonbifo/boardsubtype
```

```
polaris_rmonbifo_tmp_read(polaris_caf_t)
```

```
# pvsm_cpu.sh reads /tmp/cgroup.log
```

```
optional_policy(`
```

```
polaris_vman_tmp_manage(polaris_caf_t)
```

```
`)
```

```
# allow to read /proc/cpuinfo
```

```
kernel_read_system_state(polaris_caf_t)
```

```
optional_policy(`
```

```
container_runtime_domtrans(polaris_caf_t)
```

```
`)
```

```
# add new type for /opt/cisco/caf files and allow CAF to manage them
```

```
type polaris_caf_files_t;
```

```
files_type(polaris_caf_files_t)
```

```
files_root_filetrans(polaris_caf_t, polaris_caf_files_t, dir)
```

```
files_root_filetrans(polaris_caf_t, polaris_caf_exec_t, dir, "scripts")
```

```
manage_dirs_pattern(polaris_caf_t, polaris_caf_files_t, polaris_caf_files_t)
```

```
manage_files_pattern(polaris_caf_t, polaris_caf_files_t, polaris_caf_files_t)
```

```
manage_lnk_files_pattern(polaris_caf_t, polaris_caf_files_t, polaris_caf_files_t)
```

```
gen_require(`
```

```
    type polaris_hm_t;
```

```
`)
```

```
polaris_caf_files_read(polaris_hm_t)
```

```
# this label is created for sharing of core file dirs between host and containers
```

```
type polaris_caf_core_files_t;
```

```

polaris_disk_type(polaris_caf_core_files_t)
# transition /local files and dirs
files_root_filetrans(polaris_caf_t, polaris_caf_core_files_t, dir, "local")
polaris_btrace_data_manage(polaris_caf_core_files_t)
manage_files_pattern(polaris_caf_core_files_t, usr_t, usr_t)

# manage local core files between host and container
polaris_caf_local_core_files_manage(polaris_caf_t)
polaris_caf_local_core_files_manage(brctl_t)

# run_ioxn_caf.sh invokes startup.py that eventually through resourcemanager.py
# calls cpu_count_logical function in order to get number of cores and which
# needs read access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_caf_t)

# run-caf.sh modifies iox_polaris.conf; backup is saved due to "sed-i.bak".
# in order to preserve security context, setfscreate is invoked
allow polaris_caf_t self:process setfscreate;

# work with /var/log/caf/ files
type polaris_caf_log_t;
logging_log_file(polaris_caf_log_t)
manage_files_pattern(polaris_caf_t, polaris_caf_log_t, polaris_caf_log_t)
manage_dirs_pattern(polaris_caf_t, polaris_caf_log_t, polaris_caf_log_t)
logging_log_filetrans(polaris_caf_t, polaris_caf_log_t, dir, "caf")
logging_log_filetrans(polaris_caf_t, polaris_caf_log_t, dir, "docker")

corenet_tcp_bind_polaris_caf_api_port(polaris_caf_t)

virt_stream_connect(polaris_caf_t)
virt_read_config(polaris_caf_t)

# allow to get getattr of /proc file system
domain_read_all_domains_state(polaris_caf_t)

# allow access to /etc/guestshell_rsa_key* files
type polaris_guestshell_ssh_key_t;
files_type(polaris_guestshell_ssh_key_t)
files_etc_filetrans(polaris_caf_t, polaris_guestshell_ssh_key_t, file, "guestshell_rsa_key")
files_etc_filetrans(polaris_caf_t, polaris_guestshell_ssh_key_t, file, "guestshell_rsa_key.pub")
manage_files_pattern(polaris_caf_t, polaris_guestshell_ssh_key_t, polaris_guestshell_ssh_key_t)

# add new type for "internal" temp files created by underlying python modules when
# user-level python scripts (e.g., run_ioxn_caf.sh, run-caf.sh, etc) performs init;
# we are now creating them using TMPDIR=/tmp/caf; and, allow CAF to manage these
# internal temp files; in addition, underlying python-infra invokes __mmap() that
# somehow translates to.... execute stuff like "/tmp/caf/#97893 (deleted)"
type polaris_caf_tmp_files_t;

```

```

files_tmp_file(polaris_caf_tmp_files_t)
files_tmp_filetrans(polaris_caf_t, polaris_caf_tmp_files_t, dir)
files_tmp_filetrans(polaris_caf_t, polaris_caf_tmp_files_t, file)
manage_files_pattern(polaris_caf_t, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
manage_dirs_pattern(polaris_caf_t, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
# python through libffi tries to mmap open file with PROT_EXEC, it triggers need
# for execute permission
allow polaris_caf_t polaris_caf_tmp_files_t:file execute;
allow polaris_caf_t polaris_caf_tmp_files_t:file map;

# python3 seems to do a setxattr syscall
# A folder like /bootflash/iox/repo/guestshell/extract_archive
# contains files that are extracted from a tarball and are
# made polaris_caf_tmp_files_t because of the files_tmp_filetrans rule
relabel_files_pattern(polaris_caf_t, polaris_iox_files_t, polaris_iox_files_t)
relabel_files_pattern(polaris_caf_t, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)

# allow to run e2fsck in its own domain
fstools_domtrans(polaris_caf_t)

# allow to run mount in its own domain
mount_domtrans(polaris_caf_t)

# add new type for /guestshell/*.sh files
type polaris_guestshell_exec_t;
files_type(polaris_guestshell_exec_t)

# add new type for /var/run/netns/guestshell
type polaris_guestshell_var_run_t;
files_type(polaris_guestshell_var_run_t)

# add new type for /var/run/cisco_cli
type polaris_caf_var_run_t;
files_pid_file(polaris_caf_var_run_t)
manage_dirs_pattern(polaris_caf_t, polaris_caf_var_run_t, polaris_caf_var_run_t)
manage_files_pattern(polaris_caf_t, polaris_caf_var_run_t, polaris_caf_var_run_t)
files_pid_filetrans(polaris_caf_t, polaris_caf_var_run_t, { file dir })

# Intermediate step: When CAF unpacks the contents of the application
# you upload, it will stage the contents somewhere and verify some checks
# (filesystem check on the disk image, existence of several folders, etc.). Disk
# images are mounted without any label since CAF has not generated security
# labels yet for the app at this point. The disk gets unmounted and eventually
# gets mounted again with the proper context/label.
type polaris_disk_caf_t;
polaris_disk_type(polaris_disk_caf_t)
list_dirs_pattern(polaris_caf_t, polaris_disk_caf_t, polaris_disk_caf_t)

```

```

allow polaris_caf_t self:capability { chown dac_override fowner fsetid setfcap sys_chroot sys_ptrace };
allow polaris_caf_t self:process setcap;
fs_read_nsfs_files(polaris_caf_t)

# caf to manage loop device: finding free /dev/loopN device
dev_rw_loop_control(polaris_caf_t)

# PLEASE LOOK AT ME
# allow caf to read, write /dev/loopN devices that are
# under fixed_disk_device_t label. It is pretty strong premission
# and at this point it is only done for /dev/loopN devices.
# Can we do better? i.e move /dev/loopN to some other label?
storage_manage_fixed_disk(polaris_caf_t)

# caf executing chroot via bash
gen_require(
    type svirt_sandbox_file_t;
)
allow polaris_caf_t svirt_sandbox_file_t:file { execute execute_no_trans };

gen_require(
    type polaris_disk_bootflash_t;
    type polaris_disk_hddisk_t;
)
setattr_dirs_pattern(polaris_caf_t, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
# replicating policy done for polaris_disk_bootflash_t
setattr_dirs_pattern(polaris_caf_t, polaris_disk_hddisk_t, polaris_disk_hddisk_t)

# caf connects to its own port 8098
corenet_tcp_connect_polaris_caf_api_port(polaris_caf_t)

virt_manage_sandbox_files(polaris_caf_t)

kernel_read_network_state(polaris_caf_t)

polaris_bootflash_manage(polaris_caf_t)
polaris_bootflash_files_mmap(polaris_caf_t)
#allow polaris_disk_hddisk_t manage like polaris_disk_bootflash_t
polaris_hddisk_manage(polaris_caf_t)

# caf execve virsh
gen_require(
    type virsh_t;
    type virsh_exec_t;
)
domtrans_pattern(polaris_caf_t, virsh_exec_t, virsh_t)
# virsh needs to read /opt/cisco/caf/scripts/ieobcbr.xml
polaris_caf_files_read(virsh_t)

```

```

# caf calls tipc-config that works with tipc sockets
allow polaris_caf_t self:socket create_socket_perms;
allow polaris_caf_t self:netlink_generic_socket { create_socket_perms sendto recvfrom };

# get and set attrs on httpd_var_run_t under /bootflash/iox
gen_require(
    type httpd_var_run_t;
)
getattr_sock_files_pattern(polaris_caf_t, httpd_var_run_t, httpd_var_run_t)
setattr_sock_files_pattern(polaris_caf_t, httpd_var_run_t, httpd_var_run_t)
manage_dirs_pattern(polaris_caf_t, httpd_var_run_t, httpd_var_run_t)
# allow TCP connection for http port e.g. Local Manager
corenet_tcp_connect_http_port(polaris_caf_t)

# execute lvm commands, like lvs
lvm_domtrans(polaris_caf_t)

polaris_disk_crashinfo_getattr(polaris_caf_t)
optional_policy(
polaris_ncd_tmp_read(polaris_caf_t)
)

logging_send_syslog_msg(polaris_caf_t)

# tries to load KLM like cuse, fuse, overlay
modutils_domtrans_insmod(polaris_caf_t)

# modifies files under /var/www/features/iox
apache_manage_sys_content(polaris_caf_t)

# caf reads version of ioxman from its executable
polaris_ioxman_exec_read(polaris_caf_t)

polaris_ioxman_show_version(polaris_caf_t)

type polaris_iox_alt_hdd_files_t;
files_type(polaris_iox_alt_hdd_files_t)
polaris_pfile_type(polaris_iox_alt_hdd_files_t)
polaris_iox_alt_hdd_manage(polaris_caf_t)

# On stargazer platform /vol/disk0 is used by iox to create below dirs.
# On nyquist platform /vol/usb1 with polaris_disk_harddisk_t is used
# Transition them to appropriate labels.
gen_require(
    type container_var_lib_t;
)

```

```

filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_iox_files_t, dir, "iox")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_caf_tmp_files_t, dir, "caf")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t
polaris_iox_files_t }, container_var_lib_t, dir, "docker")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_iox_files_t, dir, "iox_data_share")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_iox_files_t, dir, "iox_host_data_share")

# Allow files under guest-share directory which is shared between ios
# and container
type polaris_iox_shared_files_t;
files_type(polaris_iox_shared_files_t)
polaris_pfile_type(polaris_iox_shared_files_t)
manage_dirs_pattern(polaris_caf_t, polaris_iox_shared_files_t, polaris_iox_shared_files_t)
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t polaris_iox_alt_hdd_files_t },
polaris_iox_shared_files_t, dir, "guest-share")

# Allow signature verification of applications
gen_require(
    type polaris_code_verify_t;
)
polaris_iox_files_manage(polaris_code_verify_t)

# allow caf to control /tmp/trace/resource.log
polaris_iox_manage_tmp_files(polaris_caf_t)

# some utility running under caf needs access to /varied/ovf-env.xml
polaris_disk_varied_read(polaris_caf_t)

# caf reads the udev information
gen_require(
    type udev_var_run_t;
)
manage_files_pattern(polaris_caf_t, udev_var_run_t, udev_var_run_t)

gen_require(
    type virtd_lxc_t;
)
allow polaris_caf_t virtd_lxc_t:process signull;

polaris_removable_manage(polaris_caf_t)
polaris_lm_tmp_read(polaris_caf_t)

# caf modifies /etc/cgroup_params.txt
files_manage_etc_files(polaris_caf_t)

```

```

# read /tmp/iox_override.conf created by ioxman
polaris_iox_read_tmp_files(polaris_caf_t)

# python udev library used by caf
allow polaris_caf_t self:netlink_kobject_uevent_socket { bind create getattr setopt };

#need access to rawip socket by pd_iox.sh
allow polaris_caf_t self:capability { net_raw setgid };
allow polaris_caf_t self:rawip_socket { create getopt setopt };
# LOOK AT ME caf leaks fifo file descriptors need permissions for
# domains that started by it
gen_require(
    type iptables_t;
)
allow iptables_t polaris_caf_t:fifo_file { read write append getattr };

# allow iptables_t usersn permissions for IP accessed by the script guestshell_setup.sh
allow iptables_t self:cap_usersn { net_admin net_raw };

container_stream_connect(polaris_caf_t)

gen_require(
    type pki_ca_port_t;
)
allow polaris_caf_t pki_ca_port_t:tcp_socket name_connect;

polaris_flashlib_read(polaris_caf_t)
polaris_flashlib_write(polaris_caf_t)
polaris_contdev_dev_read(polaris_caf_t)

gen_require(
    type rsync_exec_t;
    type rsync_port_t;
)
allow polaris_caf_t rsync_exec_t:file { execute execute_no_trans getattr map open read };
allow polaris_caf_t rsync_port_t:tcp_socket name_connect;

# IOX uses rsync to sync the data
gen_require(
    type rsync_t;
)
rsync_entry_domtrans(polaris_caf_t, rsync_t)
polaris_manage_rsync_tmplog_dir(polaris_caf_t)
allow rsync_t polaris_caf_t:fifo_file { getattr write };

kernel_search_network_sysctl(polaris_caf_t)
kernel_rw_net_sysctls(polaris_caf_t)

```



```

dev_rw_sysfs(polaris_caf_t)

# Allow run-caf.sh to configure byte_queue_limits/limit_min for KR port
gen_require(
    type sysfs_t;
)
allow polaris_caf_t sysfs_t:file create;
dev_manage_sysfs_dirs(polaris_caf_t)

# CAF needs access to setup for containers
manage_dirs_pattern(polaris_caf_t, self, self)
fs_associate_proc(polaris_caf_t)

# guestshell_setup.sh reads /proc/sys/kernel/core_pattern
kernel_read_usermodehelper_state(polaris_caf_t)
# and then guestshell_setup.sh reads /tmp/corelink
gen_require(
    type initrc_tmp_t;
)
allow polaris_caf_t initrc_tmp_t:lnk_file read;

# Beluga/Meraki container
ifdef(^ms_platform',`
polaris_iox_container_domtrans(polaris_caf_t)
)
# Bottlenose/Meraki container
ifdef(^bottlenose_platform',`
polaris_iox_container_domtrans(polaris_caf_t)
)

#allow run_ioxn_caf.sh to modify /etc/docker/daemon.json, etc.
container_manage_config_files(polaris_caf_t)

# Manage IOx Secure storage CC files
type polaris_iox_ss_disk_t;
files_type(polaris_iox_ss_disk_t)
polaris_pfile_type(polaris_iox_ss_disk_t)

#Guestshell management
virt_signull(polaris_caf_t)

gen_require(
    type ifconfig_t;
)
# allow ifconfig_t users permissions for IP
allow ifconfig_t self:cap_users { net_admin sys_admin sys_ptrace };
# allow ifconfig_t to transition into dhcpc domain

```

```

sysnet_domtrans_dhcp(ifconfig_t)

# Being an IOS client does not allow for setattr permissions
gen_require(
    type polaris_iosd_portal_app_lipc_t;
)
setattr_sock_files_pattern(polaris_caf_t, polaris_iosd_portal_app_lipc_t, polaris_iosd_portal_app_lipc_t)

#ifdef(^passport_platform',`

gen_require(
    type polaris_sioxcd_rp_t;
)

# Allow read of /etc/passwd
auth_map_passwd(polaris_sioxcd_rp_t)
#
# Allow usage of ls in helper script
corecmd_exec_bin(polaris_sioxcd_rp_t)

# Allow sysfs read
dev_list_sysfs(polaris_sioxcd_rp_t)

# Allow create/write/open of files under tmp
type polaris_sioxcd_rp_tmp_t;

files_tmp_file(polaris_sioxcd_rp_tmp_t)
files_tmp_filetrans(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, { dir file } )
manage_dirs_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)
manage_files_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)
manage_fifo_files_pattern(polaris_sioxcd_rp_t, polaris_sioxcd_rp_tmp_t, polaris_sioxcd_rp_tmp_t)

# Allow losetup in helper script to run in its own domain
fstools_domtrans(polaris_sioxcd_rp_t)
#
## Allow mount/umount in its own domain
mount_domtrans(polaris_sioxcd_rp_t)
#
## Allow /tmp/sw/boot read
polaris_boot_tmp_read(polaris_sioxcd_rp_t)

## Allow /tmp/tmppub read
polaris_btrace_tmppub_read(polaris_sioxcd_rp_t)

## Allow iox_polaris.conf read
polaris_caf_files_read(polaris_sioxcd_rp_t)
#
# Allow chasfs access

```

```
polaris_chasfs_manage(polaris_sioxcd_rp_t)

# Allow /sys/devices/platform/cpld/board_vtype read
polaris_cpld_read(polaris_sioxcd_rp_t)

# Allow debug.conf access
polaris_read_debug_conf(polaris_sioxcd_rp_t)

# Allow cats /tmp/sw/boot/rmonbifo/boardsubtype
polaris_rmonbifo_tmp_read(polaris_sioxcd_rp_t)

# Allow console logging
term_open_unallocated_ttys(polaris_sioxcd_rp_t)

# Allow capability 1/24 access
allow polaris_sioxcd_rp_t self:capability { dac_override sys_resource };

# Transition to chvrf domain needed by push_using_rsync
polaris_chvrf_domtrans(polaris_sioxcd_rp_t)

# Allow flashutil
polaris_flashlib_read(polaris_sioxcd_rp_t)

#iptables execute in its own domain
iptables_domtrans(polaris_caf_t)

# logger needs to run pidof
dev_read_sysfs(polaris_sioxcd_rp_t)
kernel_read_system_state(polaris_sioxcd_rp_t)
domain_read_all_domains_state(polaris_sioxcd_rp_t)

# Manage alternate hdd files
polaris_iox_alt_hdd_manage(polaris_sioxcd_rp_t)

# Allow ls /tmp/ufs/crashinfo
optional_policy(`
polaris_ncd_tmp_read(polaris_sioxcd_rp_t)
`)

# Allow logger which is used for syslog messages
allow polaris_sioxcd_rp_t self:unix_dgram_socket { connect create };
logging_send_syslog_msg(polaris_sioxcd_rp_t)

# Allow standby to access /dev/sda3
fs_getattr_xattr_fs(polaris_sioxcd_rp_t)

# Allow getattr under iox_alt_hdd_mount_dir
polaris_iox_alt_hdd_getattr(polaris_sioxcd_rp_t)
```

```

')

# Allow sync_data to use chvrf
polaris_chvrf_domtrans(polaris_caf_t)

#tty device and link files under /dev
type polaris_caf_tty_file_t;
dev_node(polaris_caf_tty_file_t)
dev_filetrans(polaris_caf_t, polaris_caf_tty_file_t, lnk_file)
term_use_ptmx(polaris_caf_t)
polaris_caf_tty_lnk_manage(polaris_caf_t)
polaris_caf_chr_file_read(polaris_caf_t)

polaris_iosd_vcpu_read(polaris_caf_t)

# Allow access starting/stopping iox
polaris_chasfs_read(iptables_t)
polaris_chasfs_read(ifconfig_t)
polaris_hman_use_fifo(polaris_caf_t)
iptables_domtrans(polaris_caf_t)

# Allow application signature verification
polaris_code_verify_domtrans(polaris_caf_t)

#access /proc/rmonbifo file cat9k-ioxhelper.sh
polaris_proc_rmonbifo_read(polaris_caf_t)

gen_require(
    type dhcpc_t;
)
# allow these users capabilities for dhcpc
allow dhcpc_t self:cap_users { net_raw net_bind_service };
# allow CAF to transition to dhcpc e.g. dhclient_custom.sh
sysnet_domtrans_dhcpc(polaris_caf_t)
# allow reading of dhcp configuration files e.g.
# /vol/usb1/iox/repo-docker/perfsonar1/dhcp/dhcp_eth0.conf
polaris_caf_files_read(dhcpc_t)
# allow writing of dhcp lease files e.g. eth0ip4.lease
polaris_iox_files_manage(dhcpc_t)
# allow dhcpc domain to transition back into CAF e.g. dhclient_custom.sh
polaris_caf_domtrans(dhcpc_t)

# Allow read container share files
container_read_share_files(polaris_caf_t)

# Allow manage container files
gen_require(
    type container_file_t;

```

```

    type container_share_t;
    type container_log_t;
)
mmap_files_pattern(polaris_caf_t, container_file_t, container_file_t)
manage_files_pattern(polaris_caf_t, container_file_t, container_file_t)

manage_chr_files_pattern(polaris_caf_t, container_share_t, container_share_t)
manage_fifo_files_pattern(polaris_caf_t, container_share_t, container_share_t)
manage_sock_files_pattern(polaris_caf_t, container_share_t, container_share_t)

manage_files_pattern(polaris_caf_t, container_log_t, container_log_t)

# Allow polaris caf to set attributes of device nodes of fuse devices
gen_require(
    type fuse_device_t;
)
allow polaris_caf_t fuse_device_t:chr_file setattr;

# Allow polaris caf to set attributes of TUN/TAP virtual network device
gen_require(
    type tun_tap_device_t;
)
allow polaris_caf_t tun_tap_device_t:chr_file setattr;

# Allow operations on fifo file
type fifo_var_run_t;
# make sure /tmp/ttyF0 is labeled correctly
files_tmp_file(fifo_var_run_t)
files_tmp_filetrans(polaris_caf_t, fifo_var_run_t, fifo_file)
manage_fifo_files_pattern(polaris_caf_t, fifo_var_run_t, fifo_var_run_t)

# allow udev read operations
polaris_udev_tmp_read(polaris_caf_t)

# allow link file for tmpfs_t
allow polaris_caf_t tmpfs_t:lnk_file create;

#####
# IOx Secure storage service policies
#####
optional_policy(
gen_require(
    type polaris_ioxss_rp_t;
    type polaris_sort_files_t;
    type polaris_iosd_t;
)
type polaris_ioxss_rp_tmp_t;
files_tmp_file(polaris_ioxss_rp_tmp_t)

```

```

files_tmp_filetrans(polaris_ioxss_rp_t, polaris_ioxss_rp_tmp_t, file, "ioxss_up")
polaris_ioxss_rp_tmp_manage(polaris_ioxss_rp_t)

polaris_chasfs_read(polaris_ioxss_rp_t)
polaris_lua_read(polaris_ioxss_rp_t)

manage_files_pattern(polaris_ioxss_rp_t, polaris_iox_ss_disk_t, polaris_iox_ss_disk_t)
allow polaris_sort_files_t polaris_iox_ss_disk_t:dir list_dir_perms;
allow polaris_iosd_t polaris_iox_ss_disk_t:dir list_dir_perms;

# Allow polaris_sort_files_t getattr of iosd_portal_app_lipc socket file
polaris_iosd_portal_app_lipc_getattr(polaris_sort_files_t)

# allow secure storage server to connect through tcp_socket on port 9000 from system-config.ini
gen_require(`
    type http_port_t;
`)

allow polaris_ioxss_rp_t self:tcp_socket { bind create listen setopt };
corenet_tcp_bind_http_port(polaris_ioxss_rp_t);
allow polaris_ioxss_rp_t node_t:tcp_socket node_bind;

# allow polaris_caf to process signal of dhcpc client
allow polaris_caf_t dhcpc_t:process signal;

# allow secure storage server to connect through socket
allow polaris_ioxss_rp_t self:socket create_socket_perms;
`)

optional_policy(`
# Allow polaris_sort_files_t getattr of container fifo file
gen_require(`
    type polaris_sort_files_t;
    type container_file_t;
`)
getattr_fifo_files_pattern(polaris_sort_files_t, container_file_t, container_file_t)
`)

# Clear iox handling
container_manage_lib_files(polaris_caf_t)
container_manage_lib_dirs(polaris_caf_t)
container_manage_share_files(polaris_caf_t)
container_manage_share_dirs(polaris_caf_t)
gen_require(`
    type polaris_vs_oper_db_tdlldb_t;
    type polaris_tdlldb_t;
`)
manage_files_pattern(polaris_caf_t, polaris_tdlldb_t, polaris_vs_oper_db_tdlldb_t)

```

```

# allow caf to read systemd unit files
systemd_read_unit_files(polaris_caf_t)

# allow restorecon on iox_alt_hdd_mount_dir
seutil_domtrans_setfiles(polaris_caf_t)

filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_iox_alt_hdd_files_t,
file, "iox_alt_hdd.dsk")
filetrans_pattern(polaris_caf_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_iox_alt_hdd_files_t,
dir, "iox_alt_hdd_mount_dir")

allow ifconfig_t polaris_iox_files_t:file { read };

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscaf.te
```

No license file was found, but licenses were detected in source scan.

```

#
# May 2017, Victor Kamensky
#
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
# All rights reserved
#

## <summary>Polaris confd Policy Rules.</summary>

```

```

#####
## <summary>
##   Setup /dev/shm/confd directory and file, pid and shared memory.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_confd_shm_setup',`
    gen_require(`
        type polaris_confd_shm_t;
        type tmpfs_t;
    `)
    fs_tmpfs_filetrans($1, polaris_confd_shm_t, dir, "confd")
    manage_dirs_pattern($1, tmpfs_t, polaris_confd_shm_t)
    manage_files_pattern($1, { tmpfs_t polaris_confd_shm_t }, polaris_confd_shm_t)
    allow $1 polaris_confd_shm_t:file map;
)

```

```
#####
## <summary>
##   Read /dev/shm/confd_shared_schema shared memory.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_confid_shared_schema_read`,`
    gen_require(`
        type polaris_confid_shm_t;
        type tmpfs_t;
    `)
    read_files_pattern($1, { tmpfs_t polaris_confid_shm_t } , polaris_confid_shm_t)
    allow $1 polaris_confid_shm_t:file map;
)`
)
```

```
#####
## <summary>
##   Watch confd_shm directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_confid_shared_schema_watch`,`
    gen_require(`
        type polaris_confid_shm_t;
    `)
    allow $1 polaris_confid_shm_t:dir watch;
)`
)
```

```
#####
## <summary>
##   Read /proc/cond_pid/exe file. Few dmi utilities do that by
## some reason. Look at handle_confid_pid_available.
##   Read files and symlinks under /dev/shm/confd.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
```



```

## </param>
#
interface(`polaris_conf_d_read',`
    gen_require(`
        type polaris_conf_d_t;
    `)
    read_files_pattern($1, polaris_conf_d_t, polaris_conf_d_t)
    read_lnk_files_pattern($1, polaris_conf_d_t, polaris_conf_d_t)
`)

#####
## <summary>
##   Create /var/log/ndbutil directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_conf_ndbutil_create',`
    gen_require(`
        type polaris_conf_ndbutil_lock_t;
    `)
    files_lock_filetrans($1, polaris_conf_ndbutil_lock_t, dir, "ndbutil")
    files_create_lock_dirs($1)
    manage_dirs_pattern($1, polaris_conf_ndbutil_lock_t, polaris_conf_ndbutil_lock_t)
    manage_files_pattern($1, polaris_conf_ndbutil_lock_t, polaris_conf_ndbutil_lock_t)
    create_dirs_pattern($1, polaris_conf_ndbutil_lock_t, polaris_conf_ndbutil_lock_t)
`)

#####
## <summary>
## Creates types for and rules for ndbutils files under /var/lock/ndbutil
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_ndbutil_t
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>

```

```

## The name of the object being created.
## </summary>
## </param>
#
template(`polaris_ndbutil_lock_template`,`
    gen_require(`
        type polaris_confnd_ndbutil_lock_t;
    `)
    type polaris_$2_ndbutil_t;
    files_type(polaris_$2_ndbutil_t)

    filetrans_pattern($1, polaris_confnd_ndbutil_lock_t, polaris_$2_ndbutil_t, file, $3)
    manage_files_pattern($1, polaris_confnd_ndbutil_lock_t, polaris_$2_ndbutil_t)

    allow $1 polaris_$2_ndbutil_t:file { watch watch_reads };
)

```

```

#####
## <summary>
## Execute a domain transition to run mmap_schema polaris process.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#

```

```

interface(`polaris_mmap_schema_domtrans`,`
    gen_require(`
        type polaris_mmap_schema_t, polaris_mmap_schema_exec_t;
    `)

    domtrans_pattern($1, polaris_mmap_schema_exec_t, polaris_mmap_schema_t)
)

```

```

#####
## <summary>
## Execute a domain transition to run confd polaris process.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#

```

```

interface(`polaris_confnd_domtrans`,`
    gen_require(`
        type polaris_confnd_t, polaris_confnd_exec_t;
    `)

```

```

    ')

    domtrans_pattern($1, polaris_confid_exec_t, polaris_confid_t)
')

#####
## <summary>
##   Read confd log file (i.e /var/confd0/log/cia-confd.log). Used
## by dmiatudhd to convert confd logs to btrace.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_confid_log_read`,`
    gen_require(`
        type polaris_confid_var_t;
    `)
    read_files_pattern($1, polaris_confid_var_t, polaris_confid_var_t)
`)

#####
## <summary>
##   Manage confd log file (i.e /var/confd0/log/cia-confd.log). Used
## by pman to rotate logs into /bootflash/tracelogs.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_confid_log_manage`,`
    gen_require(`
        type polaris_confid_var_t;
    `)
    manage_files_pattern($1, polaris_confid_var_t, polaris_confid_var_t)
`)

#####
## <summary>
## Execute dmi_ports_fetch in the caller domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.

```

```

## </summary>
## </param>
#
interface('confd_exec_dmi_ports_fetch',`
gen_require(`
type polaris_dmi_ports_fetch_exec_t;
`)

corecmd_search_bin($1)
can_exec($1, polaris_dmi_ports_fetch_exec_t)
`)

#####
## <summary>
##   Manage confd /var/log files (i.e /var/log/confd)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_confd_var_log_manage',`
gen_require(`
type polaris_confd_var_log_t;
`)
logging_log_filetrans($1, polaris_confd_var_log_t, dir, "confd")
manage_dirs_pattern($1, var_log_t, polaris_confd_var_log_t)
manage_files_pattern($1, polaris_confd_var_log_t, polaris_confd_var_log_t)
`)

#####
## <summary>
##   Read confd /var/log files (i.e /var/log/confd)
##   /bootflash/tracelogs/cia-netconf-trace* also has polaris_confd_var_log_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_confd_var_log_read',`
gen_require(`
type polaris_confd_var_log_t;
`)
list_dirs_pattern($1, polaris_confd_var_log_t, polaris_confd_var_log_t)
read_files_pattern($1, polaris_confd_var_log_t, polaris_confd_var_log_t)
`)

```

```
)

#####
## <summary>
## Write into fifo file created by confd, typical case when
##   confd starts script under popen in different domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_confd_tmp_use_fifo`,`
gen_require(`
type polaris_confd_tmp_t;
`)

    read_fifo_files_pattern($1, polaris_confd_tmp_t, polaris_confd_tmp_t)
    write_fifo_files_pattern($1, polaris_confd_tmp_t, polaris_confd_tmp_t)
)

```

```
#####
## <summary>
## Write into file created by confd, to deal with cases
##   confd starts script under popen in different domain and
##   file descriptor leaks into another domain. Since we cannot
##   modify confd to use O_CLOEXEC
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolecap/>
#
interface(`polaris_confd_tmp_use`,`
gen_require(`
type polaris_confd_tmp_t;
`)

    read_files_pattern($1, polaris_confd_tmp_t, polaris_confd_tmp_t)
    write_files_pattern($1, polaris_confd_tmp_t, polaris_confd_tmp_t)
)

```

```
#####
## <summary>
```

```

## Provide access for file operations under /etc/ dir.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_conf_d_etc_read`,`
    gen_require(`
        type polaris_conf_d_etc_t;
    `)

    read_files_pattern($1, polaris_conf_d_etc_t, polaris_conf_d_etc_t)
`)

```

```
#####
```

```

## <summary>
## Create an object in the /var directory under
## polaris_conf_d_var_t label.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_conf_d_var_filetrans`,`
    gen_require(`
        type polaris_conf_d_var_t;
    `)

    files_var_filetrans($1, polaris_conf_d_var_t, $2, $3)
`)

```

```
#####
```

```

## <summary>
## Make the specified domain able to work with /var/confd0

```

```

## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_confd_var_dir_manage`,`
    gen_require(`
        type polaris_confd_var_t;
    `)

    manage_dirs_pattern($1, polaris_confd_var_t, polaris_confd_var_t);
`)

#####
## <summary>
## Execute a domain transition to run admin_tech scripts of sdwan
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_admin_tech_domtrans`,`
    gen_require(`
        type polaris_admin_tech_t, polaris_admin_tech_exec_t;
    `)

    domtrans_pattern($1, polaris_admin_tech_exec_t, polaris_admin_tech_t)
`)

#####
## <summary>
## Read admin_tech files created under bootflash
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_admin_tech_data_read`,`
    gen_require(`
        type polaris_admin_tech_data_t;
    `)

    read_files_pattern($1, polaris_admin_tech_data_t, polaris_admin_tech_data_t)
`)

```

```

')

#####
## <summary>
##   Manage admin_tech files created under bootflash
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_admin_tech_data_manage',`
  gen_require(`
    type polaris_admin_tech_data_t;
  `)
  manage_files_pattern($1, polaris_admin_tech_data_t, polaris_admin_tech_data_t)
  manage_lnk_files_pattern($1, polaris_admin_tech_data_t, polaris_admin_tech_data_t)
  manage_dirs_pattern($1, polaris_admin_tech_data_t, polaris_admin_tech_data_t)

  allow $1 polaris_admin_tech_data_t:file watch;
)

```

```

#####
## <summary>
## Allow domain to be started by confd with
##   transition into specific service domain.
## </summary>
## <param name="domain">
## <summary>
##   Type to be used to run utility.
## </summary>
## </param>
## <param name="entry_point">
## <summary>
##   Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
interface(`polaris_conf_ddomain',`
  gen_require(`
    type polaris_conf_d_t;
  `)
  `)

  domtrans_pattern(polaris_conf_d_t, $2, $1)
)

```

```

#####
## <summary>

```



```

##   Manage confd_cli files under /tmp/confd_cli.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_confid_cli_tmp_manage',`
    gen_require(`
        type polaris_confid_cli_tmp_t;
    `)
    manage_files_pattern($1, polaris_confid_cli_tmp_t, polaris_confid_cli_tmp_t)
`)

```

#####

```

## <summary>
##   Manage vconfd files under /tmp/vconfd.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vconfd_tmp_manage',`
    gen_require(`
        type polaris_vconfd_tmp_t;
    `)
    manage_dirs_pattern($1, polaris_vconfd_tmp_t, polaris_vconfd_tmp_t)
    manage_files_pattern($1, polaris_vconfd_tmp_t, polaris_vconfd_tmp_t)
`)

```

#####

```

## <summary>
##   Connect to confd port. Should be used only by utility
## domains that do not have TDL entry. Processes with TDL entries
## just need to register as confd pseudo service clients.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_confid_connect',`
    polaris_ripc_confid_ipc_connect($1)
`)

```

```
#####
## <summary>
## Use unix stream socket created by confd as standard I/O
## descriptors. Need to look more, because so far it triggers only
## getattr, append and ioctl permissions. If it would be real standard I/O
## it would need read and write as well.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_conf_d_unix_stream_stdio_use`,`
    gen_require(`
        type polaris_conf_d_t;
    `)
    allow $1 polaris_conf_d_t:unix_stream_socket { append getattr ioctl };
)`)

```

```
#####
## <summary>
## Creates types and rules for a script that is started
## by confd process.
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_t
## </summary>
## </param>
#
template(`polaris_vconf_d_domain_template`,`
    polaris_utility_domain_template($1)

    polaris_conf_d_domain(polaris_$1_t, polaris_$1_exec_t)

    # access /etc/passwd
    auth_use_nsswitch(polaris_$1_t)

    # inherit unix stream as script stdio
    polaris_conf_d_unix_stream_stdio_use(polaris_$1_t)
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisconfd.if

No license file was found, but licenses were detected in source scan.

```
dnl
dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
divert(-1)
```

```
include(`polaris_process.m4')
```

```
include(`polaris_database_db.m4')
include(`polaris_database_db_fc.m4')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl
#
# This is a generated file! Instead of modifying this file,
# modify proper platform TDL file.
#
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_database_fc.m4
No license file was found, but licenses were detected in source scan.
```

```
#
# February 2020, Victor Kamensky
#
# Copyright (c) 2020-2021 by Cisco Systems, Inc.
# All rights reserved
#
```

```
policy_module(polarisinstallmgr, 1.0);
```

```
gen_require(`
    type polaris_install_mgr_t;
')
polaris_chasfs_manage(polaris_install_mgr_t)
polaris_tdlresolve_read(polaris_install_mgr_t)
polaris_cpld_read(polaris_install_mgr_t)
polaris_flashlib_read(polaris_install_mgr_t)
polaris_lua_read(polaris_install_mgr_t)
```

```
logging_send_syslog_msg(polaris_install_mgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_install_mgr_t)
```

```

polaris_db_tdlldb_dir_use(polaris_install_mgr_t)

# read all files in persisten storage
polaris_persistent_read(polaris_install_mgr_t)

# calls code_verify
polaris_code_verify_domtrans(polaris_install_mgr_t)
# calls mount command
mount_domtrans(polaris_install_mgr_t)

# allow access to gnmib image files
optional_policy(`
polaris_gnmib_gnoi_images_read(polaris_install_mgr_t)
`)

# LOOK AT ME: /dev/mem access restriction will be removed after
# CSCvu32649 is fixed using CSCvu32742.
# code_sign_verify accesses /dev/mem: class=chr_file, {read, open, map}
# to read the codesign key in storage
# side effects: execute is also allowed
gen_require(`
    type polaris_code_verify_t;
    type polaris_nvram_file_t;
`)
dev_rx_raw_memory(polaris_code_verify_t)

# read access to /bootflash/nvram_config on CLI "install remove inactivate"
read_files_pattern(polaris_code_verify_t, polaris_disk_bootflash_t, polaris_nvram_file_t)
getattr_files_pattern(polaris_code_verify_t, polaris_disk_bootflash_t, polaris_nvram_file_t)

# open, read, map and getattr access of capsule-upgrade.log file
polaris_capsule_upgrade_log_use(polaris_code_verify_t)

# calls install_mgr_helper_api.sh
corecmd_exec_bin(polaris_install_mgr_t)
corecmd_exec_shell(polaris_install_mgr_t)
auth_use_nsswitch(polaris_install_mgr_t)

# /tmp/sw/inst_tmp_x handling
type polaris_install_mgr_tmp_t;
files_tmp_file(polaris_install_mgr_tmp_t)
gen_require(`
    type tmp_t;
`)
manage_dirs_pattern(polaris_install_mgr_t, tmp_t, polaris_install_mgr_tmp_t)
manage_dirs_pattern(polaris_install_mgr_t, polaris_install_mgr_tmp_t, polaris_install_mgr_tmp_t)
files_tmp_filetrans(polaris_install_mgr_t, polaris_install_mgr_tmp_t, dir, "inst_tmp_1")

```

```

files_tmp_filetrans(polaris_install_mgr_t, polaris_install_mgr_tmp_t, dir, "inst_tmp_2")

# writes into /bootflash/.installer/watchlist
polaris_disk_install_manage(polaris_install_mgr_t)

# install_mgr_monitor.c:add_prior_watches
polaris_persistent_watch(polaris_install_mgr_t)

# watch over /tmp/patch
polaris_patch_data_watch(polaris_install_mgr_t)

polaris_repm_peer_mqipc_manage(polaris_install_mgr_t)

# watches over /tmp for /tmp/booted appearance in
# init_operation_mgmt_watches function
gen_require(
    type tmp_t;
)
allow polaris_install_mgr_t tmp_t:dir watch;

allow polaris_install_mgr_t self:capability sys_resource;

#install_mgr writes into /bootflash/.installer/watchlist and watches /bootflash/inot_fifo
polaris_install_disk_manage(polaris_install_mgr_t)

#install_mgr does search and get attribute operation on /tftp directory
gen_require(
    type tftpd_rw_t;
)
allow polaris_install_mgr_t tftpd_rw_t:dir { getattr search };

# allow read access to iso9660
fs_read_iso9660_files(polaris_install_mgr_t)

# accesses /proc/sys/vm/drop_caches
kernel_rw_vm_sysctls(polaris_install_mgr_t)

# creates files under /tmp/pkg_cs_debug through install_helper
# and verify_pkg shell function from common
polaris_pkg_cs_debug_manage(polaris_install_mgr_t)

# for pluggable FS, allow the install manager to access files on them (it needs read and
# write access).
gen_require(
    type removable_t;
)
allow polaris_install_mgr_t removable_t:dir { getattr open read search watch };
allow polaris_install_mgr_t removable_t:file { getattr open read };

```

```

allow polaris_install_mgr_t removable_t:lnk_file read;

#allow install_mgr to stat caf files in /vol/harddisk/caf, /bootflash/caf, etc.
polaris_caf_tmp_files_read(polaris_install_mgr_t)

# install manager Cleanup related to inotify watches, Basically frees malloced memory
gen_require(
    type root_t;
)
allow polaris_install_mgr_t root_t:dir watch;

# install manager access to /guestshell
polaris_guestshell_files_read(polaris_install_mgr_t)

# install manager access to /lib/systemd/systemd
polaris_init_access_check(polaris_install_mgr_t)

# install manager reads dcmlog.txt
optional_policy(
    gen_require(
        type polaris_fed_debug_dcmlog_t;
    )
    read_files_pattern(polaris_install_mgr_t, polaris_fed_debug_dcmlog_t, polaris_fed_debug_dcmlog_t)
)
# install manager reads /firmware
polaris_firmware_read(polaris_install_mgr_t)

# install manager reads /guestshell
gen_require(
    type polaris_guestshell_t;
)
getattr_dirs_pattern(polaris_install_mgr_t, polaris_guestshell_t, polaris_guestshell_t)

# install_manager reads /tmp/sw/boot during auto_upgrade
polaris_boot_tmp_read(polaris_install_mgr_t)

# install_manager writes /tmp/sw/boot during auto_upgrade
polaris_boot_tmp_write(polaris_install_mgr_t)

# install_manager reads /tmp/sw/boot/rmonbifo during auto_upgrade
polaris_rmonbifo_tmp_read(polaris_install_mgr_t)

# install_manager reads /tmp/tmppub during auto_upgrade
polaris_btrace_tmppub_read(polaris_install_mgr_t)

# install manager accesses /tmp/rsync_log_dir during auto_upgrade
polaris_manage_rsync_tmpplog_dir(polaris_install_mgr_t)

```

```

# install manager invokes mcp_chvrf.sh for rsync operations during auto_upgrade
polaris_chvrf_domtrans(polaris_install_mgr_t)

polaris_bexecute_domtrans(polaris_install_mgr_t)

ifdef(`ngwc_family',`
# install_mgr needs to be able to execute the auto_upgrade_client_helper scripts
polaris_autoupgrade_domtrans(polaris_install_mgr_t)

# read /tmp/etc/installer
polaris_autoupgrade_tmp_manage(polaris_install_mgr_t)
')

ifdef(`mcp_family',`
# install_mgr needs to be able to execute the auto_upgrade_client_helper scripts
polaris_autoupgrade_domtrans(polaris_install_mgr_t)

# read /tmp/etc/installer
polaris_autoupgrade_tmp_manage(polaris_install_mgr_t)
')

ifdef(`wlc_family',`
# install_mgr needs to be able to execute the auto_upgrade_client_helper scripts
polaris_autoupgrade_domtrans(polaris_install_mgr_t)

# read /tmp/etc/installer
polaris_autoupgrade_tmp_manage(polaris_install_mgr_t)
')

# with "/bootflash"...this needs read and attr to access for logfile
polaris_read_user_file(polaris_install_mgr_t)
polaris_user_file_getattr(polaris_install_mgr_t)

# auto upgrade server bind operation when install manager initialize auto upgrade server
corenet_tcp_bind_polaris_autoupgrade_port(polaris_install_mgr_t)

# access to /tmp/etc
polaris_etc_list(polaris_install_mgr_t)

# read access to /tmp/etc/installer
polaris_install_tmp_read(polaris_install_mgr_t)

polaris_script_errmsg_use(polaris_install_mgr_t)

# install mgr calls install_abort.sh on rollback timer expiry
polaris_install_engine_domtrans(polaris_install_mgr_t)

# /tmp/ufs/crashinfo access

```

```

optional_policy(
polaris_ncd_tmp_read(polaris_install_mgr_t)
')

# read/write to /bootflash/.rollback_timer/install_abort_time
polaris_rbtimer_bootflash_manage(polaris_install_mgr_t)

allow polaris_install_mgr_t self:process setpgid;

optional_policy(
  polaris_efi_files_list_dirs(polaris_install_mgr_t)
')

# walk all files on "install issu activate" and "install remove inactivate" CLI
files_read_all_files(polaris_install_mgr_t)

# install mgr file descriptor leaks into mcp_chvrf.sh for rsync operation
gen_require(
  type polaris_chvrf_t;
)
allow polaris_chvrf_t polaris_install_mgr_t:file read;

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisinstallmgr.te

No license file was found, but licenses were detected in source scan.

```

#
# May 2017, Victor Kamensky
#
# Copyright (c) 2017-2021 by Cisco Systems, Inc.
# All rights reserved
#

```

```

policy_module(polarisconfd, 1.0);

```

```

gen_require(
  type polaris_confnd_t;
)

```

```

# confd-startup.sh calls confd_cmd to get_phase and other cases
# that utilities under confd label connects to confd
polaris_ripc_confnd_ipc_connect(polaris_confnd_t)

```

```

#confd needs communicate over HTTP
corenet_tcp_bind_http_port(polaris_confnd_t)

```

```

# commplex_main (port 5000) is used by apache
corenet_udp_bind_complex_main_port(polaris_confnd_t)

```



```

corenet_tcp_bind_generic_node(polaris_confd_t)
allow polaris_confd_t self:tcp_socket { getattr getopt setopt bind create listen accept connect read write };

corenet_udp_bind_generic_node(polaris_confd_t)
allow polaris_confd_t self:udp_socket { bind connect create getattr getopt setopt };
corenet_udp_bind_polaris_confd_snmp_traps_port(polaris_confd_t)

logging_send_syslog_msg(polaris_confd_t)

polaris_chasfs_manage(polaris_confd_t)
polaris_btrace_data_manage(polaris_confd_t)
polaris_cpld_read(polaris_confd_t)
polaris_boot_tmp_read(polaris_confd_t)
polaris_rmonbifo_tmp_read(polaris_confd_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_confd_t)

# confd-startup.sh process is shell script need permission to execute shell
# and variety of small util commands under bin_t
corecmd_exec_shell(polaris_confd_t)
corecmd_exec_bin(polaris_confd_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_confd_t)

# confdexec needs access to /sys/devices/system/cpu/online
dev_read_sysfs(polaris_confd_t)

allow polaris_confd_t self:capability { net_admin sys_resource };

# allow read permissions for /etc/hosts file
sysnet_read_config(polaris_confd_t)

# allow read permissions for /var/run/netns/8
fs_read_nsfs_files(polaris_confd_t)

# work with /var/confd0/ files
type polaris_confd_var_t;
files_tmp_file(polaris_confd_var_t)
polaris_confd_var_filetrans(polaris_confd_t, dir, "confd0")
manage_files_pattern(polaris_confd_t, polaris_confd_var_t, polaris_confd_var_t)
manage_lnk_files_pattern(polaris_confd_t, polaris_confd_var_t, polaris_confd_var_t)
manage_dirs_pattern(polaris_confd_t, polaris_confd_var_t, polaris_confd_var_t)

# erlang calls efile_fileinfo function (./erts/emulator/drivers/unix/unix_efile.c)
# root directory. Inside of the function code calls 'access' function that check

```

```

# access permission for R_OK and W_OK. W_OK triggers denial warning. Insted of
# granting access let's mark it as dontaudit. Erlang will be fine with this
files_dontaudit_write_root_dirs(polaris_conf_d_t)

# deals with /dev/shm/confd files (shared memory and pid)
type polaris_conf_d_shm_t;
files_tmpfs_file(polaris_conf_d_shm_t)

# confd-startup.sh modifies confd.conf which is under polaris_conf_d_var_t label
# sed -i /CONFID_FXS_CISCO_AUTOGEN_EWLC/d /var/confd0/confd.conf
allow polaris_conf_d_t self:process setfscreate;

type polaris_conf_d_ndbutil_lock_t;
files_lock_file(polaris_conf_d_ndbutil_lock_t)

#####
# confd mmap_schema utility runs from systemd unit under polaris_conf_d_t label
#####
polaris_conf_d_shm_setup(polaris_conf_d_t)
# create ndbutil directory under /var/lock
polaris_conf_d_ndbutil_create(polaris_conf_d_t)

# Allow access to /crashinfo
polaris_disk_crashinfo_getattr(polaris_conf_d_t)

optional_policy(`
# confd-startup.sh on nyquist makes ls /tmp/ufs/crashinfo
polaris_ncd_tmp_read(polaris_conf_d_t)
`)

# confd-startup.sh reads /proc/cmdline
kernel_read_system_state(polaris_conf_d_t)

# LOOK AT ME allow mapping of low addresses, that could be exploited
# need to understand why; unfortunately confd symbols are not decodable
# need to ask tail-f guys
ifdef(`tsn_platform',`
domain_mmap_low_uncond(polaris_conf_d_t)
gen_require(`
    type polaris_conf_d_cli_t;
`)
domain_mmap_low_uncond(polaris_conf_d_cli_t)
`)
ifdef(`quake_platform',`
domain_mmap_low_uncond(polaris_conf_d_t)
`)

polaris_mmap_schema_domtrans(polaris_conf_d_t)

```

```

# mmap_schema process policy
gen_require(
    type polaris_mmap_schema_t;
)
polaris_btrace_data_manage(polaris_mmap_schema_t)
polaris_chasfs_read(polaris_mmap_schema_t)
polaris_cpld_read(polaris_mmap_schema_t)
polaris_flashlib_read(polaris_mmap_schema_t)

polaris_db_tdlb_dir_use(polaris_mmap_schema_t)

polaris_confd_ndbutil_create(polaris_mmap_schema_t)
polaris_confd_shm_setup(polaris_mmap_schema_t)

# connects to config mmap_schema is not TDL process, let
# grant explicit permission to access corresponding port
polaris_ripc_confd_ipc_connect(polaris_mmap_schema_t)
allow polaris_mmap_schema_t self:tcp_socket { connect create setopt };
polaris_socketat_nsfs_read(polaris_mmap_schema_t)

allow polaris_mmap_schema_t self:capability dac_override;

polaris_tdlresolve_read(polaris_mmap_schema_t)
polaris_confd_read(polaris_mmap_schema_t)

polaris_ndbmand_ndbutil_manage(polaris_mmap_schema_t)

optional_policy(
    polaris_gnmib_ndbutil_lock(polaris_mmap_schema_t, ".l.schema_use.gnmib")
)

type polaris_confd_tmp_t;
files_tmp_file(polaris_confd_tmp_t)
polaris_systemd_tmpfiles_tmp_filetrans(polaris_confd_tmp_t, dir, "confd")
files_tmp_filetrans(polaris_confd_t, polaris_confd_tmp_t, dir, "confd")
manage_files_pattern(polaris_confd_t, tmp_t, polaris_confd_tmp_t)
manage_fifo_files_pattern(polaris_confd_t, tmp_t, polaris_confd_tmp_t)
manage_dirs_pattern(polaris_confd_t, tmp_t, polaris_confd_tmp_t)

# posix_pathconf called from get_tmpdir calls starvfs over /tmp
fs_getattr_tmpfs(polaris_confd_t)

# dmi_ports_fetch that runs under confd_t reads global.service.conf
polaris_tdlresolve_read(polaris_confd_t)
confd_exec_dmi_ports_fetch(polaris_confd_t)

```

```

# confd-startup script reads /tmp/dmi.ds_config if it exists
polaris_psd_tmp_read(polaris_conf_d_t)

# vip-confd-startup.sh related
# figure out BOOT_ROLE in install_util.sh
polaris_read_packages_conf(polaris_conf_d_t)
# touch /bootflash/sdwan/day0_oper.xml
allow polaris_conf_d_t self:capability dac_override;
polaris_bootflash_manage(polaris_conf_d_t)
# /usr/bin/sw syncddb call uuidgen
dev_read_rand(polaris_conf_d_t)

polaris_dmiauthd_tmp_manage(polaris_conf_d_t)

# PLEASE LOOK AT ME: overloaded use of /bootflash/.installer and
# /bootflash/.sdwaninstaller directories. In controller mode cedge code loopback
# mounts /bootflash/.sdwaninstallerfs file onto /bootflash/.sdwaninstaller and
# creates /bootflash/.installer symbolic link to it. As result effective
# /bootflash/.installer carries two meaning: used by polaris install infra for
# regular install operations, and keep persistent state in controller mode. For
# now /bootflash/.sdwaninstallerfs was forced to be mounted with
# polaris_disk_install_t label, so installer policy would be happy, but confd
# writes into it through /var/confd0 which is symbolic link to
# /bootflash/.installer/images/pkg_boot_17.3.01/confd0 that means we need to
# grant polaris_disk_install_manage to confd which is not good thing.
# It would be much better if two different directories would be used.
polaris_disk_install_manage(polaris_conf_d_t)

# /var/log/confd handling
type polaris_conf_d_var_log_t;
logging_log_file(polaris_conf_d_var_log_t)
polaris_conf_d_var_log_manage(polaris_conf_d_t)

# /etc/version handling
type polaris_conf_d_etc_t;
files_config_file(polaris_conf_d_etc_t)
files_etc_filetrans(polaris_conf_d_t, polaris_conf_d_etc_t, file, "version")
gen_require(
    type etc_t;
)
manage_files_pattern(polaris_conf_d_t, etc_t, polaris_conf_d_etc_t)

# "/usr/bin/sw syncddb" calls "confd_cmd -p 3010 -o -c "delete /software""
# that invokes /usr/binos/conf/install_assist.sh
polaris_install_engine_domtrans(polaris_conf_d_t)

# confd calls /usr/bin/sw that creates temp files in /tmp/cedge_sw_log
# since it runs under same domain make sure that cedge_sw_log gets

```

```

# right label
files_tmp_filetrans(polaris_confd_t, polaris_confd_tmp_t, dir, "cedge_sw_log")

# /tmp/confd_booted created by vip-confd-start
files_tmp_filetrans(polaris_confd_t, polaris_confd_tmp_t, file, "cedge_booted")

# runs flashutils to read rommon variables
polaris_flashlib_read(polaris_confd_t)

allow polaris_confd_t self:capability fowner;

optional_policy(`
# work with /tmp/.econfd2sysmgr-ipc
polaris_econfd2sysmgr_tmp_manage(polaris_confd_t)
`)

# confdexec calls dmidecode to get bios-vendor
dmidecode_domtrans(polaris_confd_t)

optional_policy(`
# polaris_sw.sh called in confd context accesses
# /etc/viptela/controller_version
polaris_cedge_etc_manage(polaris_confd_t)
`)

# PLEASE LOOK AT ME confd tcp ports are supposed to be handle
# through TDL pseudo services, that one it not
corenet_tcp_connect_polaris_confd_maapi_port(polaris_confd_t)

# confd starts cmdptywrapper utility through erl_child_setup
# that allocates free pty device using operations on /dev/ptms
allow polaris_confd_t self:capability { fsetid setgid };
term_getattr_pty_fs(polaris_confd_t)
term_setattr_generic_ptys(polaris_confd_t)
term_use_generic_ptys(polaris_confd_t)
term_use_ptmx(polaris_confd_t)

# uses nice utility to start misc scripts
allow polaris_confd_t self:process setsched;

# allow netconf_callhome to execute ncsshd under ncsshd domain
polaris_ncsshd_mgmt_domtrans(polaris_confd_t)

# allow DmiAuth spawned by confd to access /tmp/.DmiAuth.socket
polaris_dmi_dmiauthd_dgram_send(polaris_confd_t)

# the default port for NETCONF Call Home (SSH) is 4334,
# and it is configurable by users

```

```

corenet_tcp_connect_all_ports(polaris_conf_d_t)
# by default the port is selected by system, and it is configurable by users
corenet_tcp_bind_generic_port(polaris_conf_d_t)
# netconf_callhome may create vrf-based netns on demand
polaris_vrf_netns_manage(polaris_conf_d_t)

# cmdwrapper utility that started by confd calls xstat
allow polaris_conf_d_t self:capability setuid;

# label for /tmp/vconfd temporary files created by binos/viptela/vconfd/*.sh
# scripts created from viptela/vconfd/vconfd_script_cli_session.sh
type polaris_vconfd_tmp_t;
files_tmp_file(polaris_vconfd_tmp_t)
# confd writes /tmp/vconfd/USID.XXX and /tmp/vconfd/THANDLE.YYY files
polaris_vconfd_tmp_manage(polaris_conf_d_t)

# label for /tmp/confd_cli temporary files created by execute_conf_d_cli.sh
type polaris_conf_d_cli_tmp_t;
files_tmp_file(polaris_conf_d_cli_tmp_t)

# execute_conf_d_cli creates /tmp/sh-thd moved to /tmp/confd_cli
files_tmp_filetrans({ polaris_conf_d_t polaris_conf_d_cli_t}, polaris_conf_d_cli_tmp_t, dir, "confd_cli")

# execute_conf_d_cli.sh script policy
polaris_utility_domain_template(conf_d_cli)
polaris_bexecute_domain(polaris_conf_d_cli_t, polaris_conf_d_cli_exec_t)

polaris_chasfs_read(polaris_conf_d_cli_t)
corecmd_exec_shell(polaris_conf_d_t)
corecmd_exec_bin(polaris_conf_d_cli_t)
auth_use_nsswitch(polaris_conf_d_cli_t)
# bash get_tmpdir statfs /tmp directory
fs_getattr_tmpfs(polaris_conf_d_cli_t)

polaris_conf_d_cli_tmp_manage(polaris_conf_d_cli_t)
polaris_vconfd_tmp_manage(polaris_conf_d_cli_t)
telnet_use_ptys(polaris_conf_d_cli_t)

polaris_ripc_conf_d_ipc_connect(polaris_conf_d_cli_t)

# execute_conf_d_cli.sh -a -g PRIV00 runs grep over /bootflash/sdwan/.init_stage
polaris_bootflash_read(polaris_conf_d_cli_t)

# execute_conf_d_cli.sh writes to "pipe:[24719894]"
polaris_dmi_ncsshd_fwd_use_fifo(polaris_conf_d_cli_t)
# allow /usr/binos/conf/bexecute.sh for tcp_socket access
# due to "/bin/sh /usr/binos/conf/mcp_chvrf.sh eobc
# /usr/binos/conf/bexecute.sh -c /bin/mcp_pkg_wrap rp_daemons

```

```

# /usr/binos/conf/execute_co"
allow polaris_confcli_t polaris_dmi_ncsshd_fwd_t:tcp_socket ioctl;
#=====
# admin-tech : scripts in binos/viptela/vconfd/*admin_tech*.sh
# Invocation triggered here:
# viptela/vconfd/viptela-actions.yang: tailf:exec "vconfd_script_admin_tech.sh"
#=====
polaris_vconfd_domain_template(admin_tech)

# /bin/bash /usr/binos/conf/bshell.sh -S -c
#   show platform hardware qfp active infrastructure shared-memory
#   process cpp-control-pro.....
polaris_bexecute_domtrans(polaris_admin_tech_t)

# admin-tech launches "ps" via scripts
domain_read_all_domains_state(polaris_admin_tech_t)

# See tracelogs accessed by vconfd_script_polaris_admin_tech_child.sh
polaris_btrace_data_manage_all(polaris_admin_tech_t)

# various utilities like "find", "memaudit", etc needs this
files_getattr_all_files(polaris_admin_tech_t)
files_getattr_all_dirs(polaris_admin_tech_t)
fs_getattr_all_fs(polaris_admin_tech_t)
files_read_all_files(polaris_admin_tech_t)

# '/bin/bash /usr/bin/memaudit' needs access to /proc/kmsg, /proc/mdstat, etc
dev_getattr_mtr_dev(polaris_admin_tech_t)
kernel_read_all_proc(polaris_admin_tech_t)
dev_getattr_loop_control(polaris_admin_tech_t)

# infra/memaudit/memaudit uses dmesg
dmesg_domtrans(polaris_admin_tech_t)
gen_require(
    type dmesg_t;
)
polaris_confcli_unix_stream_stdio_use(dmesg_t)

# infra/memaudit/memaudit uses mount
mount_domtrans(polaris_admin_tech_t)

# infra/memaudit/memaudit uses fdisk
fstools_domtrans(polaris_admin_tech_t)
polaris_nvram_read(polaris_admin_tech_t)
polaris_nvram_getattr(polaris_admin_tech_t)

# infra/memaudit/memaudit writes to /proc/sys/vm/drop_caches
kernel_rw_vm_sysctls(polaris_admin_tech_t)

```

```

# memaudit and smap needs 'getattr', 'search' on sysctl_irq_t:dir
kernel_read_irq_sysctls(polaris_admin_tech_t)

# du -b -s /tmp/cc /tmp/rp /tmp/fp
files_getattr_all_sockets(polaris_admin_tech_t)
files_getattr_all_pipes(polaris_admin_tech_t)

# df -Th -BM needs access to /run/netns/2
fs_getattr_nfs_files(polaris_admin_tech_t)

# ls /tmp/ufs//harddisk
# maapi --clicmd --get-io --no-hidden show configuration commit list
corecmd_exec_bin(polaris_admin_tech_t)

# bash vconfd_script_admin_tech.sh -u root -c cli executes:
# 1. map on /etc/passwd
auth_map_passwd(polaris_admin_tech_t)
# 2. hostname
hostname_exec(polaris_admin_tech_t)
# 3. journalctl
journalctl_domtrans(polaris_admin_tech_t)

# journalctl writes to /tmp/vm4-bootuplog-20200903-175223-UTC.log
# see vconfd_script_polaris_admin_tech_child.sh
gen_require(
    type journalctl_t;
)
manage_files_pattern(journalctl_t, polaris_admin_tech_tmp_t, polaris_admin_tech_tmp_t)
polaris_conf_unix_stream_stdio_use(journalctl_t)

# admin_tech reads /tmp/chassis/cpld/chasfs/board_vtype on crankshaft(sdwan)
polaris_chasfs_read(polaris_admin_tech_t)

# find -H /misc/scratch -name MEMORY_LOG_*.text
# memaudit writes to /bootflash/MEMORY_LOG_2020-07-28-01:32:11.text
# We also have 'mv -Z /bootflash/admintech /var/tech/ios'
# admin_tech watches /tmp/chassis/local/rp/chasfs/etc/ios_admintech_done
type polaris_admin_tech_data_t;
polaris_disk_type(polaris_admin_tech_data_t)
polaris_bootflash_filetrans(polaris_admin_tech_t, polaris_admin_tech_data_t, dir)
polaris_bootflash_filetrans(polaris_admin_tech_t, polaris_admin_tech_data_t, file)
polaris_admin_tech_data_manage(polaris_admin_tech_t)

# sdwan_tech_support.sh -o /var/tech/binos; work with /var/tech/ files
type polaris_admin_tech_var_t;
files_tmp_file(polaris_admin_tech_var_t)
files_var_filetrans(polaris_admin_tech_t, polaris_admin_tech_var_t, dir, "tech")

```



```

manage_files_pattern(polaris_admin_tech_t, polaris_admin_tech_var_t, polaris_admin_tech_var_t)
manage_dirs_pattern(polaris_admin_tech_t, polaris_admin_tech_var_t, polaris_admin_tech_var_t)

# vconfd_script_polaris_admin_tech.sh invokes vlog "Requested admin-tech initiated."
# vlog is implemented in viptela/Utils/vlog using logger; that needs
# - ceate/connect unix_dgram_socket of type polaris_admin_tech_t
# - read from devtmpfs of type devlog_t
# - write to sock_file of type devlog_t
# - sendto path="/run/systemd/journal/dev-log" of type unix_dgram_socket
logging_send_syslog_msg(polaris_admin_tech_t)

# maapi --cli get paginate: this performs connect to confd socket
polaris_ripc_conf_d_ipc_connect(polaris_admin_tech_t)

# reads /tmp/chassis/cpld/chasfs/board_vtype
# on c8kv cpld is at /sys/bus/platform/devices/cpld which has sysfs_t LABEL
polaris_cpld_read(polaris_admin_tech_t)

# handle various files created under /tmp
type polaris_admin_tech_tmp_t;
files_tmp_file(polaris_admin_tech_tmp_t)
files_tmp_filetrans(polaris_admin_tech_t, polaris_admin_tech_tmp_t, file)
manage_files_pattern(polaris_admin_tech_t, polaris_admin_tech_tmp_t, polaris_admin_tech_tmp_t)

# As part of admin-tech generation on cEdges, vconfd_script_polaris_admin_tech.sh
# invokes vconfd_script_polaris_admin_tech_child.sh which in turn invokes the
# script sdwan_tech_support.sh. The sdwan_tech_support.sh passes the file
# /tmp/sdwan_tech_support_command_file_out.txt to a bshell instance. The bshell
# instance does open operation on the file. So bshell needs open allow
# policy for /tmp/sdwan_tech_support_command_file_out.txt
gen_require(
    type polaris_bshell_t;
)
allow polaris_bshell_t polaris_admin_tech_tmp_t:file open;

# maapi needs this.
allow polaris_admin_tech_t self:tcp_socket { getopt setopt create connect read write };

# tar --ignore-failed-read -czf /home/vmanage-admin/vm4-20200903-055157-admin-tech.tar.gz
# /tmp/fp/trace/cpp_cp_F0-0_TAN.20041_0.20
allow polaris_admin_tech_t self:capability dac_override;

# awk /^Shared/ {v += $2} END { print v } /proc/6384/smmaps
allow polaris_admin_tech_t self:capability sys_ptrace;

# 'top -n1 -b' creates /.config dir
# TODO/LOOKATME: selinux team to review handling of this issue in a
# common way for invoking top

```

```

allow polaris_admin_tech_t root_t:dir create;

# "show installerfs" is invoked by vconfd_script_admin_tech_common.sh
# this invokes vconfd_script_show_installerfs.sh via confd
# let's execute this under install_show domain
polaris_install_show_domtrans(polaris_conf_d_t)

# create_bootflash_snapshot() performs 'ls -l /bootflash/.installer'
polaris_disk_install_read(polaris_admin_tech_t)

# vconfd_script_polaris_admin_tech_child.sh
# mv /bootflash/admintech /var/tech/ios
allow polaris_admin_tech_t self:process setfscreate;

# rm -rf $collated_ra (collated_log_*)

#Nutella-XE - Vedge image install
#/bin/sh /tmp/sw/rp/0/0/rp_security/mount/bin/sw syncddb
#mount -t vfat /dev/mmcblk0gp0p1 /gpp
mount_domtrans(polaris_conf_d_t)

#df /bootflash
fstools_domtrans(polaris_conf_d_t)

#Nutella-XE - Vedge image activate
#/usr/binos/bin/flashutil --command unsetvar --name MIG_INT_STATE
polaris_flashlib_write(polaris_conf_d_t)

# permit comm="ps" to "getattr" on dev="devtmpfs" for polaris_admin_tech_t
term_getattr_unallocated_ttys(polaris_admin_tech_t)

# permit to access polaris_proc_rmonbifo_t by
# /usr/bin/vconfd_script_admin_tech.sh
polaris_proc_rmonbifo_read(polaris_admin_tech_t)

# permit to access/unlink /bootflash by polaris_admin_tech_t
polaris_bootflash_manage(polaris_admin_tech_t)

# vconfd_script_admin_tech.sh executes 'top -n1 -b' which creates /.config dir
gen_require(
    type admin_home_t;
)
allow polaris_admin_tech_t admin_home_t:dir { add_name create write };

# vconfd_script_admin_tech.sh sources vconfd_script_cli_session.sh and calls
# start_cli_session() which writes to /tmp/vconfd/USID.XXX,
# /tmp/vconfd/THANDLE.YYY and /tmp/vconfd/start_cli.XXXXXXXXXXX
polaris_vconfd_tmp_manage(polaris_admin_tech_t)

```

```

# work with "/tmp/fp/pvp/work/inot_fifo"
polaris_pvp_stdin_read(polaris_admin_tech_t)

# work with "/tmp/fp/trace/fifo/pvp_sh%fp_0_0_22607_fifo"
polaris_use_btrace_fifo(polaris_admin_tech_t)

# access to tunnel interface from snapshot_cdb()
corenet_rw_tun_tap_dev(polaris_conf_d_t)

# access to /tmp/bootstrap/sdwan/ciscosdwan_cloud_init.cfg
init_read_script_tmp_files(polaris_conf_d_t)

# "vconfd_notifier security-clear-installed-cert" reads
# /var/run/netns/default which is symlinked to /proc/1/ns/net
polaris_cedge_reset_ns(polaris_conf_d_t)

# allow /usr/binos/conf/execute_conf_d_cli.sh to access polaris_disk_install_t
polaris_disk_install_read(polaris_conf_d_cli_t)

# vconfd script ends up cleaning core files, most likely its
# vconfd_script_polaris_admin_tech_child.sh, so it needs read/write
# permission to polaris_core_file_t files.
polaris_core_file_manage(polaris_admin_tech_t)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisconfd.te
```

No license file was found, but licenses were detected in source scan.

```

#
# OWNERS - Code Ownership
#
# For information on the purpose and format of this file see:
# https://polaris-git.cisco.com/csg/polaris/wiki/Code-Reviews
#
# Copyright (c) 2019-2021 by Cisco Systems, Inc.
# All rights reserved.
#

```

```
* @csg/polaris-selinux-dev
```

#iox team related files

```

polariscontainer*    @csg/polaris-selinux-dev @csg/iox-selinux
polariscsf*         @csg/polaris-selinux-dev @csg/iox-selinux
polarisgsdrp*       @csg/polaris-selinux-dev @csg/iox-selinux
polarisioxman*      @csg/polaris-selinux-dev @csg/iox-selinux
polarisvman*        @csg/polaris-selinux-dev @csg/iox-selinux

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/OWNERS

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#

## <summary>Polaris lm Policy Rules.</summary>
```

```
#####
```

```
## <summary>
##   Read files of type polaris_lm_tmp_t (e.g., /tmp/iosd_level)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_lm_tmp_read`,`
    gen_require(`
        type polaris_lm_tmp_t;
    `)
    read_files_pattern($1, polaris_lm_tmp_t, polaris_lm_tmp_t)
`)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarislm.if

No license file was found, but licenses were detected in source scan.

```
#
# August 2017, Shawn Lu
#
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# All rights reserved
#

## <summary>Polaris nmspd Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnmspd.if

No license file was found, but licenses were detected in source scan.

```
dnl
```

```

dnl April 2018, Victor Kamensky
dnl
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.
dnl All rights reserved
dnl
define(`polaris_database_aux',`dnl
#####
## <summary>
## Use $2 database.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <infoflow type="none"/>
#
interface(`polaris_db_tdldb_$1_use`,`
gen_require(
    type $2;
)

    polaris_tdldb_use(dollarsone, $2, $3)
)
)

define(`polaris_database',`dnl
polaris_database_aux(database_stem($1), database_label($1), $1)dnl
)

define(`polaris_database_process`,`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_database\_db\_if.m4

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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# All rights reserved
#

```

```

policy_module(polarishm, 1.0);

```

```

gen_require(
    type polaris_hm_t;
)

```

```

polaris_btrace_data_manage(polaris_hm_t)
polaris_chasfs_manage(polaris_hm_t)
polaris_tdlresolve_read(polaris_hm_t)
polaris_tdlldb_list_dirs(polaris_hm_t)
polaris_cpld_read(polaris_hm_t)
polaris_lua_read(polaris_hm_t)
polaris_flashlib_read(polaris_hm_t)

polaris_ripc_sman_ui_serv_connect(polaris_hm_t)

polaris_db_tdlldb_dir_use(polaris_hm_t)

files_getattr_all_files(polaris_hm_t)
files_getattr_all_dirs(polaris_hm_t)
gen_require(
    attribute non_security_file_type;
)
allow polaris_hm_t { non_security_file_type }:dir list_dir_perms;

# hman need to read proc for all processes to collect CPU
# utilization information
domain_read_all_domains_state(polaris_hm_t)
domain_signull_all_domains(polaris_hm_t)

kernel_read_system_state(polaris_hm_t)

# hman needs to run "df /dev/shm" command
corecmd_exec_bin(polaris_hm_t)
corecmd_exec_shell(polaris_hm_t)

# hman needs to operate on all maroon files
polaris_maroon_data_manage_all(polaris_hm_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_hm_t)

fs_getattr_tmpfs(polaris_hm_t)

# work with /tmp files (/tmp/myhostname)
type polaris_hm_tmp_t;
files_tmp_file(polaris_hm_tmp_t)
manage_files_pattern(polaris_hm_t, tmp_t, polaris_hm_tmp_t)
files_tmp_filetrans(polaris_hm_t, polaris_hm_tmp_t, file, "myhostname")

allow polaris_hm_t self:capability { chown fsetid dac_override kill sys_resource sys_ptrace };
allow polaris_hm_t self:process setsched;
allow polaris_hm_t self:unix_dgram_socket create;

```

```

allow polaris_hm_t self:cap_userns { kill sys_ptrace };

polaris_boot_tmp_read(polaris_hm_t)

# Allow write to flash. Needed for usb disable feature
ifdef(`ngwc_family',`
polaris_flashlib_write(polaris_hm_t)
')

# "show platform software mount RP active" command needs attributes of
# all file systems
fs_getattr_all_fs(polaris_hm_t)
# above show command accesses /var/run/netns/2
fs_read_nsfs_files(polaris_hm_t)
# reads /scratch link which is labeled as polaris_disk_bootflash_t
polaris_disk_bootflash_read_lnk(polaris_hm_t)
polaris_disk_harddisk_read_lnk(polaris_hm_t)

# needed for "show platform software bound-uds RP active"
kernel_read_network_state(polaris_hm_t)

# "show rom-monitor R0" needs content of /proc/rmonbifo/bootver;
# please refer to hman_ui.tpp file
polaris_proc_rmonbifo_read(polaris_hm_t)

# "show plat soft yang-management process r0" invokes hm_show_yang_proc_cb;
# "show plat soft iox-service" invokes hm_iox_srvc_show_cb;
# They invoke "ps -C" which needs access to /sys/devices/system/cpu/online
# TODO: should we replace system() with something like hm_get_procs_with_name_running
dev_read_sysfs(polaris_hm_t)
# "show platform software yang-management process state" invokes /bin/mcp_pkg_wrap,
# which sources /tmp/sw/boot/rmonbifo/env_var.sh
polaris_rmonbifo_tmp_read(polaris_hm_t)
# show iox-service requires reading of libvirt_ver of created under CAF context
optional_policy(`
polaris_caf_tmp_files_read(polaris_hm_t)
')
# hardcoded policy for hm to df, per Victor
optional_policy(`
gen_require(`
type polaris_iosd_portal_dmi_lipc_t;
type polaris_iosd_portal_app_lipc_t;
')
allow polaris_hm_t { polaris_iosd_portal_dmi_lipc_t polaris_iosd_portal_app_lipc_t }:sock_file getattr;
')

# during "show version installed" command
# "grep -q srdriver /tmp/sw/rp/local/0/rp_base/iso" which is link to the universal image

```

```

polaris_bootflash_read(polaris_hm_t)
# this is for calcscha.sh (invoked by the command above) but might work for others too
polaris_install_engine_domtrans(polaris_hm_t)
# this if for hman to read and delete /tmp/version.info created by calcscha.sh in prev context type
polaris_install_tmp_read(polaris_hm_t)
gen_require(
    type polaris_install_tmp_t;
)
allow polaris_hm_t polaris_install_tmp_t:file unlink;

# need open, read on /bootflash/packages.conf (grep sha1sum: /tmp/packages.conf)
polaris_read_packages_conf(polaris_hm_t)

# This is created for hman to grant it access to /bootflash/topnmemuse
polaris_bootflash_manage(polaris_hm_t)

# read /tmp/pkg_summary.txt file
polaris_pkg_summary_tmp_read(polaris_hm_t)

polaris_zram_getattr(polaris_hm_t)

optional_policy(
polaris_ssd_auth_domtrans(polaris_hm_t)
)

optional_policy(
polaris_ssd_unmount_domtrans(polaris_hm_t)
)

optional_policy(
polaris_confd_domtrans(polaris_hm_t)
)

#####
# show platform software process slot R0 monitor
# mcp_monitor_process_batchmode.sh
# /bin/sh /usr/binos/conf/bexec.sh -c /usr/binos/conf/mcp_monitor_process_batchmode.sh -n 1 -d 3 -l 0
#####

polaris_utility_domain_template(monitor_process)

polaris_bexecute_domtrans(polaris_hm_t)
polaris_bexecute_domain(polaris_monitor_process_t, polaris_monitor_process_exec_t)

# mcp_monitor_process_batchmode.sh calls "top" command
# "top" needs read/getattr access of various files in the system
domain_read_all_domains_state(polaris_monitor_process_t)

```



```

# "top" needs access to /sys/devices/system/cpu/online, etc
dev_read_sysfs(polaris_monitor_process_t)

# "top" need read access to /proc/meminfo, /proc/stat
kernel_read_system_state(polaris_monitor_process_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_monitor_process_t)

# need write/ioctl/getattr access for pipes like "pipe:[118396]"
polaris_hman_use_fifo(polaris_monitor_process_t)

corecmd_exec_bin(polaris_monitor_process_t)

gen_require(
    type admin_home_t;
)
#top -b -n3 -d3 needs permission to create dir /.config ,write
#to files and add files
allow polaris_monitor_process_t admin_home_t:dir { add_name create write };
allow polaris_monitor_process_t self:capability sys_ptrace;
#####

#####
# pkg_summary.sh : show version R0 installed
# /bin/bash /usr/binos/conf/pkg_summary.sh -o /tmp/pkg_summary.txt -d model -P
#####

polaris_utility_domain_template(pkg_summary)

polaris_pkg_summary_domtrans(polaris_hm_t)

# it executes find /tmp/sw -maxdepth 5 -mindepth 5 -name mount
files_getattr_all_dirs(polaris_pkg_summary_t)
files_getattr_all_files(polaris_pkg_summary_t)
files_read_all_dirs_except(polaris_pkg_summary_t)

polaris_chasfs_read(polaris_pkg_summary_t)
polaris_cpld_read(polaris_pkg_summary_t)
polaris_use_btrace_fifo(polaris_pkg_summary_t)
polaris_rmonbifo_tmp_read(polaris_pkg_summary_t)
polaris_btrace_data_manage(polaris_pkg_summary_t)
polaris_boot_tmp_read(polaris_pkg_summary_t)

# need open, read on /bootflash/debug.conf
polaris_read_debug_conf(polaris_pkg_summary_t)

polaris_read_packages_conf(polaris_pkg_summary_t)

```

```

allow polaris_pkg_summary_t self:capability sys_resource;

corecmd_exec_bin(polaris_pkg_summary_t)

auth_use_nsswitch(polaris_pkg_summary_t)

polaris_disk_crashinfo_getattr(polaris_pkg_summary_t)

# read /proc/cmdline
kernel_read_system_state(polaris_pkg_summary_t)

# handle /tmp/pkg_summary.txt file
type polaris_pkg_summary_tmp_t;
files_tmp_file(polaris_pkg_summary_tmp_t)
files_tmp_filetrans(polaris_pkg_summary_t, polaris_pkg_summary_tmp_t, file)
manage_files_pattern(polaris_pkg_summary_t, polaris_pkg_summary_tmp_t, polaris_pkg_summary_tmp_t)

#####

#####
# pkg_to_tree.sh : Generates a software tree based on a provisioning file.
# /bin/bash /usr/binos/conf/pkg_to_tree.sh -c /tmp/packages.conf
# -t /tmp/show_patch_provision_temp -p /tmp/sw/isos
# -r /tmp/show_provision_temp -a -q
#####

polaris_utility_domain_template(pkg_to_tree)

gen_require(
    type unconfined_service_t;
)
polaris_pkg_to_tree_domtrans({unconfined_service_t polaris_hm_t})

files_getattr_all_files(polaris_pkg_to_tree_t)
polaris_harddisk_read(polaris_pkg_to_tree_t)
polaris_cpld_read(polaris_pkg_to_tree_t)
polaris_use_btrace_fifo(polaris_pkg_to_tree_t)
polaris_rmonbifo_tmp_read(polaris_pkg_to_tree_t)
polaris_btrace_data_manage(polaris_pkg_to_tree_t)
polaris_boot_tmp_read(polaris_pkg_to_tree_t)
polaris_patch_data_manage(polaris_pkg_to_tree_t)

# if being executed on other node, telnet /dev/ptsN might be used
# as stdin/stdout
telnet_use_ptys(polaris_pkg_to_tree_t)

# pkg_to_tree.sh creates/deletes directories and files under

```

```

# /tmp/show_provision_temp
type polaris_show_provision_tmp_t;
files_tmp_file(polaris_show_provision_tmp_t)
polaris_show_provision_temp_manage(polaris_pkg_to_tree_t)

# pkg_to_tree.sh verifies each package as it is mounted
polaris_code_verify_domtrans(polaris_pkg_to_tree_t)

corecmd_exec_bin(polaris_pkg_to_tree_t)

polaris_disk_crashinfo_getattr(polaris_pkg_to_tree_t)

# manage the /tmp/lf symbolic link
type polaris_pkg_to_tree_tmp_t;
files_tmp_file(polaris_pkg_to_tree_tmp_t)
files_tmp_filetrans(polaris_pkg_to_tree_t, polaris_pkg_to_tree_tmp_t, lnk_file, "lf")
manage_lnk_files_pattern(polaris_pkg_to_tree_t, polaris_pkg_to_tree_tmp_t, polaris_pkg_to_tree_tmp_t)

# permit pkg_to_tree.sh mounting to use conf/pkg files in bootflash
polaris_bootflash_read(polaris_pkg_to_tree_t)
polaris_disk_bootflash_search(polaris_pkg_to_tree_t)

# we want to read the existing mounts in chasfs
polaris_chasfs_read(polaris_pkg_to_tree_t)

# pkg_to_tree.sh interfaces with installer data, including ISSU files
polaris_install_tmp_log_write(polaris_pkg_to_tree_t)
polaris_sw_data_manage(polaris_pkg_to_tree_t)
polaris_read_packages_conf(polaris_pkg_to_tree_t)
polaris_issu_tmp_files_manage(polaris_pkg_to_tree_t)
polaris_install_tmp_manage(polaris_pkg_to_tree_t)

# allow pkg_to_tree.sh to do the loopback mounts of packages and manage
# mount links in tmp. This includes mapping mounted passwd file and
# mounting sysfs. This is also needed to mount /mnt/sd3/iox_alt_hdd.dsk
mount_domtrans(polaris_pkg_to_tree_t)
auth_map_passwd(polaris_pkg_to_tree_t)
dev_list_sysfs(polaris_pkg_to_tree_t)
allow polaris_pkg_to_tree_t sysfs_t:file { getattr open read };
allow polaris_pkg_to_tree_t tmp_t:lnk_file { create rename unlink };

# when expanding/installing super images, pkg_to_tree uses install_engine_exec_t
# utilities like issu_check
polaris_install_engine_domtrans(polaris_pkg_to_tree_t)

#####
# misc hman cli(s)
#####

```

```

# hman needs access to /bootflash/.issu_loc_lock
polaris_issu_files_manage(polaris_hm_t)

# hman process creates/deletes directories and files under
# /tmp/show_provision_temp
polaris_show_provision_temp_manage(polaris_hm_t)

# signal send during show platform software process slot R0 monitor
polaris_send_signal_to_bexecute(polaris_hm_t)

polaris_dyncfg_tmp_read(polaris_hm_t)

polaris_disk_crashinfo_getattr(polaris_hm_t)

# setting up /dev/ttyS0 speed from hman_handle_console_baud_rate_change
term_use_unallocated_ttys(polaris_hm_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_hm_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_hm_t)

# hman starts agetty-iosd.service in case of nyquist stack
getty_systemctl(polaris_hm_t)

# This block is policies for "sh pla so filesystem bootflash: de" CLI
polaris_utility_domain_template(cli_fs_cmds)

gen_require(
    type polaris_bexecute_t;
)
polaris_bexecute_domtrans(polaris_cli_fs_cmds_t)
polaris_cli_fs_cmds_domtrans(polaris_bexecute_t)
telnet_use_ptys(polaris_cli_fs_cmds_t)

# Blanket permission for disk management for cli_fs_cmds (for show/erase fs)
polaris_persistent_manage(polaris_cli_fs_cmds_t)
# permission to manage removable ( seems pretty safe )
polaris_removable_manage(polaris_cli_fs_cmds_t)
polaris_getattr_removable(polaris_cli_fs_cmds_t)
fs_read_removable_symlinks(polaris_cli_fs_cmds_t)
# btrace.sh needs these
polaris_boot_tmp_read(polaris_cli_fs_cmds_t)
polaris_btrace_tmppub_read(polaris_cli_fs_cmds_t)
# this is for NFS access mounted in a dir of ncd context
optional_policy(

```

```

    polaris_ncd_tmp_read(polaris_cli_fs_cmds_t)
)

#need to access pipes like pipe:[107820]
polaris_hman_use_fifo(polaris_cli_fs_cmds_t)

# df or stat the mount point
fs_getattr_nfs(polaris_cli_fs_cmds_t)
# mkfs permissions via domtrans
fstools_domtrans(polaris_cli_fs_cmds_t)
# runs NFS exportfs ( copied from ncd )
rpc_read_exports(polaris_cli_fs_cmds_t)
rpc_write_exports(polaris_cli_fs_cmds_t)
rpc_manage_nfs_state_data_dir(polaris_cli_fs_cmds_t)
rpc_manage_nfs_state_data(polaris_cli_fs_cmds_t)
fs_rw_nfsd_fs(polaris_cli_fs_cmds_t)
kernel_rw_rpc_sysctls(polaris_cli_fs_cmds_t)
fs_getattr_xattr_fs(polaris_cli_fs_cmds_t)
# rsync/remote_format perms ( rsync borrowed from polariscrft.te )
polaris_udev_tmp_list_dirs(polaris_cli_fs_cmds_t)
gen_require(`
    type rsync_exec_t;
    type rsync_port_t;
    type rsync_tmp_t;
)
allow polaris_cli_fs_cmds_t rsync_port_t:tcp_socket name_connect;
allow polaris_cli_fs_cmds_t rsync_exec_t:file { execute execute_no_trans getattr map open read };

allow polaris_cli_fs_cmds_t rsync_tmp_t:file open;

allow polaris_cli_fs_cmds_t self:capability { chown fsetid setgid };

# Need to access /proc/self/fd/1 by platform_fs_operation.sh which is invoked by
# /bin/bash/usr/binos/conf/mcp_cli_fs_cmds.sh show bootflash:all
fs_associate_proc(polaris_cli_fs_cmds_t)

polaris_cli_fs_cmds_domtrans(polaris_hm_t)

corecmd_exec_bin(polaris_cli_fs_cmds_t)
polaris_cpld_read(polaris_cli_fs_cmds_t)
polaris_chasfs_manage(polaris_cli_fs_cmds_t)
polaris_use_btrace_fifo(polaris_cli_fs_cmds_t)
polaris_rmonbifo_tmp_read(polaris_cli_fs_cmds_t)

auth_use_nsswitch(polaris_cli_fs_cmds_t)

# allow polaris_cli_fs_cmds_t polaris_udev_tmp_files_t:file open;
polaris_udev_tmp_read(polaris_cli_fs_cmds_t)

```

```

#watch on modify /tmp/udev/etc/udev/usbflash1-2/udev-info for remote/stby usb device
polaris_udev_tmp_watch(polaris_cli_fs_cmds_t)

# allow to run mount in its own domain
mount_domtrans(polaris_cli_fs_cmds_t)
# runs systemctl to remount file system.
# usb[01] fs_target remount service used.
systemd_exec_systemctl(polaris_cli_fs_cmds_t)
systemd_config_generic_services(polaris_cli_fs_cmds_t)

# allow to run readlink -f /dev/bootflash1
storage_getattr_fixed_disk_dev(polaris_cli_fs_cmds_t)

# allow "format" CLI to add/delete links in /dev/, and /; e.g., /dev/harddisk1 /harddisk
ifdef(`crankshaft_family',`
    gen_require(`
        type device_t;
        type root_t;
        type udev_t;
    ')
    #/dev/harddisk1 /dev/harddisk1 -> /dev/dm-0
    filetrans_pattern({udev_t polaris_cli_fs_cmds_t}, device_t, fixed_disk_device_t, lnk_file, "harddisk1")
    filetrans_pattern({udev_t polaris_cli_fs_cmds_t}, device_t, fixed_disk_device_t, lnk_file, "harddisk")
    #/harddisk -> /misc/scratch
    filetrans_pattern(polaris_cli_fs_cmds_t, root_t, polaris_disk_bootflash_t, lnk_file, "harddisk")

    manage_lnk_files_pattern(polaris_cli_fs_cmds_t, fixed_disk_device_t, fixed_disk_device_t)
')
seutil_domtrans_setfiles(polaris_cli_fs_cmds_t)
polaris_hman_use_fifo(setfiles_t)
# need open, read on /bootflash/packages.conf
polaris_read_packages_conf(polaris_cli_fs_cmds_t)

# "sed" needs access to /proc/cmdline
kernel_read_system_state(polaris_cli_fs_cmds_t)

# work with /tmp files (/tmp/fs_lock_bootflash)
type polaris_cli_fs_cmds_tmp_t;
gen_require(`
    type tmp_t;
')
files_tmp_file(polaris_cli_fs_cmds_tmp_t)
manage_files_pattern(polaris_cli_fs_cmds_t, tmp_t, polaris_cli_fs_cmds_tmp_t)
files_tmp_filetrans(polaris_cli_fs_cmds_t, polaris_cli_fs_cmds_tmp_t, file)

#"find /vol/disk0/caf" when show CLI is excuted
polaris_caf_tmp_files_read(polaris_cli_fs_cmds_t)

```

```

#Caf and IOxMan-CLI interaction
polaris_caf_tmp_files_manage(polaris_cli_fs_cmds_t)

# mcp_cli_fs_cmds.sh show webui: all runs df -P /webui
fs_getattr_tmpfs(polaris_cli_fs_cmds_t)

polaris_persistent_getattr(polaris_cli_fs_cmds_t)
fs_getattr_xattr_fs(polaris_cli_fs_cmds_t)
allow polaris_cli_fs_cmds_t self:capability dac_override;
allow polaris_cli_fs_cmds_t self:dir { add_name write };

# allow caf access to mcp_cli_fs_cmds.sh for fsck on ngwc platforms
ifdef(`ngwc_family',`
domain_read_all_domains_state(polaris_cli_fs_cmds_t)
polaris_caf_domtrans(polaris_cli_fs_cmds_t)
polaris_caf_files_read(polaris_cli_fs_cmds_t)
dev_read_sysfs(polaris_cli_fs_cmds_t)
')

#####
# fsck CLI using mcp_cli_fs_cmds.sh as tested on sparrow
#####
# allow fsck in mcp_cli_fs_cmds.sh to execute udev in the udev domain
udev_domtrans(polaris_cli_fs_cmds_t)
# allow crypsetup to be executed
lvm_domtrans(polaris_cli_fs_cmds_t)
# allow fsck to run on bootflash
polaris_nvram_getattr(polaris_cli_fs_cmds_t)

# during SDWAN admin-tech generation, fs_display_*() in mcp_cli_fs_cmds.sh is
# invoked; this tries to find files like /bootflash/tracelogs/cia-netcon* with
# LABEL polaris_confd_var_log_t
polaris_confd_var_log_read(polaris_cli_fs_cmds_t)
#####
# hm calls df to figure out tmpfs size, on some platforms
# where configfs is mounted it needs statfs access to it
gen_require(`
    type configfs_t;
')
allow polaris_hm_t configfs_t:dir getattr;

# hm populates vrf_shm on behalf of iosd, and may create
# and delete vrf-based netns
polaris_vrf_netns_manage(polaris_hm_t)
fs_unmount_nsfs(polaris_hm_t)

#read udev_info
polaris_udev_tmp_read(polaris_hm_t)

```

```

gen_require(
    type rsync_t;
)
allow rsync_t polaris_hm_t:fifo_file read;

#####
# show platform software yang-management process monitor
# mcp_monitor_dmi_proc.sh
# /bin/bash /bin/mcp_pkg_wrap rp_daemons /usr/binos/conf/mcp_monitor_dmi_proc.sh
#####

polaris_utility_domain_template(monitor_dmi_process)

polaris_bexecute_domain(polaris_monitor_dmi_process_t, polaris_monitor_dmi_process_exec_t)

# mcp_monitor_dmi_proc.sh calls "ps" command
# "ps" needs read/getattr access of various files in the system
# ps -eo comm,pid,s,vsize,rssize,%cpu,%mem,etime --sort=comm
domain_read_all_domains_state(polaris_monitor_dmi_process_t)

# "ps" needs access to /proc/uptime
kernel_read_system_state(polaris_monitor_dmi_process_t)

# "ps" needs access to /sys/devices/system/cpu/online, etc
dev_read_sysfs(polaris_monitor_dmi_process_t)

# "ps" need read access to /proc
kernel_list_proc(polaris_monitor_dmi_process_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_monitor_dmi_process_t)

# executes head command
corecmd_exec_bin(polaris_monitor_dmi_process_t)

# sources cyan_api.sh
files_exec_usr_files(polaris_monitor_dmi_process_t)

# /bin/bash /tmp/sw/rp/0/0/rp_daemons/mount/usr/binos/conf/mcp_monitor_dmi_proc.sh
corecmd_shell_entry_type(polaris_monitor_dmi_process_t)

# need write/ioctl/getattr access for pipes like "pipe:[79843]"
polaris_hman_use_fifo(polaris_monitor_dmi_process_t)

# read /etc/init.d/quad_sup_usb_infra.sh
init_read_script_files(polaris_cli_fs_cmds_t)
#This triggers access to /tmp/.flashlock and /dev/sda3

```



```

polaris_flashlib_lock(polaris_cli_fs_cmds_t)
#allow flash utility
polaris_flashlib_read(polaris_cli_fs_cmds_t)
# /sys/bus/usb/drivers/usb/*/authorized is accessed (read and write) from hman.
# For USB disable feature across all ngwc platforms needs authorized file to
# be accessed.
#ifdef(^ngwc_family',`
gen_require(`
type sysfs_t;
`)
allow polaris_hm_t sysfs_t:file create;
dev_rw_sysfs(polaris_hm_t)
dev_manage_sysfs_dirs(polaris_hm_t)
`)

# work with /tmp files (/tmp/usb-disable)
polaris_iosd_usb_disable_tmp_manage(polaris_hm_t)

#need access to tmp files created under issu directory
polaris_issu_tmp_files_read(polaris_hm_t)

# HMMAN calls for checking database compactability
# tdlldb_epoch_test is requires access to /tmp/issu/provision/sw-running.txt
polaris_install_tmp_read(polaris_hm_t)

optional_policy(`
  polaris_efi_files_list_dirs(polaris_cli_fs_cmds_t)
`)

# Execute hdparam in its own domain
fstools_domtrans(polaris_hm_t)

# Allow polaris_hm to get attributes of fixed disk
storage_getattr_fixed_disk_dev(polaris_hm_t)

# Allow read to ssd auth tmp files /tmp/ssd_blk_device
polaris_read_ssd_tmp_files(polaris_hm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarishm.te
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#
# March 2017, Victor Kamensky
#
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#

```

```
## <summary>Polaris ngwc_tbl_mgr Policy Rules.</summary>
```

```
Found in path(s):
```

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngwctblmgr.if
```

```
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```

```
#
```

```
# September 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris polarisbtman Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Execute fs tools in the btrace_rotate domain.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed to transition.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_btrace_rotate_domtrans`,`
```

```
gen_require(`
```

```
type polaris_btman_t, polaris_btman_exec_t;
```

```
`)
```

```
corecmd_search_bin($1)
```

```
domtrans_pattern($1, polaris_btman_exec_t, polaris_btman_t)
```

```
`)
```

```
#####
```

```
## <summary>
```

```
## Read /tmp/tmppub files/dirs
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_btrace_tmppub_read`,`
```

```
gen_require(`
```

```
type polaris_btrace_tmppub_t;
```

```

    ')

    read_files_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
    read_lnk_files_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
    list_dirs_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
')

#####
## <summary>
##   Manage /tmp/tmpub files/dirs
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_btrace_tmppub_manage`,`
    gen_require(`
        type polaris_btrace_tmppub_t;
    `)

    manage_files_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
    manage_dirs_pattern($1, polaris_btrace_tmppub_t, polaris_btrace_tmppub_t)
')

#####
## <summary>
## Read and write all btman's fifo file, used as
##   standard input/output.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_use_btman_fifo`,`
    gen_require(`
        type polaris_btman_t;
    `)

    allow $1 polaris_btman_t:fifo_file { rw_term_perms lock append create unlink };
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtman.if

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```
#
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#
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#

## <summary>Polaris webui Policy Rules.</summary>

#####
## <summary>
##   Read files under /webui/..., these are webui odm file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_read_webui_files`,`
    gen_require(`
        type polaris_webui_file_t;
    `)

    read_files_pattern($1, polaris_webui_file_t , polaris_webui_file_t)
    read_lnk_files_pattern($1, polaris_webui_file_t, polaris_webui_file_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswebui.if

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```
#
# March 2017, Victor Kamensky
#
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#

/tmp/fp/tlddb(/.*)?          gen_context(system_u:object_r:polaris_tlddb_t,s0)
/tmp/rp/tlddb(/.*)?         gen_context(system_u:object_r:polaris_tlddb_t,s0)
/tmp/cc/tlddb(/.*)?         gen_context(system_u:object_r:polaris_tlddb_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristlddb.fc

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```
#
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#
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#

## <summary>Polaris NVRAM Policy Rules.</summary>

#####
# Polaris lsmpi
#####

#####
## <summary>
##   Work (read, write, ioctl) with /dev/lsmpi device.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_lsmpi_dev_use`,`
gen_require(`
    type device_t;
    type polaris_lsmpi_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_lsmpi_device_t)
    read_chr_files_pattern($1, device_t, polaris_lsmpi_device_t)
    allow $1 polaris_lsmpi_device_t:chr_file map;
`)

#####
## <summary>
##   Read lsmpi sysctl file, ie one under /proc/sys/lsmpi and
## /proc/sys/lsmpi_lodrv directories.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
```

```

interface(`polaris_lsmpi_sysctl_read`,`
gen_require(
    type polaris_sysctl_lsmpi_t;
)
    read_files_pattern($1, polaris_sysctl_lsmpi_t, polaris_sysctl_lsmpi_t)
)

#####
## <summary>
##   Read from /sys/devices/virtual/contdev sysfs files.
## sys files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_contdev_dev_read`,`
gen_require(
    type polaris_sysfs_contdev_t;
    type sysfs_t;
)
    read_files_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
    list_dirs_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
    # genfscon statement specifically excludes symbolic links from
    # genfscon path specific entries. To workaround, let us allow
    # to follow sysfs_t symbolic links
    allow $1 sysfs_t:lnk_file read;
)

#####
## <summary>
##   Write into /sys/devices/virtual/contdev sysfs files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_contdev_dev_write`,`
gen_require(
    type polaris_sysfs_contdev_t;
    type sysfs_t;
)
    write_files_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
    # genfscon statement specifically excludes symbolic links from

```

```

    # genfscon path specific entries. To workaround, let us allow
    # to follow sysfs_t symbolic links
    allow $1 sysfs_t:lnk_file read;
)

#####
## <summary>
##   Manage /sys/devices/virtual/contdev sysfs files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_manage_contdev_dev`,`
gen_require(`
    type polaris_sysfs_contdev_t;
        type sysfs_t;
)
    manage_files_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
    manage_dirs_pattern($1, polaris_sysfs_contdev_t, polaris_sysfs_contdev_t)
    # genfscon statement specifically excludes symbolic links from
    # genfscon path specific entries. To workaround, let us allow
    # to follow sysfs_t symbolic links
    allow $1 sysfs_t:lnk_file read;
)

#####

## <summary>
##   Allow the specified domain to manage punt/inject socket
##   files. I.e /tmp/pi/dp_2_iosd_pi and /tmp/pi/iosd_2_dp_pi
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pi_uds_manage`,`
    gen_require(`
        type polaris_pi_uds_t;
    )

    manage_sock_files_pattern($1, polaris_pi_uds_t, polaris_pi_uds_t)
)

```

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisismpi.if

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#

# March 2017, Victor Kamensky

#

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#

/usr/binos/conf/issu\_stack.sh -- gen\_context(system\_u:object\_r:polaris\_issu\_stack\_exec\_t,s0)

/tmp/issu\_stk(/.\*)? gen\_context(system\_u:object\_r:polaris\_issu\_stack\_tmp\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisissustack.fc

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#

# August 2017, Shawn Lu

#

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#

# polarisnmspd file contexts place holder

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#

# Aug 2020, Sridhar C

#

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#

policy\_module(polarisxcopy, 1.0);

#####

## xcopy\_script.sh

#####

polaris\_utility\_domain\_template(xcopy\_script)

polaris\_bexecute\_domain(polaris\_xcopy\_script\_t, polaris\_xcopy\_script\_exec\_t)

# xcopy\_script.sh call other scripts through brelay.sh

polaris\_bexecute\_domtrans(polaris\_xcopy\_script\_t)



```

polaris_chasfs_manage(polaris_xcopy_script_t)

# xcopy calls curl/sshpas/scp command and support scp/http/https
gen_require(
    type polaris_curl_t;
    type ssh_exec_t;
    type ssh_home_t;
    type devpts_t;
)
polaris_curl_domtrans(polaris_xcopy_script_t)
corenet_tcp_connect_ssh_port(polaris_curl_t)
corenet_tcp_connect_http_port(polaris_curl_t)
corenet_tcp_connect_ssh_port(polaris_xcopy_script_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_xcopy_script_t)

# read polaris vrf net namespace file
fs_read_nsfs_files(polaris_xcopy_script_t)

# curl needs access to bootflash
polaris_bootflash_manage(polaris_curl_t)
polaris_bootflash_manage(polaris_xcopy_script_t)

# also need to be able to ls /tmp/ufs/ on ngwc
optional_policy(
    polaris_ncd_tmp_read(polaris_xcopy_script_t)
)

# Execute
corecmd_exec_bin(polaris_xcopy_script_t)

#uses kernel utilities like pidof, stat
domain_read_all_domains_state(polaris_xcopy_script_t)
kernel_list_proc(polaris_xcopy_script_t)

# read /proc/cmdline
kernel_read_system_state(polaris_xcopy_script_t)
fs_getattr_tmpfs(polaris_xcopy_script_t)
fs_getattr_xattr_fs(polaris_xcopy_script_t)

# xcopy started from the smand and needs fifo
polaris_smand_use_fifo(polaris_xcopy_script_t)

# ping to check reachability
netutils_domtrans_ping(polaris_xcopy_script_t)
#

```

```

# calls mcp_chvrf.sh for ping and curl
polaris_chvrf_domtrans(polaris_xcopy_script_t)

# xcopy uses ps to find the curl process state
# "ps" needs read access to /sys/devices/system/cpu/online
# "ps" needs read access to /proc/uptime
dev_read_sysfs(polaris_xcopy_script_t)

# Started by bexecute so it has its stdin set to telnet pty file
telnet_use_ptys(polaris_xcopy_script_t)

# stdout is set to fifo set by rotte to capture output into btrace
# btrace also need these policies :)
# btrace_init also refer to /tmp/sw/boot/..
polaris_use_btrace_fifo(polaris_xcopy_script_t)
polaris_cpld_read(polaris_xcopy_script_t)
polaris_boot_tmp_read(polaris_xcopy_script_t)

# Allow /tmp/xcopy/
type polaris_xcopy_tmp_t;
files_tmp_file(polaris_xcopy_tmp_t)
files_tmp_filetrans(polaris_xcopy_script_t, polaris_xcopy_tmp_t, { dir file })
polaris_xcopy_tmp_manage(polaris_xcopy_script_t)

# Curl writes the progress...
polaris_xcopy_tmp_manage(polaris_curl_t)

# PS command access ttyS1
term_getattr_unallocated_ttys(polaris_xcopy_script_t)

# sshpass/scp
ssh_getattr_user_home_dir(polaris_xcopy_script_t)

# sshpass uses the ptmx
term_use_ptmx(polaris_xcopy_script_t)
term_getattr_pty_fs(polaris_xcopy_script_t)

# scp uses ssh
#allow polaris_xcopy_script_t ssh_exec_t:file { execute execute_no_trans map open read };
ssh_exec(polaris_xcopy_script_t)

allow polaris_xcopy_script_t self:capability { sys_resource fsetid };
allow polaris_xcopy_script_t self:process setfscreate;
allow polaris_xcopy_script_t ssh_home_t:dir { create search };
allow polaris_xcopy_script_t devpts_t:chr_file { getattr open read setattr write };

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisxcopy.te

```

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```
#
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#
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#

## <summary>Polaris dmi_ncsshd_fwd Policy Rules.</summary>

#####
## <summary>
##   Connect to and send messages to dmi_ncsshd_bp
## tmp/.ncsshd_bp.sock unix datagram sockets.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dmi_ncsshd_fwd_dgram_send`,`
    gen_require(`
        type polaris_dmi_ncsshd_log_t;
        type polaris_dmi_ncsshd_fwd_t;
    `)

    allow $1 self:unix_stream_socket {create_socket_perms};
    allow $1 polaris_dmi_ncsshd_fwd_t:unix_stream_socket {connectto};
    write_sock_files_pattern($1, polaris_dmi_ncsshd_log_t,polaris_dmi_ncsshd_log_t)
)`

#####
## <summary>
##   Write into fifo file created by dmi_ncsshd_fwd, typical case when
##   hman starts script under popen.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_dmi_ncsshd_fwd_use_fifo`,`
    gen_require(`
        type polaris_dmi_ncsshd_fwd_t;
    `)
```

```
)  
  
write_fifo_files_pattern($1, polaris_dmi_ncsshd_fwd_t, polaris_dmi_ncsshd_fwd_t)  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmincshdfwd.if  
No license file was found, but licenses were detected in source scan.
```

```
dnl  
dnl April 2018, Victor Kamensky  
dnl  
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.  
dnl All rights reserved  
dnl  
define(`polaris_database_aux',`dnl  
/tmp/rp/tdlodb/[0-9]/$2 -- gen_context(system_u:object_r:$1,s0)  
/tmp/fp/tdlodb/[0-9]/$2 -- gen_context(system_u:object_r:$1,s0)  
/tmp/cc/tdlodb/[0-9]/$2 -- gen_context(system_u:object_r:$1,s0)  
/tmp/rp/tdlodb/[0-9]/$2.lock -- gen_context(system_u:object_r:$1,s0)  
/tmp/fp/tdlodb/[0-9]/$2.lock -- gen_context(system_u:object_r:$1,s0)  
/tmp/cc/tdlodb/[0-9]/$2.lock -- gen_context(system_u:object_r:$1,s0)  
)  
  
define(`polaris_database',`dnl  
polaris_database_aux(database_label($1), $1)  
)  
  
define(`polaris_database_process',`')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_database_db_fc.m4  
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```

```
#  
# June 2017, Victor Kamensky  
#  
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#  
  
## <summary>Polaris ioxman Policy Rules.</summary>  
  
#####  
## <summary>  
##   Manage ioxman temporary files and directories in /tmp.  
## Like /tmp/ios_xml.dat.  
## </summary>
```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_manage_tmp_files`,`
    gen_require(`
        type polaris_iox_tmp_t;
    `)

    manage_files_pattern($1, polaris_iox_tmp_t, polaris_iox_tmp_t)
    files_tmp_filetrans($1, polaris_iox_tmp_t, file, "iox_xml.dat")
    files_tmp_filetrans($1, polaris_iox_tmp_t, file, "iox_override.conf")
    # /tmp/trace/resource.log can be created by ioxman/vman/caf
    # through sourcing in the family of the pvsm_*.sh scripts
    files_tmp_filetrans($1, polaris_iox_tmp_t, file, "resource.log")
)

```

```

#####
## <summary>
##   Read ioxman temporary files and directories in /tmp.
##   Like /tmp/iox_xml.dat and /tmp/iox_override.conf
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_iox_read_tmp_files`,`
    gen_require(`
        type polaris_iox_tmp_t;
    `)

    read_files_pattern($1, polaris_iox_tmp_t, polaris_iox_tmp_t)
)

```

```

#####
## <summary>
##   Make the specified domain able to work with iosd2iox files
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_iox2iosd_tmp_manage',`
    gen_require(`
        type polaris_iox2iosd_tmp_t;
    `)

    manage_dirs_pattern($1, polaris_iox2iosd_tmp_t, polaris_iox2iosd_tmp_t)
    manage_files_pattern($1, polaris_iox2iosd_tmp_t, polaris_iox2iosd_tmp_t)
)

```

```
#####
```

```

## <summary>
##   Read ioxman executable file. Used by caf to read iosman
## version.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_ioxman_exec_read',`
    gen_require(`
        type polaris_ioxman_exec_t;
        type bin_t;
    `)

    read_files_pattern($1, bin_t, polaris_ioxman_exec_t)
)

```

```
#####
```

```

## <summary>
##   Allow the specified domain to get show_version information
## from ioxman executable
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_ioxman_show_version',`
    gen_require(`
        type polaris_ioxman_exec_t;
    `)

    polaris_show_version($1, polaris_ioxman_exec_t)
)

```

```
#####
```

```

## <summary>
##   Allow the specified domain to get show_version information
## from dockerd and other container_runtime_t executables
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_container_runtime_show_version`,`
    gen_require(`
        type container_runtime_exec_t;
    `)
    polaris_show_version($1, container_runtime_exec_t)
`)

#####
## <summary>
##   Execute a domain transition to run cat9k_ssd_auth_cmds.sh
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_ssd_auth_domtrans`,`
    gen_require(`
        type polaris_ssd_auth_t, polaris_ssd_auth_exec_t;
    `)

    domtrans_pattern($1, polaris_ssd_auth_exec_t, polaris_ssd_auth_t)
`)

#####
## <summary>
##   Read ssd files in /tmp/ssd_blk_device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_read_ssd_tmp_files`,`
    gen_require(`
        type polaris_ssd_auth_tmp_t;

```

```
)  
  
read_files_pattern($1, polaris_ssd_auth_tmp_t, polaris_ssd_auth_tmp_t)  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisioxman.if  
No license file was found, but licenses were detected in source scan.
```

```
#  
# Nov 2020, Swati Kumaro  
#  
# Copyright (c) 2020 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
/dev/blzi_fpga -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_ts_1pps -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_gps_1pps -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_lol_1pps -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_ts_interest_0 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_ts_interest_1 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_ts_interest_2 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_ts_interest_3 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_ts_interest_4 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)  
/dev/blzi_ts_interest_5 -c gen_context(system_u:object_r:polaris_blzi_device_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisptdrp.fc  
No license file was found, but licenses were detected in source scan.
```

```
#  
# January 2021, Gabriel Lee, Shawn Liu  
#  
# Copyright (c) 2021 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
policy_module(polarisezmanage, 1.0);
```

```
type polaris_ezmanage_file_t;  
files_type(polaris_ezmanage_file_t)  
polaris_pfile_type(polaris_ezmanage_file_t)
```

```
polaris_process_domain_template(ezmanage)
```

```
# Allow ezManage script to be executed by systemd  
gen_require(`
```



```

    type unconfined_service_t;
)

polaris_ezmanage_domtrans(unconfined_service_t)

# Allow ezManage file and directory access
polaris_manage_ezmanage_files(polaris_ezmanage_t)

# Allow ezManage socket access
allow polaris_ezmanage_t self:unix_dgram_socket { connected_socket_perms sendto };

# Allow read of /etc/passwd
auth_use_nsswitch(polaris_ezmanage_t)

# ezManage python script needs access to USB ttys for modem AT channel
term_use_usb_ttys(polaris_ezmanage_t)

# ezManage python script needs /usr/bin/python3 execution and may also call other generic system bin utilities
corecmd_exec_bin(polaris_ezmanage_t)

# ezManage needs to access /bootflash/ciscosdwan.cfg and a variably named tar file in /bootflash/modem_firmware
polaris_bootflash_filetrans(polaris_ezmanage_t, polaris_ezmanage_file_t, file, "ciscosdwan.cfg")
polaris_bootflash_filetrans(polaris_ezmanage_t, polaris_ezmanage_file_t, file, "modem_firmware.tar.gz")

# ezManage socket file is created in /var/run
type polaris_ezmanage_var_run_t;
files_pid_file(polaris_ezmanage_var_run_t)
files_pid_filetrans(polaris_ezmanage_t, polaris_ezmanage_var_run_t, sock_file, "cwan_ezmanage_py_server")

# Allow ezManage to access its socket file in /var/run
polaris_manage_ezmanage_var_run_files(polaris_ezmanage_t)

# Allow ezManage to access ngiolite socket file in /var/run
gen_require(
    type polaris_cwan_svr_var_run_t;
)
rw_sock_files_pattern(polaris_ezmanage_t, polaris_cwan_svr_var_run_t, polaris_cwan_svr_var_run_t)

# Allow ezManage to access ngiolite dgram_socket
gen_require(
    type polaris_ngiolite_t;
)
allow polaris_ezmanage_t polaris_ngiolite_t:unix_dgram_socket sendto;

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisezmanage.te

No license file was found, but licenses were detected in source scan.

```

#
# March 2017, Victor Kamensky
#
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# All rights reserved
#

## <summary>Polaris dbm Policy Rules.</summary>

#####
## <summary>
##   Setup /bootflash/.dbpersist directory and content.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_tldbpersist_setup`,`
    gen_require(`
        type polaris_disk_bootflash_t;
        type polaris_disk_dbm_t;
    `)
    filetrans_pattern($1, polaris_disk_bootflash_t, polaris_disk_dbm_t, dir, ".dbpersist")
    # allow creation of /bootflash/.dbpersist directory
    manage_dirs_pattern($1, polaris_disk_bootflash_t, polaris_disk_dbm_t)
    # dbm can manage files inside of its own polaris_disk_dbm_t directories
    manage_files_pattern($1, polaris_disk_dbm_t, polaris_disk_dbm_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdbm.if

No license file was found, but licenses were detected in source scan.

```

#
# May 2017, Victor Kamensky
#
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#

```

# polarismdtpubd file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismdtpubd.fc

No license file was found, but licenses were detected in source scan.

```

#
# February 2020, Victor Kamensky
#
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# All rights reserved
#

policy_module(polaristtm, 1.0);

gen_require(
    type polaris_ttm_t;
)
polaris_chasfs_read(polaris_ttm_t)
polaris_cpld_read(polaris_ttm_t)

logging_send_syslog_msg(polaris_ttm_t)

# vconfd_load_shared_schemas
polaris_confid_shared_schema_read(polaris_ttm_t)

# /var/run/.ttmd socket and pid
type polaris_ttm_var_run_t;
files_pid_file(polaris_ttm_var_run_t)
manage_files_pattern(polaris_ttm_t, polaris_ttm_var_run_t, polaris_ttm_var_run_t)
manage_sock_files_pattern(polaris_ttm_t, polaris_ttm_var_run_t, polaris_ttm_var_run_t)
files_pid_filetrans(polaris_ttm_t, polaris_ttm_var_run_t, { file sock_file })

# allow /usr/binos/bin/ttmd to acces polaris_tdlresolve_t and
#
#           polaris_global_service_t
polaris_tdlresolve_manage(polaris_ttm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristtm.te
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#
# February 2020, Victor Kamensky
#
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# All rights reserved
#

policy_module(polarissdaveproxy, 1.0);

gen_require(
    type polaris_sdave_proxy_t;
)

```

```

# btrace_application_start
polaris_chasfs_read(polaris_sdavc_proxy_t)
polaris_tdlresolve_read(polaris_sdavc_proxy_t)
polaris_cpld_read(polaris_sdavc_proxy_t)

# Allow SDAVC exports using UDP socket.
allow polaris_sdavc_proxy_t self:udp_socket create_socket_perms;

# Change namespace to allow network communication with vManage
(process_namespace_network_change_internal - opens /var/run/netns/*)
polaris_cedge_set_ns(polaris_sdavc_proxy_t)

# Reset the namespace back to default (process_namespace_network_default opens /proc/1/ns/net)
polaris_cedge_reset_ns(polaris_sdavc_proxy_t)

type polaris_sdavc_proxy_files_t;
files_type(polaris_sdavc_proxy_files_t)
polaris_pfile_type( polaris_sdavc_proxy_files_t)

# Create /bootflash/sdavc directory, Write, Read & Removed files (For SDAVC imports)
polaris_bootflash_filetrans(polaris_sdavc_proxy_t, polaris_sdavc_proxy_files_t, dir, "sdavc")
polaris_bootflash_filetrans(polaris_iosd_t, polaris_sdavc_proxy_files_t, dir, "sdavc")
polaris_sdavc_proxy_manage(polaris_sdavc_proxy_t)

# IOSd process also should have access to /bootflash/sdavc directory
gen_require(
    type polaris_iosd_t;
)
polaris_sdavc_proxy_manage(polaris_iosd_t)

# Allow SDAVC imports (HTTP GET, PUT) we use /usr/bin/curl executable.
# Exe: curl -f -s --connect-time 10 -o /bootflash/sdavc/.... -w%{http_code} http://<user>:<pw>@<vManage system
ip>:<port>
# Run CURL in its domain so it wont have all sdavcproxy permissions.

gen_require(
    type polaris_curl_t;
)
polaris_curl_domtrans(polaris_sdavc_proxy_t)
corenet_tcp_connect_generic_port(polaris_curl_t)

# cURL process also should have access to /bootflash/sdavc directory
polaris_sdavc_proxy_manage(polaris_curl_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissdavcproxy.te

```

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```
#  
# Sep 2020, Sridhar C  
#  
# Copyright (c) 2020 by Cisco Systems, Inc.  
# All rights reserved  
#  
  
/usr/binos/conf/xcopy_script.sh -- gen_context(system_u:object_r:polaris_xcopy_script_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisxcopy.fc  
No license file was found, but licenses were detected in source scan.
```

```
dnl  
dnl April 2018, Victor Kamensky  
dnl  
dnl Copyright (c) 2018-2019 by Cisco Systems, Inc.  
dnl All rights reserved  
dnl  
divert(-1)
```

```
include(`polaris_process.m4')  
dnl Stub out plaris process  
define(`polaris_process',`')
```

```
dnl Stub out mqipc  
define(`polaris_mqipc_service_server',`')  
define(`polaris_mqipc_service_client',`')  
define(`polaris_mqipc_service_server_elastic_client',`')
```

```
dnl Stub out lipc  
define(`polaris_lipc_service_server',`')  
define(`polaris_lipc_service_client',`')
```

```
include(`polaris_ipc_ripc.m4')  
include(`polaris_ipc_base_ripc_te.m4')
```

```
dnl Stub out non existent one  
define(`polaris_websocket_service_server',`')  
define(`polaris_cipc_service_server',`')
```

```
include(`polaris_max_scope.m4')
```

```
divert(0)dnl  
#  
# This is a generated file! Instead of modifying this file,
```

```

# modify proper platform TDL file.
#

policy_module(autopolarisplatformipcbase, 1.0);

gen_require(`
    attribute port_type;
    attribute defined_port_type;
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_base_te.m4
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisdroputil, 1.0);

polaris_process_domain_template(droputil)

corecmd_exec_bin(polaris_droputil_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_droputil_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_droputil_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_droputil_t)

# work with /tmp files
type polaris_droputil_tmp_t;
files_tmp_file(polaris_droputil_tmp_t)
manage_dirs_pattern(polaris_droputil_t, tmp_t, polaris_droputil_tmp_t)
manage_files_pattern(polaris_droputil_t, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
manage_fifo_files_pattern(polaris_droputil_t, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
manage_lnk_files_pattern(polaris_droputil_t, polaris_droputil_tmp_t, polaris_droputil_tmp_t)
files_tmp_filetrans(polaris_droputil_t, polaris_droputil_tmp_t, { file dir })

# on some platform /tmp/rp/dropbox is created by binos service
# that runs under initrc_t
gen_require(`

```

```

        type initrc_t;
    )
files_tmp_filetrans(initrc_t, polaris_droputil_tmp_t, dir, "dropbox")

allow polaris_droputil_t self:capability { sys_resource dac_override };
allow polaris_droputil_t self:process setpgid;

polaris_btrace_data_manage(polaris_droputil_t)
polaris_cpld_read(polaris_droputil_t)
polaris_chasfs_manage(polaris_droputil_t)
polaris_boot_tmp_read(polaris_droputil_t)
polaris_read_debug_conf(polaris_droputil_t)
polaris_disk_crashinfo_getattr(polaris_droputil_t)
polaris_rmonbifo_tmp_read(polaris_droputil_t)

# runs systemctl start reflector.service
systemd_exec_systemctl(polaris_droputil_t)

# PLEASE LOOK AT ME need to have separate label for reflector.service
# allow only to start if, do it once copy of reflector.service is fixed
systemd_config_generic_services(polaris_droputil_t)

# droputil.sh delets /tmp/rp/droputil/so-del-stage/rp/0
fs_getattr_tmpfs(polaris_droputil_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdroputil.te
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisofa, 1.0);

gen_require(^
    type polaris_ofa_t;
)

polaris_btrace_data_manage(polaris_ofa_t)
polaris_crft_data_manage(polaris_ofa_t)
polaris_chasfs_manage(polaris_ofa_t)
polaris_tdlresolve_read(polaris_ofa_t)
polaris_tdlldb_list_dirs(polaris_ofa_t)
polaris_cpld_read(polaris_ofa_t)

```

```
polaris_flashlib_read(polaris_ofa_t)
```

```
allow polaris_ofa_t self:capability sys_admin;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisofa.te
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
# Copyright (c) 2016-2021 by Cisco Systems, Inc.
```

```
# All rights reserved
```

```
#
```

```
# /bootflash labels
```

```
/bootflash(/.*)? gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
```

```
/bootflash/.ssh(/.*)? gen_context(system_u:object_r:ssh_home_t,s0)
```

```
/bootflash/.ssh/ssh_host.*_key\pub gen_context(system_u:object_r:sshd_key_t,s0)
```

```
/bootflash/.ssh/ssh_host.*_key gen_context(system_u:object_r:sshd_key_t,s0)
```

```
/bootflash/tracelogs(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)
```

```
/bootflash/tan(/.*)? gen_context(system_u:object_r:polaris_btrace_data_t,s0)
```

```
/bootflash/core(/.*)? gen_context(system_u:object_r:polaris_core_file_t,s0)
```

```
/bootflash/debug.conf gen_context(system_u:object_r:polaris_debug_conf_t,s0)
```

```
/bootflash/packages.conf gen_context(system_u:object_r:polaris_packages_conf_t,s0)
```

```
# /objstore
```

```
/objstore(/.*)? gen_context(system_u:object_r:polaris_disk_objstore_t,s0)
```

```
/dev/shm/sem\objstore_sem gen_context(system_u:object_r:polaris_objstore_sem_t,s0)
```

```
# hanet driver used by vpcgw platform of VXE family
```

```
ifdef(^vpcgw_platform',`
```

```
/dev/hanet -c gen_context(system_u:object_r:polaris_hanet_device_t,s0)
```

```
`)
```

```
# /csl_p_0
```

```
/csl_p_0(/.*)? gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
```

```
# /csl_p_1.context
```

```
/csl_p_1(/.*)? gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
```

```
# /csl_s_0.context
```

```
/csl_s_0(/.*)? gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
```

```
# /csl_s_1.context
```

```
/csl_s_1(/.*)? gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)
```

```
# /varied
```



```

/varied(/.*)?          gen_context(system_u:object_r:polaris_disk_varied_t,s0)
/varied/install_info   gen_context(system_u:object_r:polaris_vxeinstall_info_t,s0)
/varied/obfl_.*        gen_context(system_u:object_r:polaris_obfl_data_t,s0)
/varied/grub_cisco_version  gen_context(system_u:object_r:polaris_grubver_t,s0)
/varied/grub(/.*)?     gen_context(system_u:object_r:boot_t,s0)
/varied/grub2(/.*)?    gen_context(system_u:object_r:polaris_grub_bios_t,s0)
/varied/vcpu_template.txt  gen_context(system_u:object_r:polaris_iosd_vcpu_t,s0)

/sbin/grub*           gen_context(system_u:object_r:bootloader_exec_t,s0)

# /grubenv
/bootefi(/.*)?       gen_context(system_u:object_r:polaris_grub_efi_t, s0)

# from /lib/tmpfiles.d/binos-vxe.conf
/lic0 -l              gen_context(system_u:object_r:polaris_disk_csl_p_t,s0)
/lic1 -l              gen_context(system_u:object_r:polaris_disk_csl_s_t,s0)

# umbrella_ini.sh executable label
/usr/binos/conf/umbrella_init.sh -- gen_context(system_u:object_r:polaris_umbrella_init_exec_t,s0)

#
# On ultra_us /cpld_util.sh creates /tmp/chassis. Put this script into the initexec_t domain so
# chasfs transitions properly.
#
/cpld_util.sh         gen_context(system_u:object_r:initrc_exec_t,s0)

# /config labels
/config(/.*)?         gen_context(system_u:object_r:polaris_disk_config_t,s0)
/config/.ssh(/.*)?    gen_context(system_u:object_r:ssh_home_t,s0)
/config/.ssh/ssh_host.*_key\pub gen_context(system_u:object_r:sshd_key_t,s0)
/config/.ssh/ssh_host.*_key gen_context(system_u:object_r:sshd_key_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvxe.fc
No license file was found, but licenses were detected in source scan.

#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisboot, 1.0);

#####
# /tmp/sw/boot policy
#####

```

```

type polaris_boot_tmp_t;
files_tmp_file(polaris_boot_tmp_t)
gen_require(
    attribute domain;
)
files_tmp_filetrans(domain, polaris_boot_tmp_t, dir, "boot")
# /tmp/sw/isos
files_tmp_filetrans(domain, polaris_boot_tmp_t, dir, "isos")

# dmesg command is executed in its own domain and result is store
# into /tmp/sw/boot/dmesg file
gen_require(
    type dmesg_t;
)
polaris_boot_tmp_write(dmesg_t)

# /tmp/reload_reason copied from /bootflash/.prst_sync/reload_info
files_tmp_filetrans(domain, polaris_boot_tmp_t, file, "reload_reason")

# /tmp/bootup_timestamp created by /etc/init.d/binos
gen_require(
    type initrc_t;
    type init_t;
)
files_tmp_filetrans({ initrc_t init_t }, polaris_boot_tmp_t, file, "bootup_timestamp")

type polaris_boot_file_t;
files_type(polaris_boot_file_t)
polaris_pfile_type(polaris_boot_file_t)
gen_require(
    type polaris_disk_bootflash_t;
)
filetrans_pattern(domain, polaris_disk_bootflash_t, polaris_boot_file_t, file, "reload_info")
filetrans_pattern(domain, polaris_disk_bootflash_t, polaris_boot_file_t, file, "stack_reload_info")

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboot.te

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```

#
# February 2020, Victor Kamensky
#
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#

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscfgmgr.fc

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscxp.fc
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiportsfetch.fc
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisftm.fc
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdbgd.fc
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisfpm.fc
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisvdaemon.fc
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristtm.fc
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisomp.fc
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisinstallmgr.fc
No license file was found, but licenses were detected in source scan.

```

```

#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2021 by Cisco Systems, Inc.
# All rights reserved
#

```

```

## <summary>Polaris Common Policy Rules.</summary>

```

```

#####
# Polaris common
#####

```

```

#####
## <summary>
##   Create a domain for long running Polaris processes in
##   confined mode.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="entry_point">
## <summary>
##   Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#

```

```

interface(`polaris_process_domain_confined`,`
    gen_require(`
        type unconfined_service_t;
    `)
    init_daemon_domain($1, $2)

```

```

# polaris process now started by pman, which still runs
# under unconfined label

```

```

type_transition unconfined_service_t $2:process $1;
allow unconfined_service_t $1:process transition;
allow $1 unconfined_service_t:process sigchld;

polaris_pman_entry($1, $2)

gen_require(`
    attribute polaris_domain;
    attribute polaris_exec_domain;
    attribute polaris_extended_domain;
`)
typeattribute $1 polaris_domain, polaris_extended_domain;
typeattribute $2 polaris_exec_domain;

# allow all process to check whether kernel ksm is enabled
polaris_ksm_run_check($1
)

#####
## <summary>
##   Create a domain for long running Polaris processes. Note
##   depending on policy build setting it could be confined or
##   not confined
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="entry_point">
## <summary>
##   Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#
interface(`polaris_process_domain`,`

# the default is to confine all domains
polaris_process_domain_confined($1, $2)

#
# if the domain is in the permissive map, then set it to be confined
# permissive. if the domain is in the confined map, then there really
# isnt much else to do but leave it confined. if the domain isnt in
# the permissive or confined maps then determine if the domain should
# be unconfined.
#
ifelse(permissive_domain($1), $1, `polaris_permissive_domain_setup($1)',

```

```

        confined_domain($1), $1, `',
                `polaris_domain_maybe_unconfined($1)')
    ')

#####
## <summary>
##   Create a domain for utility Polaris processes in
##   confined mode.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="entry_point">
## <summary>
##   Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#
interface(`polaris_utility_domain_confined',`
    domain_type($1)
    domain_entry_file($1, $2)
    role system_r types $1;

    gen_require(`
        attribute polaris_domain;
        attribute polaris_exec_domain;
        attribute polaris_extended_domain;
    ')
    typeattribute $1 polaris_domain, polaris_extended_domain;
    typeattribute $2 polaris_exec_domain;

    # allow all process to check whether kernel ksm is enabled
    polaris_ksm_run_check($1)
')

#####
## <summary>
##   Create a domain for utility Polaris processes. Note
##   depending on policy build setting it could be confined or
##   not confined
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>

```

```

## <param name="entry_point">
## <summary>
## Type of the program to be used as an entry point to this domain.
## </summary>
## </param>
#
interface(`polaris_utility_domain`,`

    # the default is to confine all domains
    polaris_utility_domain_confined($1, $2)

    #
    # if the domain is in the permissive map, then set it to be confined
    # permissive. if the domain is in the confined map, then there really
    # isnt much else to do but leave it confined. if the domain isnt in
    # the permissive or confined maps then determine if the domain should
    # be unconfined.
    #
    ifelse(permissive_domain($1), $1, `polaris_permissive_domain_setup($1)',
           confined_domain($1), $1, `',
           `polaris_domain_maybe_unconfined($1)')
)

#####
## <summary>
## Creates types and rules for a basic
## polaris process domain.
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_t
## </summary>
## </param>
#
template(`polaris_process_domain_template`,`
    type polaris_$1_t;
    type polaris_$1_exec_t;

    polaris_process_domain(polaris_$1_t, polaris_$1_exec_t)
    ifdef(polaris_permissive,`
        permissive polaris_$1_t;
    `)
)

polaris_btrace_data_client_template($1)
polaris_maroon_data_client_template($1)
polaris_crft_data_client_template($1)
polaris_process_proc_kpageflags_template($1)
polaris_process_uswap_access(polaris_$1_t, $1, "$1")

```

```

)

#####
## <summary>
## Creates types and rules for a basic
## polaris process domain.
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_t
## </summary>
## </param>
#
template(`polaris_utility_domain_template`,`
    type polaris_${1}_t;
    type polaris_${1}_exec_t;

    polaris_utility_domain(polaris_${1}_t, polaris_${1}_exec_t)
    ifdef(polaris_permissive,`
        permissive polaris_${1}_t;
    `)
)

    polaris_btrace_data_client_template($1)
    polaris_maroon_data_client_template($1)
    polaris_crft_data_client_template($1)
    polaris_process_proc_kpageflags_template($1)
)

#####
## <summary>
## Allow the specified domain to execute polaris domain
## process in the caller domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_exec`,`
    gen_require(`
        attribute polaris_exec_domain;
    `)

    can_exec($1, polaris_exec_domain)
)

```

```
#####
## <summary>
##   Allow the specified domain to read polaris domain
##   executable file. I.e to get information from executables
##   like binary trace info, trace key etc
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_read_exec_domain`,`
    gen_require(`
        attribute polaris_exec_domain;
        type bin_t;
    `)

    read_files_pattern($1, bin_t, polaris_exec_domain)
`)
```

```
#####
## <summary>
##   Allow the specified domain to receive signals from any
##   polaris process.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_receive_signal_from_domain`,`
    gen_require(`
        attribute polaris_domain;
    `)

    allow polaris_domain $1:process signal_perms;
`)
```

```
#####
## <summary>
##   Systemd-tmpfiles utility creates an object
##   in the tmp directories, with a private type using a type
##   transition.
##   Note rules to create files and directories which are
##   performed by systemd-tmpfiles reside in /lib/tmpfiles.d/
##   directory. And polaris specific rules are in binos.conf file.
```



```

## Note systemd-tmpfiles utility would use label from file_contexts
## to restore proper label. I.e the same effect could be achieved by
## placing proper .fc expression.
## </summary>
## <param name="private type">
## <summary>
## The type of the object to be created.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_systemd_tmpfiles_tmp_filetrans`,`
    gen_require(`
        type systemd_tmpfiles_t;
    `)
    files_tmp_filetrans(systemd_tmpfiles_t, $1, $2, $3)
`)

#####
## <summary>
## socketat through get_netns_fd function call access
## /proc/pid/ns/net file
##
## Implementation notes:
##
## wants to read /proc/pid/ns/net but gets denial because our 3.10 kernel
## does not support nsfs yet, so /proc/pid/ns/net is marked as proc_t instead
## of be nsfs_t. For now allow read access to proc_t through
## kernel_system_state_reader attribute. Try to drop it in latter kernels
## type=AVC msg=audit(1479574148.450:70): avc: denied { open } for pid=27619 comm="smd"
## path="net:[4026531957]" dev="proc" ino=4026531957 scontext=system_u:system_r:polaris_smd_t:s0
## tcontext=system_u:object_r:proc_t:s0 tclass=file
## in 4.4 /proc/pid/ns/net inode is under nsfs_t, polaris_smd_t needs to
## open, getattr, and read from it
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>

```

```

## </param>
#
interface(`polaris_socketat_nsfs_read`,`
    kernel_read_system_state($1)
    fs_read_nsfs_files($1)
    gen_require(`
        type ifconfig_var_run_t;
    `)
    list_dirs_pattern($1, ifconfig_var_run_t, ifconfig_var_run_t)
`)

```

```
#####
```

```

## <summary>
## All namespace related operation to switch name space
## is covered under this macro.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_namespace_set_netns_with_etc`,`
    files_mounon_isid($1)
    files_mounon_rootfs($1)
    dev_mount_sysfs_fs($1)
    dev_unmount_sysfs_fs($1)
    sysnet_read_config($1)
    sysnet_write_config($1)
    sysnet_manage_config_dirs($1)
    files_rw_etc_files($1)
    allow $1 net_conf_t:file mounon;
    allow $1 etc_t:file mounon;
    allow $1 self:capability sys_chroot;
`)

```

```
#####
```

```

## <summary>
## process can execute libeiutil build_config_directory function
##
## Implementation notes:
## build_config_directory function from mgmt/libeiutil/src/eiutil.c
## calls glibc nftw function, which effectively walks whole file tree
## and execute given call back. While function is executed it needs
## access to all files and directories attributes also it wants to
## search all directories. But we will not grant search access to
## security_file_type, instead we will dontaudit those. Anyway no
## relevant config file should be under security_file_type directory.

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_libeiutil_build_config_directory`,`
    files_getattr_all_files($1)
    files_getattr_all_dirs($1)
    files_read_all_symlinks($1)

    files_list_non_security($1)
    files_dontaudit_list_security_dirs($1)
`)

#####
## <summary>
##   Allow the specified domain to read write from i2c device.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_i2c_use`,`
    gen_require(`
        type device_t;
        type polaris_i2c_device_t;
    `)

    rw_chr_files_pattern($1, device_t, polaris_i2c_device_t)
`)

#####
## <summary>
##   Work (read, write, ioctl) with /dev/remap_mem0
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_remap_mem_dev_use`,`
    gen_require(`
        type device_t;

```

```

type polaris_remap_mem_device_t;
)
write_chr_files_pattern($1, device_t, polaris_remap_mem_device_t)
read_chr_files_pattern($1, device_t, polaris_remap_mem_device_t)
allow $1 polaris_remap_mem_device_t:chr_file map;
)

```

```
#####
```

```

## <summary>
## Allow the specified domain to read firmware files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_firmware_read`,`
gen_require(`
type polaris_firmware_t;
`)

read_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
# /firmware/* are link files, allow to follow symbolic link
allow $1 polaris_firmware_t:lnk_file read;
allow $1 polaris_firmware_t:dir read;
)

```

```
#####
```

```

## <summary>
## Allow the specified domain to manage firmware files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_firmware_manage`,`
gen_require(`
type polaris_firmware_t;
`)

manage_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
manage_lnk_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
manage_dirs_pattern($1, polaris_firmware_t, polaris_firmware_t)
)

```

```
#####
## <summary>
##   Allow the specified domain to getattr of firmware files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_firmware_getattr`,`
    gen_require(`
        type polaris_firmware_t;
    `)

    getattr_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
)

#####
## <summary>
##   Allow the specified domain to map of firmware files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_firmware_map`,`
    gen_require(`
        type polaris_firmware_t;
    `)

    read_files_pattern($1, polaris_firmware_t, polaris_firmware_t)
    allow $1 polaris_firmware_t:file map;
)

#####
## <summary>
##   Allow the specified domain to write relocations into text segment, deals
## with icc broken relocations.
##
## LOOK AT ME:
## Basically it deals with denials like this:
## type=AVC msg=audit(1475815369.598:3): avc: denied { execmod } for pid=4929 comm="cman_fp"
## path="/tmp/sw/mount/csr1000v-mono-universalk9.2016-10-
## 06_20.15_kamensky.SSA.pkg/usr/cpp/lib64/libcpp_client_ha_oor.so" dev="loop0" ino=7683
## scontext=system_u:system_r:unconfined_service_t:s0 tcontext=system_u:object_r:lib_t:s0 tclass=file
```

```

## It happens because icc generates code with relocations in text segment and
## run-time linker is dealing with it by doing mprotect(WRITE), relocatings,
## mprotect(NO WRITE). Remove once icc compiled is fixed
##
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_icc_broken_relocations`,`
    gen_require(`
        type lib_t;
    `)

    allow $1 lib_t:file execmod;
)

#####
## <summary>
##   Allow the specified domain to work with /dev/mem
##
## LOOK AT ME!!! LOOK AT ME!!! Missing driver: application works
## with /dev/mem directy
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_dev_mem_use`,`
    dev_read_raw_memory($1)
    dev_write_raw_memory($1)
    allow $1 self:capability sys_rawio;
    gen_require(`
        type memory_device_t;
    `)
    allow $1 memory_device_t:chr_file map;
)

#####
## <summary>
##   Append to /tmp/etc file. First usage to update xinetd.conf
## files.
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_etc_append`,`
gen_require(`
type polaris_etc_t;
`)
append_files_pattern($1, polaris_etc_t, polaris_etc_t)
`)

```

```
#####
```

```

## <summary>
## Search /tmp/etc directory
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_etc_search`,`
gen_require(`
type polaris_etc_t;
`)
search_dirs_pattern($1, polaris_etc_t, polaris_etc_t)
`)

```

```
#####
```

```

## <summary>
## List the contents of /etc directories.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_etc_list`,`
gen_require(`
type polaris_etc_t;
`)

allow $1 polaris_etc_t:dir list_dir_perms;
`)

```

```
#####
```

```

## <summary>
## Allow domain to attach to TUN devices created by ifconfig_t subject.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`ifconfig_attach_tun_iface`,`
gen_require(`
type ifconfig_t;
`)

allow $1 ifconfig_t:tun_socket relabelfrom;
allow $1 self:tun_socket relabelto;
`)

```

```

#####
## <summary>
##   Perms used by pidof
##   binos/infra/systemd/scripts/errmsg.sh, might needs /dev/ttyS0
##   access.
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`pidof_use`,`
# FIXME or fix labeling
# /sys/devices/system/cpu/online should be labeled cpu_online_t
# but for some reason this did not happen, grant perms for both
dev_read_sysfs($1)
dev_read_cpu_online($1)
# /proc scan
domain_read_all_domains_state($1)
kernel_list_proc($1)
`)

```

```

#####
## <summary>
##   Script can execute errmsg function from
##   binos/infra/systemd/scripts/errmsg.sh, might needs /dev/ttyS0
##   access.
## </summary>

```



```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_script_errmsg_use`,`
    # send to syslog (journal), iosd outputs to console if up
    logging_send_syslog_msg($1)
    # check if iosd is up and find its pid and if ttyS0 is opened
    pidof_use($1)
    # if FDs dont have ttyS0 it sends to console itself
    term_use_unallocated_ttys($1)
`)

#####
## <summary>
## Allow the specified domain to read ebf (explicit
## bindind) files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ebf_map`,`
    gen_require(`
        type polaris_ebf_t;
    `)

    read_files_pattern($1, polaris_ebf_t, polaris_ebf_t)
    allow $1 polaris_ebf_t:file map;
`)

#####
## <summary>
## Allow the specified domain to execute show_version command
## for given executable label
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="subject_exec">
## <summary>

```

```

## Domain of executable that version can be checked
## </summary>
## </param>
#
interface(`polaris_show_version',`
    read_files_pattern($1, $2, $2)
    allow $1 $2:file map;
`)

```

```
#####
```

```

## <summary>
## Configure the polaris domain as permissive
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_permissive_domain_setup',`
    gen_require(`
        type $1;
    `)

```

```

    permissive $1;

```

```

`)

```

```
#####
```

```

## <summary>
## Creates types and rules for process access to uswap feature.
## Ability to create file/folder under /bootflash/.USWAP/"FRU", and
## map file.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="stem">
## <summary>
## Stem for the object label. Name is constructed as
## polaris_"stem"_uswap_files_t. It should be the short
## form of the process name.
## E.g., for IOSd polaris_iosd_uswap_files_t.

```

```

## </summary>
## </param>
## <param name="name">
## <summary>
## The name of the object being created.
## Name of the folder created by the process for
## creating the uswap files.
## </summary>
## </param>
#
template(`polaris_process_uswap_access`,`
    gen_require(`
        type polaris_uswap_files_t;
    `)
    type polaris_${2}_uswap_files_t;
    files_type(polaris_${2}_uswap_files_t)
    polaris_pfile_type(polaris_${2}_uswap_files_t)

    filetrans_pattern($1, polaris_uswap_files_t, polaris_${2}_uswap_files_t, {file dir})
    manage_dirs_pattern($1, polaris_${2}_uswap_files_t, polaris_${2}_uswap_files_t)
    manage_files_pattern($1, polaris_${2}_uswap_files_t, polaris_${2}_uswap_files_t)
    manage_lnk_files_pattern($1, polaris_${2}_uswap_files_t, polaris_${2}_uswap_files_t)
    allow $1 polaris_${2}_uswap_files_t:file map;

    # allow access to pvp to clean-up the process related uswap file/folder
    gen_require(`
        type polaris_pvp_t;
    `)
    allow polaris_pvp_t polaris_${2}_uswap_files_t:dir { read remove_name rmdir write };
    allow polaris_pvp_t polaris_${2}_uswap_files_t:file unlink;
)

#####
## <summary>
## Allow process access to to access page related files such as "/proc/kpageflags"
## </summary>
## <param name="stem">
## <summary>
## Stem for the domain. Name is constructed as polaris_stem_t
## </summary>
## </param>
#
template(`polaris_process_proc_kpageflags_template`,`
    gen_require(`
        type proc_t;
    `)
    allow polaris_${1}_t proc_t:file { open read };
)

```

```
#####
## <summary>
## transition context of fman(rp/fp) created iptbl tmp files related to acl mgmt.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_fman_acl_iptbl_tmp_file`,`
    gen_require(`
        type polaris_iptbl_tmp_t;
    `)
    files_tmp_filetrans($1, polaris_iptbl_tmp_t, file, "iptbl.v4")
    files_tmp_filetrans($1, polaris_iptbl_tmp_t, file, "iptbl.v6")
    manage_files_pattern($1, polaris_iptbl_tmp_t, polaris_iptbl_tmp_t)
`)
```

```
#####
## <summary>
## Manage files/folders in /tmp/rsync_log_dir.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_manage_rsync_tmplog_dir`,`
    gen_require(`
        type polaris_rsync_tmp_t;
    `)
    manage_files_pattern($1, polaris_rsync_tmp_t, polaris_rsync_tmp_t)
    manage_dirs_pattern($1, polaris_rsync_tmp_t, polaris_rsync_tmp_t)
`)
```

```
#####
## <summary>
## Manage cerr shared memory /dev/shm/cerrno_dll.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
```

```

## </param>
#
interface(`polaris_cerr_shm_manage',`
    gen_require(`
        type tmpfs_t;
        type polaris_cerr_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_cerr_shm_t)
    allow $1 polaris_cerr_shm_t:file map;
    fs_tmpfs_filetrans($1, polaris_cerr_shm_t, file, "cernno_dll")
)

#####
## <summary>
##   Manage shared memory for vrf - /dev/shm/vrf_shm.
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vrf_shm_manage',`
    gen_require(`
        type tmpfs_t;
        type polaris_vrf_shm_t;
    `)
    fs_getattr_tmpfs($1)
    manage_files_pattern($1, tmpfs_t, polaris_vrf_shm_t)
    allow $1 polaris_vrf_shm_t:file map;
    filetrans_pattern($1, tmpfs_t, polaris_vrf_shm_t, file, "vrf_shm")
)

#####
## <summary>
##   On-demand creation of vrf-based netns using "ip netns".
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vrf_netns_manage',`
    polaris_vrf_shm_manage($1)

    kernel_rw_net_sysctls($1)

```

```

polaris_lfts_dev_use($1)

sysnet_exec_ifconfig($1)
sysnet_manage_ifconfig_run($1)
gen_require(`
    type ifconfig_var_run_t;
`)
allow $1 ifconfig_var_run_t:file { create mounton open read };
allow $1 ifconfig_var_run_t:dir mounton;

gen_require(`
    type polaris_ip_linux_port_var_t;
`)
read_files_pattern($1, var_t, polaris_ip_linux_port_var_t)
getattr_files_pattern($1, var_t, polaris_ip_linux_port_var_t)
`)

#####
## <summary>
## Allow read/write of network state directory files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
##
#
interface(`polaris_kernel_rw_network_state_files`,`
gen_require(`
type proc_net_t;
`)

rw_files_pattern($1, proc_net_t, proc_net_t)
`)
#
#####
## <summary>
## Allow the specified domain to send signals to
## Binos shell
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_send_signal_to_shell`,`

```

```

    gen_require(
        type polaris_shell_t;
    )

    allow $1 polaris_shell_t:process signal_perms;
)

#####
## <summary>
## Execute curl in the curl domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface( polaris_curl_domtrans,`
    gen_require(
        type polaris_curl_t, polaris_curl_exec_t;
    )

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_curl_exec_t, polaris_curl_t)
)

#####
## <summary>
## Manage files and directories in /tmp directory with rsync_tmp_t
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface( rsync_tmp_manage,`
    gen_require(
        type rsync_tmp_t;
    )

    manage_dirs_pattern($1, rsync_tmp_t, rsync_tmp_t)
    manage_files_pattern($1, rsync_tmp_t, rsync_tmp_t)
    manage_lnk_files_pattern($1, rsync_tmp_t, rsync_tmp_t)
    manage_fifo_files_pattern($1, rsync_tmp_t, rsync_tmp_t)
)

#####
## <summary>

```

```

## Allow the specified domain to read /tmp/ldwm_envelope file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
interface(`polaris_ldwm_envelope_read`,`
gen_require(`
type polaris_ldwm_envelope_tmp_t;
`)

read_files_pattern($1, polaris_ldwm_envelope_tmp_t, polaris_ldwm_envelope_tmp_t)
`)

#####
## <summary>
## This is copied from polarisngwc.if since other platforms may also
## read/write /sys/devices files. In addition to ngwc, tsn requires it.
## Write into /sys/devices/virtual/misc/ggpiio/gpio_out_assert sysfs files.
## or /sys/devices/platform/cpn-110-master/cpn-110-master sysfs
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
interface(`polaris_ggpiio_dev_read_write`,`
gen_require(`
type polaris_sysfs_ggpiio_t;
`)

read_files_pattern($1, polaris_sysfs_ggpiio_t, polaris_sysfs_ggpiio_t)
write_files_pattern($1, polaris_sysfs_ggpiio_t, polaris_sysfs_ggpiio_t)
`)

#####
## <summary>
## Manage files under /bootflash/certs , cert files for AP
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_wlc_ap_cert_manage`,`
gen_require(`
type polaris_ap_cert_file_t;

```



```

    )

    manage_files_pattern($1, polaris_ap_cert_file_t, polaris_ap_cert_file_t)
    manage_dirs_pattern($1, polaris_ap_cert_file_t, polaris_ap_cert_file_t)

    )

#####
## <summary>
##   Manage SERDES key directoy and files
##   SERDES library stores info in /tmp/serdes_asic_key_dir/*
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_serdes_asic_key_tmp_manage`,`
    gen_require(`
        type polaris_serdes_asic_key_tmp_t;
    `)

    files_tmp_filetrans($1, polaris_serdes_asic_key_tmp_t, { dir file}, "serdes_asic_key_dir")

    manage_dirs_pattern($1, {tmp_t polaris_serdes_asic_key_tmp_t}, polaris_serdes_asic_key_tmp_t)
    manage_files_pattern($1, polaris_serdes_asic_key_tmp_t, polaris_serdes_asic_key_tmp_t)
)

#####
## <summary>
##   Manage polaris_tech_support_tmp_t in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
interface(`polaris_tech_support_tmp_read`,`
    gen_require(`
        type polaris_tech_support_tmp_t;
    `)

    read_files_pattern($1, polaris_tech_support_tmp_t, polaris_tech_support_tmp_t)
)

#####
## <summary>

```

```

##  Getattr of any file under /proc/*/fd/*. Typically
## run by lsof.
## </summary>
## <param name="domain">
##  <summary>
##  Domain allowed access.
##  </summary>
## </param>
interface(`polaris_proc_fd_all_getattr`,`

    domain_read_all_domains_state($1)
    files_getattr_all_files($1)
    files_getattr_all_dirs($1)
    files_getattr_all_sockets($1)
    files_getattr_all_pipes($1)
    files_getattr_all_chr_files($1)
    files_getattr_all_symlinks($1)
    files_read_all_dirs_except($1)
    dev_getattr_all_chr_files($1)
    dev_getattr_all_blk_files($1)
    dev_getattr_mtrr_dev($1)

    # misc socket and fifo files got created under label of its process domain
    # and since domain labels are not in file_type attribute, need special
    # permission
    gen_require(`
        attribute domain;
    `)
    allow $1 domain:{socket socket_class_set fifo_file} getattr;
    # access sysctl_rpc_t
    kernel_read_rpc_sysctls($1)
)`

#####
## <summary>
##  Manage files and directories sysfs, This should only be used
##  if the interface needs sysfs_t create access. Otherwise please use
##  dev_rw_sysfs
## </summary>
## <param name="domain">
##  <summary>
##  Domain allowed access.
##  </summary>
## </param>
## <rolebase/>
#
interface(`polaris_sysfs_manage`,`
    gen_require(`

```

```

        type sysfs_t;
    )
    manage_files_pattern($1, sysfs_t, sysfs_t)
)

#####
## <summary>
## Check access to the init/systemd executable.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_init_access_check',`
    gen_require(`
        type init_exec_t;
    )
    init_access_check($1)
    allow $1 init_exec_t:file {open read};
    allow $1 init_exec_t:lnk_file read_lnk_file_perms;
)

#####
## <summary>
## Manage polaris_manage_rommon_info in /tmp.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
interface(`polaris_manage_rommon_info',`
    gen_require(`
        type polaris_rommon_info_tmp_t;
    )
    manage_files_pattern($1, polaris_rommon_info_tmp_t, polaris_rommon_info_tmp_t)
)

#####
## <summary>
## Allow the specified domain to manage tamlib debug file /bootflash/tamlib_dbg_log
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>

```

```

## </param>
#
interface(`polaris_tamlib_dbg_file_manage',`
    gen_require(`
        type polaris_tamlib_dbg_file_t;
    ')
    filetrans_pattern($1, polaris_disk_bootflash_t, polaris_tamlib_dbg_file_t, file, "tamlib_dbg_log")
    manage_files_pattern($1, polaris_tamlib_dbg_file_t, polaris_tamlib_dbg_file_t)
')

```

```
#####
```

```

## <summary>
##   Allow access to /dev/DDR
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_DDR_dev_use',`
    gen_require(`
        type device_t;
        type polaris_DDR_device_t;
    ')
    write_chr_files_pattern($1, device_t, polaris_DDR_device_t)
    read_chr_files_pattern($1, device_t, polaris_DDR_device_t)
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscommon.if

No license file was found, but licenses were detected in source scan.

```

#
# July 2017, Victor Kamensky
#
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# All rights reserved
#

```

```
## <summary>Polaris tams_rp Policy Rules.</summary>
```

```
#####
```

```

## <summary>
##   Allow polaris_tams_rp_t unix stream socket connect
## </summary>
## <param name="domain">
##   <summary>

```

```
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_tams_rp_socket_connect`,`
    gen_require(`
        type polaris_tams_rp_t;
    `)
    allow $1 polaris_tams_rp_t:unix_stream_socket connectto;
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristamsrp.if
No license file was found, but licenses were detected in source scan.
```

```
#
# August 2017, Shawn Lu
#
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#
```

```
# polariswncd file contexts place holder
```

```
/mnt/images(/.*)?    gen_context(system_u:object_r:polaris_wlc_ap_images_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswncd.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
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#
```

```
# /harddisk /harddisk -> /misc/scratch
```

```
/harddisk            gen_context(system_u:object_r:polaris_disk_harddisk_t,s0)
```

```
/misc/scratch        gen_context(system_u:object_r:polaris_disk_bootflash_t,s0)
```

```
/usb0                gen_context(system_u:object_r:removable_t,s0)
```

```
/usb1                gen_context(system_u:object_r:removable_t,s0)
```

```
/misc/usb0           gen_context(system_u:object_r:removable_t,s0)
```

```
/misc/usb1           gen_context(system_u:object_r:removable_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisstorage.fc
```

No license file was found, but licenses were detected in source scan.

```
#  
# July 2017, Victor Kamensky  
#  
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# All rights reserved  
#
```

```
/tmp/tam_cfg_done(/.*)? gen_context(system_u:object_r:polaris_tam_tmp_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisesgtamcfg.fc
```

No license file was found, but licenses were detected in source scan.

```
#  
# February 2020, Victor Kamensky  
#  
# Copyright (c) 2020 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
## <summary>Polaris omp Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisomp.if
```

No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
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# All rights reserved  
#
```

```
## <summary>Polaris TDLDB Policy Rules.</summary>
```

```
#####
```

```
# Polaris tdldb (infra/tdllib)
```

```
#####
```

```
#####
```

```
## <summary>
```

```
## Make specified domain as one of tdldb types.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## The domain serving as polaris_tdldb type
```

```

## </summary>
## </param>
#
interface(`polaris_tdlldb_type`,`
    gen_require(`
        attribute polaris_tdlldb;
    `)
    typeattribute $1 polaris_tdlldb;
files_type($1)
`)

#####
## <summary>
## List directories in /tmp/[rp|fp|cc]/tdlddb directories.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_tdlldb_list_dirs`,`
    gen_require(`
        type polaris_tdlldb_t;
    `)
    list_dirs_pattern($1, polaris_tdlldb_t, polaris_tdlldb_t)
`)

#####
## <summary>
## Use tdlldb database files in /tmp/[rp|fp|cc]/tdlddb
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="database_label">
## <summary>
## Database file label.
## </summary>
## </param>
## <param name="object">
## <summary>
## Database file name. Also used to derive lock file name.
## </summary>
## </param>
#

```

```

interface(`polaris_tdlldb_use`,`
gen_require(`
type polaris_tdlldb_t;
    type tmp_t;
`)
manage_dirs_pattern($1, polaris_tdlldb_t, polaris_tdlldb_t)
manage_files_pattern($1, polaris_tdlldb_t, $2)
allow $1 $2:file map;
allow $1 polaris_tdlldb_t:file lock;
type_transition $1 polaris_tdlldb_t : file $2 "$3";
type_transition $1 polaris_tdlldb_t : file $2 "$3.lock";

# manage /var/tmp/tdlddb_ene_fifo.0xYYYYYY files - it seems there is
# no way to assign separate label to them
manage_fifo_files_pattern($1, tmp_t, tmp_t)

# tdlldb_database_handle_open_internal through libuuid calls
# uuid_generate_time_generic, which needs access to udp socket
# once it reaches get_node_id function
allow $1 self:udp_socket { create ioctl };
`)

#####
## <summary>
##     Setup tdlldb database persistent files in
##         /tmp/[rp|fp|cc]/tdlddb/persist-config
## </summary>
## <param name="domain">
##     <summary>
##         Domain allowed access.
##     </summary>
## </param>
## <param name="database_label">
##     <summary>
##         Database file label.
##     </summary>
## </param>
## <param name="object">
##     <summary>
##         Database file name. Also used to derive lock file name.
##     </summary>
## </param>
#
interface(`polaris_tmp_tdlldb_persist_setup`,`
gen_require(`
type polaris_tdlldb_t;
type polaris_tdlldb_persist_t;
`)

```



```

filetrans_pattern($1, polaris_tdldb_t, polaris_tdldb_persist_t, dir, "persistent-config")
# allow creation of /tmp/rp/tdldb/persistent-config
manage_dirs_pattern($1, polaris_tdldb_t, polaris_tdldb_persist_t)
# Manage files inside of its own polaris_tdldb_persist_t directories
manage_files_pattern($1, polaris_tdldb_persist_t, polaris_tdldb_persist_t)
)

```

```
#####
```

```

## <summary>
##   Manage tdldb directories
## </summary>
## <param name="domain">
##   <summary>
##     The domain serving as polaris_tdldb type
##   </summary>
## </param>
#

```

```

interface(`polaris_tdldb_manage_dirs`,`
    gen_require(`
        type polaris_tdldb_t;
    `)
    manage_dirs_pattern($1, polaris_tdldb_t, polaris_tdldb_t)
)

```

```
#####
```

```

## <summary>
##   Use polaris_dir_db_tdldb_t database.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <infoflow type="none"/>
#

```

```

interface(`polaris_dir_db_tdldb_dir_use`,`
    gen_require(`
        type polaris_dir_db_tdldb_t;
    `)

    polaris_tdldb_use($1, polaris_dir_db_tdldb_t, DB_DIR)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristdldb.if

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```
#
```

```

# August 2017, Shawn Lu
#
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#

policy_module(polariswncd, 1.0);

gen_require(
    type polaris_wncd_t;
)

polaris_btrace_data_manage(polaris_wncd_t)
polaris_crft_data_manage(polaris_wncd_t)
polaris_chasfs_manage(polaris_wncd_t)
polaris_tdlresolve_read(polaris_wncd_t)
polaris_tdlldb_list_dirs(polaris_wncd_t)
polaris_cpld_read(polaris_wncd_t)
polaris_lua_read(polaris_wncd_t)
polaris_flashlib_read(polaris_wncd_t)

polaris_ripc_sman_ui_serv_connect(polaris_wncd_t)

polaris_db_tdlldb_dir_use(polaris_wncd_t)

#wncd need setrlimit to change limit of resource
allow polaris_wncd_t self:process setrlimit;
allow polaris_wncd_t self:capability sys_resource;

#allow tcp connection from http port
allow polaris_wncd_t self:capability net_bind_service;
corenet_tcp_bind_http_port(polaris_wncd_t)

#allow udp for dhcpd
corenet_udp_bind_dhcpd_port(polaris_wncd_t)
corenet_udp_bind_generic_node(polaris_wncd_t)
allow polaris_wncd_t self:udp_socket { create_socket_perms recv_msg send_msg };

#allow AF_PACKET
allow polaris_wncd_t self:capability net_raw;
allow polaris_wncd_t self:packet_socket { create_socket_perms recv_msg send_msg };

# required in function ewlc_capwap_dgram_srvr_state_update()
allow polaris_wncd_t self:rawip_socket { create_socket_perms setopt ioctl };

corenet_raw_bind_generic_node(polaris_wncd_t)

gen_require(

```

```

    type port_t;
)
allow polaris_wncd_t port_t:rawip_socket name_bind;

#allow to read /etc/passwd
auth_use_nsswitch(polaris_wncd_t)

#stuff related to vrf support of the socket
polaris_lfts_dev_use(polaris_wncd_t)
polaris_socketat_nsfs_read(polaris_wncd_t)

#each instance of wncd has a devshell support
corenet_tcp_bind_polaris_wncd_devshell_port(polaris_wncd_t)

# extra instances of wncd do set up cyan database for given elastic number
polaris_dyncfg_setup(polaris_wncd_t)

allow polaris_wncd_t self:capability dac_override;

# wncd does ionotify for /bootflash/apple_device_map.xml file in
# wsa_notif_register_filepath function
polaris_bootflash_read(polaris_wncd_t)
polaris_persistent_watch(polaris_wncd_t)

# manage pem certificates on /bootflash
polaris_persistent_manage(polaris_wncd_t)

# for /dev/shm/cerrno_dll
polaris_cerr_shm_manage(polaris_wncd_t)

#####
# For ewlc, wncd and wncmgrd needs access to files under /mnt/images/...these
# are related to AccessPoint images
#####

type polaris_wlc_ap_images_t;
files_type(polaris_wlc_ap_images_t)

# wncd calls ewlc_get_ap_sw_version() to open/read
#   /tmp/sw/rp/0/0/rp_wlc/mount/mnt/images/ap.pri/version.info
# call-chain: main -> ewlc_app_context_init -> wncd_evlib_app_init_cb ->
#   ewlc_capwapac_lib_init -> capwapac_init_default_config -> ewlc_get_ap_sw_version
polaris_wlc_ap_images_read(polaris_wncd_t)

polaris_odm_clnt2svr_mqipc_create(polaris_wncd_t)

# wncd works with AF_NETLINK NLMSG_APP_SIP ewlc_sip_netlink_sock_init
allow polaris_wncd_t self:netlink_socket create_socket_perms;

```

```

logging_send_syslog_msg(polaris_wncd_t)

# binds to mdns port from mdns_ipv4_socket_init function
corenet_udp_bind_mdns_port(polaris_wncd_t)

# bind CAPWAP control and data
corenet_udp_bind_polaris_capwap_ctr_port(polaris_wncd_t)
corenet_udp_bind_polaris_capwap_data_port(polaris_wncd_t)

#allow read/write/mmap access to awips file
gen_require(
type polaris_awips_signature_file_t;
)
allow polaris_wncd_t polaris_awips_signature_file_t:file { map read open getattr unlink};

# allow read / write / unlink access to /bootflash/certs
polaris_wlc_ap_cert_manage(polaris_wncd_t)

# wncd ewlc-lisp interaction module, connect to lisp map-server on port 4342
corenet_tcp_connect_lisp_cons_control_port(polaris_wncd_t)

# binds to mdns bcp port from mdns bcp function
corenet_udp_bind_mdns_bcp_port(polaris_wncd_t)

#DB persistence
polaris_tdlldbpersist_setup(polaris_wncd_t)

```

Found in path(s):

```

* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswncd.te
No license file was found, but licenses were detected in source scan.

```

```

#
# July 2018, Victor Kamensky
#
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#

## <summary>Polaris ngwc_fed_debug Policy Rules.</summary>

#####
## <summary>
##   Connect to and send messages to /tmp/idope_svr and
##   /tmp/shfwd_svr unix datagram sockets.
## </summary>
## <param name="domain">
##   <summary>

```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_fed_debug_sock_write`,
    gen_require(`
        type polaris_fed_debug_sock_t;
        type polaris_ngwc_fed_debug_mgr_t;
        type tmp_t;
    `)

    allow $1 self:unix_stream_socket {create_socket_perms};
    allow $1 polaris_ngwc_fed_debug_mgr_t:unix_stream_socket {connectto};
    write_sock_files_pattern($1, tmp_t, polaris_fed_debug_sock_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcfeddebug.if

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```

#
# March 2017, Victor Kamensky
#
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#

```

```

policy_module(polarispsd, 1.0);

```

```

gen_require(`
    type polaris_psd_t;
`)

```

```

polaris_btrace_data_manage(polaris_psd_t)
polaris_crft_data_manage(polaris_psd_t)
polaris_chasfs_manage(polaris_psd_t)
polaris_tdlresolve_read(polaris_psd_t)
polaris_tdlldb_list_dirs(polaris_psd_t)
polaris_cpld_read(polaris_psd_t)
polaris_flashlib_read(polaris_psd_t)

```

```

polaris_ripc_sman_ui_serv_connect(polaris_psd_t)

```

```

polaris_db_tdlldb_dir_use(polaris_psd_t)

```

```

# allow read of /etc/passwd
auth_use_nsswitch(polaris_psd_t)

```

```

# allow to read /proc/meminfo
kernel_read_system_state(polaris_psd_t)

# psd wants to run /usr/binos/bin/cfgwr command
corecmd_exec_bin(polaris_psd_t)
corecmd_exec_shell(polaris_psd_t)

# provide objstore access
polaris_disk_objstore_read(polaris_psd_t)

# work with /tmp files (/tmp/sh-thd-*)
type polaris_psd_tmp_t;
files_tmp_file(polaris_psd_tmp_t)
files_tmp_filetrans(polaris_psd_t, polaris_psd_tmp_t, file)
manage_files_pattern(polaris_psd_t, polaris_psd_tmp_t, polaris_psd_tmp_t)

polaris_obfl_data_read(polaris_psd_t)

allow polaris_psd_t self:capability { fsetid };

allow polaris_psd_t self:capability { dac_override chown };
allow polaris_psd_t self:netlink_route_socket rw_netlink_socket_perms;

logging_send_syslog_msg(polaris_psd_t)

#psd need detect which terminal to use as console, need read permission to ttyS*
# psd need read/write grub configure file /boot/grub/menu.*: read /boot/grub/menu.bak
# , generate /boot/grub/menu.list
# read access to bootflash for bin file loading
ifdef(`vxe_family',`
term_use_unallocated_ttys(polaris_psd_t)
polaris_legacy_grub_manage(polaris_psd_t)
polaris_bootflash_read(polaris_psd_t)
polaris_disk_varied_read(polaris_psd_t)
')
ifdef(`wlc_family',`
term_use_unallocated_ttys(polaris_psd_t)
bootloader_rw_config(polaris_psd_t)
polaris_disk_varied_read(polaris_psd_t)
')
ifdef(`vwlc_platform',`
polaris_legacy_grub_manage(polaris_psd_t)
polaris_bootflash_read(polaris_psd_t)
')

polaris_disk_csl_manage(polaris_psd_t)

fs_read_nsfs_files(polaris_psd_t)

```

```

polaris_dynconf_tmp_read(polaris_psd_t)

polaris_read_packages_conf(polaris_psd_t)

# handling /tmp/restconf
type polaris_restconf_t;
files_tmp_file(polaris_restconf_t)

files_tmp_filetrans(polaris_psd_t, polaris_restconf_t, dir, "restconf")
polaris_restconf_manage(polaris_psd_t)

# handling /tmp/.ncsshd_authorized_keys
type polaris_ncsshd_keys_t;
files_tmp_file(polaris_ncsshd_keys_t);

files_tmp_filetrans(polaris_psd_t, polaris_ncsshd_keys_t, dir, ".ncsshd_authorized_keys")
polaris_ncsshd_keys_manage(polaris_psd_t)

polaris_tmp_tlddb_persist_setup(polaris_psd_t)

polaris_tlddbpersist_setup(polaris_psd_t)

# write mem updates the grub config files
optional_policy('
polaris_grubcfg_manage(polaris_psd_t)
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispsd.te

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```

#
# February 2020, Victor Kamensky
#
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#

## <summary>Polaris fpm Policy Rules.</summary>

#####
## <summary>
##   Write fpm /var/run socket file
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.

```

```

## </summary>
## </param>
#
interface(`polaris_fpm_var_sock_write`,`
    gen_require(`
        type polaris_fpm_t;
        type polaris_fpm_var_run_t;
        type var_run_t;
    `)
    write_sock_files_pattern($1, var_run_t, polaris_fpm_var_run_t)
    allow $1 polaris_fpm_t:unix_stream_socket { connectto };
)

#####
## <summary>
##   Manage mqipc fpm2fmrp shared memory file in /dev/shm directory
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_fpm2fmrp_mqipc_use`,`
    gen_require(`
        type polaris_fpm2fmrp_mqipc_t;
    `)
    polaris_mqipc_use($1, polaris_fpm2fmrp_mqipc_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfpm.if

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```

#
# Oct 2020, Xin Xiang
#
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#

```

```

## <summary>Polaris Doppler Policy Rules.</summary>

```

```

#####
## <summary>
##   Work (read, write, ioctl) with /dev/dmmap
## </summary>
## <param name="domain">

```



```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dmammap_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_dmammap_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_dmammap_device_t)
    read_chr_files_pattern($1, device_t, polaris_dmammap_device_t)
    allow $1 polaris_dmammap_device_t:chr_file map;
)

```

```
#####
```

```

## <summary>
## Work (read, write, ioctl) with /dev/dmmap
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dplr_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_dplr_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_dplr_device_t)
    read_chr_files_pattern($1, device_t, polaris_dplr_device_t)
    allow $1 polaris_dplr_device_t:chr_file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisdoppler.if

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```

#
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#
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#

```

```

/usr/binos/conf/pvp.sh -- gen_context(system_u:object_r:polaris_pvp_exec_t,s0)
/tmp/sw/rp/max_elastic_bays -- gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)

```

```
/tmp/iosd_memory_share -- gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
```

```
/tmp/cc/0(/.*)? gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
```

```
/tmp/cc/.*pvp(/.*)? gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
```

```
/tmp/fp/pvp(/.*)? gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
```

```
/tmp/rp/pvp/oir/sw_lic_service(/.*)? gen_context(system_u:object_r:polaris_chasfs_t,s0)
```

```
/tmp/rp/pvp/oir/sw_csl_service(/.*)? gen_context(system_u:object_r:polaris_chasfs_t,s0)
```

```
/tmp/rp/pvp/oir/rp_.*(/.*)? gen_context(system_u:object_r:polaris_chasfs_t,s0)
```

```
/tmp/rp/pvp(/.*)? gen_context(system_u:object_r:polaris_pvp_tmp_t,s0)
```

```
/tmp/rp/pvp/sai_process(/.*)? gen_context(system_u:object_r:polaris_pvp_sai_t,s0)
```

```
/tmp/fp/pvp/sai_process(/.*)? gen_context(system_u:object_r:polaris_pvp_sai_t,s0)
```

```
/tmp/cc/.*pvp/sai_process(/.*)? gen_context(system_u:object_r:polaris_pvp_sai_t,s0)
```

```
/tmp/rp/pvp/process_state(/.*)? gen_context(system_u:object_r:polaris_process_state_t,s0)
```

```
/tmp/fp/pvp/process_state(/.*)? gen_context(system_u:object_r:polaris_process_state_t,s0)
```

```
/tmp/cc/pvp/process_state(/.*)? gen_context(system_u:object_r:polaris_process_state_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispvp.fc
```

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```
#
```

```
# August 2017, Shawn Lu
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polariswlc, 1.0);
```

```
# hanet driver used by vwlc, is there better place for it?
```

```
type polaris_hanet_device_t;
```

```
dev_node(polaris_hanet_device_t)
```

```
gen_require(`
```

```
    type polaris_wlc_ap_images_t;
```

```
    type mnt_t;
```

```
    attribute polaris_extended_domain;
```

```
`)
```

```
# transition when /mnt/images is created
```

```
filetrans_pattern(polaris_extended_domain, mnt_t, polaris_wlc_ap_images_t, dir, "images")
```

```
# epaN and epactrlN devices
```

```
type polaris_epa_device_t;
```

```
dev_node(polaris_epa_device_t)
```

```

# luna_fpgs device
type polaris_luna_mbfpga_device_t;
dev_node(polaris_luna_mbfpga_device_t)

# astro device
type polaris_astro_device_t;
dev_node(polaris_astro_device_t)

# cpp_il device
type polaris_cpp_il_device_t;
dev_node(polaris_cpp_il_device_t)

# oob_evfc device
type polaris_oob_evfc_device_t;
dev_node(polaris_oob_evfc_device_t)

# on vwlc all processes read grub_cisco_version in polaris_disk_varied_t
gen_require(
    attribute polaris_domain;
)
polaris_disk_varied_search(polaris_domain)

# /dev/sfp-ktr device
type polaris_sfp_katar_device_t;
dev_node(polaris_sfp_katar_device_t)

# handle /tmp/vxe_disk_XXX_YYY files
ifdef(^vwlc_platform',`
gen_require(
    type unconfined_service_t;
)
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v1")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v2")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v3")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_mbr_v4")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v1")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v2")
polaris_boot_tmp_filetrans(unconfined_service_t, file, "vxe_disk_gpt_v3")
polaris_boot_tmp_manage(unconfined_service_t)
)
type polaris_grubver_t;
polaris_pfile_type(polaris_grubver_t)

type polaris_grub_bios_t;
polaris_pfile_type(polaris_grub_bios_t)

#on vWLC, all processes read grubenv from EFI disk partition.
gen_require(

```

```
    attribute polaris_domain;
)
polaris_vwlc_grub_efi_search(polaris_domain)

type polaris_vwlcinstall_info_t;
polaris_pfile_type(polaris_vwlcinstall_info_t)

gen_require(
    type unconfined_service_t;
    type polaris_disk_varied_t;
)
# unconfined service create /boot/.install_info if does not exist yet
filetrans_pattern(unconfined_service_t, polaris_disk_varied_t, polaris_vwlcinstall_info_t, file, ".install_info")
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswlc.te

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```
#
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#
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#
```

```
/tmp/sw/boot/rmonbifo(/.*)?          gen_context(system_u:object_r:polaris_rmonbifo_tmp_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrmonbifo.fc

No license file was found, but licenses were detected in source scan.

```
#
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#
```

```
# polarisbtlogger file contexts place holder
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisbtlogger.fc

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```
#
# March 2017, Victor Kamensky
#
```

```

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#

policy_module(polarisnifmgr, 1.0);

gen_require(
    type polaris_nif_mgr_t;
)

polaris_ripc_sman_ui_serv_connect(polaris_nif_mgr_t)

polaris_btrace_data_manage(polaris_nif_mgr_t)
polaris_crft_data_manage(polaris_nif_mgr_t)
polaris_chasfs_manage(polaris_nif_mgr_t)
polaris_tdlresolve_read(polaris_nif_mgr_t)
polaris_tdlldb_list_dirs(polaris_nif_mgr_t)
polaris_cpld_read(polaris_nif_mgr_t)
polaris_lua_read(polaris_nif_mgr_t)
polaris_flashlib_read(polaris_nif_mgr_t)

#If romvar is not set, Set Rommon env variable needs write permission
polaris_flashlib_write(polaris_nif_mgr_t)

logging_send_syslog_msg(polaris_nif_mgr_t)

# set out of band interface mac set_oobndif_mac
allow polaris_nif_mgr_t self:tcp_socket ioctl;

# communication between the nif manager and fed use directories under /tmp/sv
polaris_sv_tmp_use(polaris_nif_mgr_t)

# /dev/shm/sdm access
optional_policy(
    polaris_sdm_shm_manage(polaris_nif_mgr_t)
)

# open /dev/ttyS0 console in sco_sys_init_sw_params
term_use_unallocated_ttys(polaris_nif_mgr_t)

# allow create and write access to the /proc/*_sesa file

gen_require(
    type polaris_proc_sesa_t;
)
polaris_proc_sesa_create_write(polaris_nif_mgr_t)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisnifmgr.te
```

```
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```

```
#
```

```
# April 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polarisdmiopdatamgrd, 1.0);
```

```
gen_require(^
```

```
    type polaris_dmi_opdatamgrd_t;
```

```
')
```

```
# allow to get getattr of /proc file system
```

```
domain_read_all_domains_state(polaris_dmi_opdatamgrd_t)
```

```
# work with /var/log/dmi/ files
```

```
type polaris_dmi_var_log_t;
```

```
logging_log_file(polaris_dmi_var_log_t)
```

```
manage_files_pattern(polaris_dmi_opdatamgrd_t, polaris_dmi_var_log_t, polaris_dmi_var_log_t)
```

```
manage_dirs_pattern(polaris_dmi_opdatamgrd_t, polaris_dmi_var_log_t, polaris_dmi_var_log_t)
```

```
logging_log_filetrans(polaris_dmi_opdatamgrd_t, polaris_dmi_var_log_t, dir, "dmi")
```

```
polaris_chasfs_manage(polaris_dmi_opdatamgrd_t)
```

```
polaris_btrace_data_manage(polaris_dmi_opdatamgrd_t)
```

```
polaris_cpld_read(polaris_dmi_opdatamgrd_t)
```

```
polaris_boot_tmp_read(polaris_dmi_opdatamgrd_t)
```

```
# run ldd, which in turns execve "ld.so --verify"
```

```
libs_exec_ld_so(polaris_dmi_opdatamgrd_t)
```

```
# this (opdatamgrd.sh) process is shell script need permission to execute shell
```

```
# and variety of small util commands under bin_t
```

```
corecmd_exec_shell(polaris_dmi_opdatamgrd_t)
```

```
corecmd_exec_bin(polaris_dmi_opdatamgrd_t)
```

```
# allow read of /etc/passwd
```

```
# passwd_file_t:file { getattr open read };
```

```
auth_use_nsswitch(polaris_dmi_opdatamgrd_t)
```

```
# opdatamgrd.sh calls ps command
```

```
# ps needs access to /sys/devices/system/cpu/online
```

```
dev_read_sysfs(polaris_dmi_opdatamgrd_t)
```

```
# ps needs access to proc_t
```

```

kernel_read_system_state(polaris_dmi_opdatamgrd_t)

allow polaris_dmi_opdatamgrd_t self:capability { sys_resource dac_override };

# handling of /tmp/stream-parsers
type polaris_dmi_parser_t;
files_tmp_file(polaris_dmi_parser_t)
files_tmp_filetrans(polaris_dmi_opdatamgrd_t, polaris_dmi_parser_t, dir, "stream-parsers")
manage_dirs_pattern(polaris_dmi_opdatamgrd_t, tmp_t, polaris_dmi_parser_t)
manage_files_pattern(polaris_dmi_opdatamgrd_t, polaris_dmi_parser_t, polaris_dmi_parser_t)

mount_domtrans(polaris_dmi_opdatamgrd_t)

# confd_cli runs under our label
allow polaris_dmi_opdatamgrd_t self:tcp_socket create_socket_perms;

# runs ps that wants to have access to containers files
optional_policy(`
polaris_disk_vman_dir_list(polaris_dmi_opdatamgrd_t)
`)
polaris_sandbox_file_dir_list(polaris_dmi_opdatamgrd_t)
polaris_sandbox_file_getattr(polaris_dmi_opdatamgrd_t)

# runs find to search all 'parse.*' files
# find . -perm /111 -name parse.* -exec basename {} ;
# LOOK AT ME it seems that it does search on customer visible
# directories, can and whether customer supposed to be
# able give parse.* files to dmi opdatamgrd, could it
# be exploited?
files_getattr_all_files(polaris_dmi_opdatamgrd_t)
files_getattr_all_dirs(polaris_dmi_opdatamgrd_t)

# access to /dev/pts/0
ssh_use_ptys(polaris_dmi_opdatamgrd_t)

# directly work with to /dev/ttyS1
term_use_unallocated_ttys(polaris_dmi_opdatamgrd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiopdatamgrd.te
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#
# March 2017, Victor Kamensky
#
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#

```

```

## <summary>Polaris ngwc_fed Policy Rules.</summary>

#####
## <summary>
##   Connect to and send messages to /tmp/dbgmn_log_sv unit
## datagram socket.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_fed_sock_write`,`
    gen_require(`
        type polaris_fed_sock_t;
        type polaris_ngwc_fed_t;
        type tmp_t;
    `)

    allow $1 self:unix_stream_socket {create_socket_perms};
    allow $1 polaris_ngwc_fed_t:unix_stream_socket {connectto};
    write_sock_files_pattern($1, tmp_t, polaris_fed_sock_t)
`)

#####
## <summary>
##   Allow the specified domain able to read fed /tmp files.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     File name in /tmp that the fed domain creates and other domains
##     access.
##   </summary>
## </param>
#
interface(`polaris_fed_tmp_files_read`,`
    gen_require(`
        type polaris_fed_tmp_t;
    `)

    read_files_pattern($1, polaris_fed_tmp_t, polaris_fed_tmp_t)
`)

```



)

#####

## <summary>

## Allow to read and write /tmp/epc\_ws/fed\_to\_wif\_pipe file.

## </summary>

## <param name="domain">

## <summary>

## epc\_ws\_liaison and ngwc-fed pipe interaction.

## </summary>

## </param>

#

interface(`polaris\_fed\_shm\_file\_read`,`

gen\_require(`

type polaris\_ngwc\_fed\_t;

`)

allow \$1 polaris\_ngwc\_fed\_t:shm { associate read unix\_read unix\_write write };

)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwcfed.if

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#

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#

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#

# polarismobilityd file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismobilityd.fc

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#

policy\_module(polarisdmi\_vtyserverutild, 1.0);

gen\_require(`

type polaris\_dmi\_vtyserverutild\_t;

)

```
polaris_btrace_data_manage(polaris_dmi_vtyserverutild_t)
polaris_chasfs_manage(polaris_dmi_vtyserverutild_t)
polaris_tdlresolve_read(polaris_dmi_vtyserverutild_t)
polaris_tdlldb_list_dirs(polaris_dmi_vtyserverutild_t)
polaris_cpld_read(polaris_dmi_vtyserverutild_t)
polaris_flashlib_read(polaris_dmi_vtyserverutild_t)
```

```
allow polaris_dmi_vtyserverutild_t self:socket { connect create read write };
```

```
type polaris_dmi_vtyserverutild_tmp_t;
files_tmp_file(polaris_dmi_vtyserverutild_tmp_t)
files_tmp_filetrans(polaris_dmi_vtyserverutild_t, polaris_dmi_vtyserverutild_tmp_t, fifo_file, ".DMI_FIFO")
manage_fifo_files_pattern(polaris_dmi_vtyserverutild_t,
polaris_dmi_vtyserverutild_tmp_t,polaris_dmi_vtyserverutild_tmp_t)
```

```
logging_send_syslog_msg(polaris_dmi_vtyserverutild_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmi_vtyserverutild.te
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```

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```
define(`mqipc_stem', `translit(patsubst($1, `mqipc$', ``), `-', `_)')
define(`mqipc_label', `format(`polaris_%s_mqipc_t', mqipc_stem($1))')
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_ipc_mqipc.m4
No license file was found, but licenses were detected in source scan.
```

#

# November 2020, Christine Hwang

#

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#

```
## <summary>Polaris Cabo GNSS Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Work (read, write, ioctl) with /dev/ttyS1
```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_cabo_gnss_dev_use`,`
    gen_require(`
        type device_t;
        type polaris_cabo_gnss_device_t;
    `)
    write_chr_files_pattern($1, device_t, polaris_cabo_gnss_device_t)
    read_chr_files_pattern($1, device_t, polaris_cabo_gnss_device_t)
    allow $1 polaris_cabo_gnss_device_t:chr_file map;
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscabognss.if

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```

#
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#

```

```
policy_module(polaristservice, 1.0);
```

```
polaris_process_domain_template(tservice_telnet)
```

```
polaris_process_domain_template(tservice_ssh)
```

```

gen_require(`
    type inetd_exec_t, inetd_t;
`)
domtrans_pattern(polaris_tservice_telnet_t, inetd_exec_t, inetd_t)

```

```

polaris_chasfs_manage(polaris_tservice_telnet_t)
polaris_btrace_data_manage(polaris_tservice_telnet_t)
polaris_cpld_read(polaris_tservice_telnet_t)
polaris_boot_tmp_read(polaris_tservice_telnet_t)
polaris_rmonbifo_tmp_read(polaris_tservice_telnet_t)

```

```

corecmd_exec_shell(polaris_tservice_telnet_t)
corecmd_exec_bin(polaris_tservice_telnet_t)

```

```

# allow read of /etc/passwd
auth_use_nsswitch(polaris_tservice_telnet_t)

dmidecode_domtrans(polaris_tservice_telnet_t)

allow polaris_tservice_telnet_t self:capability sys_resource;
kernel_read_system_state(polaris_tservice_telnet_t)

gen_require(
    type initrc_exec_t, initrc_t;
)
domtrans_pattern(polaris_tservice_telnet_t, initrc_exec_t, initrc_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_tservice_telnet_t)

# /bin/sh /usr/binos/conf/mcp_chvrf.sh eobc /usr/sbin/xinetd -f
# /tmp/chassis/local/rp/chasfs/rp/0/0/etc/telnet/xinetd_telnetd.conf
polaris_chvrf_domtrans(polaris_tservice_telnet_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristservice.te
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#

## <summary>Polaris WLC Platform Policy Rules.</summary>

#####
## <summary>
## Work (read, write, ioctl) with /dev/hanet
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_hanet_dev_use',`
gen_require(
    type device_t;
    type polaris_hanet_device_t;
)

```

```

        write_chr_files_pattern($1, device_t, polaris_hanet_device_t)
        read_chr_files_pattern($1, device_t, polaris_hanet_device_t)
    ')

#####
## <summary>
##   Work (read, write, ioctl) with /dev/epa[0-9]* and
## /dev/epactrl[0-9]*
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_epa_dev_use`,`
gen_require(`
    type device_t;
    type polaris_epa_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_epa_device_t)
    read_chr_files_pattern($1, device_t, polaris_epa_device_t)
    allow $1 polaris_epa_device_t:chr_file map;
')

#####
## <summary>
##   Work (read, write, ioctl) with /dev/luna_mbfpga device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_luna_mbfpga_dev_use`,`
gen_require(`
    type device_t;
    type polaris_luna_mbfpga_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_luna_mbfpga_device_t)
    read_chr_files_pattern($1, device_t, polaris_luna_mbfpga_device_t)
')

#####
## <summary>
##   Work (read, write, ioctl) with /dev/astro device
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_astro_dev_use`,`
gen_require(`
    type device_t;
    type polaris_astro_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_astro_device_t)
    read_chr_files_pattern($1, device_t, polaris_astro_device_t)
`)

#####
## <summary>
## Work (read, write, ioctl) with /dev/cpp_il device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_cpp_il_dev_use`,`
gen_require(`
    type device_t;
    type polaris_cpp_il_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_cpp_il_device_t)
    read_chr_files_pattern($1, device_t, polaris_cpp_il_device_t)
`)

#####
## <summary>
## Work (read, write, ioctl) with /dev/oob_evfc device
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_oob_evfc_dev_use`,`
gen_require(`
    type device_t;
    type polaris_oob_evfc_device_t;

```

```
)
    write_chr_files_pattern($1, device_t, polaris_oob_evfc_device_t)
    read_chr_files_pattern($1, device_t, polaris_oob_evfc_device_t)
)
```

```
#####
```

```
## <summary>
##   Work (read, write, ioctl) with /dev/sfp-ktr device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
```

```
#
interface(`polaris_sfp_katar_dev_use`,`
gen_require(`
    type device_t;
    type polaris_sfp_katar_device_t;
`)
    write_chr_files_pattern($1, device_t, polaris_sfp_katar_device_t)
    read_chr_files_pattern($1, device_t, polaris_sfp_katar_device_t)
)
```

```
#####
```

```
## <summary>
## Read vWLC install info files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
```

```
#
interface(`polaris_vwlcinstall_info_read`,`
gen_require(`
type polaris_vwlcinstall_info_t;
`)
read_files_pattern($1, polaris_vwlcinstall_info_t, polaris_vwlcinstall_info_t)
list_dirs_pattern($1, polaris_vwlcinstall_info_t, polaris_vwlcinstall_info_t)
)
```

```
#####
```

```
## <summary>
## Read /dev/vda1 device the efi partition
## </summary>
## <param name="domain">
##   <summary>
```

```

##      Domain allowed access.
##    </summary>
## </param>
#
interface(`polaris_vwlc_grub_info_read`,`
gen_require(`
type polaris_grubver_t;
type polaris_grub_bios_t;
type polaris_grub_efi_t;
`)
read_files_pattern($1, polaris_grubver_t, polaris_grubver_t)
read_files_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
read_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
list_dirs_pattern($1, polaris_grubver_t, polaris_grubver_t)
list_dirs_pattern($1, polaris_grub_bios_t, polaris_grub_bios_t)
list_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

```

```
#####
```

```

## <summary>
## Search /dev/vda1 device the efi partition
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vwlc_grub_efi_search`,`
gen_require(`
type polaris_grub_efi_t;
`)
search_dirs_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)
`)

```

```
#####
```

```

## <summary>
## Work (read, write, ioctl) with /dev/vda1 device
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_vwlc_grub_efi_use`,`
gen_require(`
type polaris_grub_efi_t;

```



```
)  
write_chr_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)  
read_chr_files_pattern($1, polaris_grub_efi_t, polaris_grub_efi_t)  
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariswlc.if  
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```

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```
define(`database_stem', `translit(patsubst($1, `_DB$', ``), `A-Z', `a-z'))
```

```
define(`database_label', `format(`polaris_%s_db_tdlldb_t', database_stem($1))')
```

```
define(`database_use_map', `defn(format(``database_use_map[%s-%s]", `$1', `$2'))')
```

```
define(`database_use_map_set', `define(format(``database_use_map[%s-%s]", `$1', `$2'), `$3'))
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/polaris_database_db.m4  
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```

#

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#

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#

```
policy_module(polarisdmiauthd, 1.0);
```

```
gen_require(  
    type polaris_dmi_dmiauthd_t;  
)
```

```
polaris_btrace_data_manage(polaris_dmi_dmiauthd_t)
```

```
polaris_crft_data_manage(polaris_dmi_dmiauthd_t)
```

```
polaris_chasfs_manage(polaris_dmi_dmiauthd_t)
```

```
polaris_tdlresolve_read(polaris_dmi_dmiauthd_t)
```

```
polaris_tdlldb_list_dirs(polaris_dmi_dmiauthd_t)
```

```
polaris_cpld_read(polaris_dmi_dmiauthd_t)
```

```
polaris_flashlib_read(polaris_dmi_dmiauthd_t)
```

```
polaris_rpc_sman_ui_serv_connect(polaris_dmi_dmiauthd_t)
```

```

polaris_db_tdlldb_dir_use(polaris_dmi_dmiauthd_t)

# dmiauthd creates and binds to /tmp/.DmiAuth.socket unix socket
type polaris_dmi_dmiauthd_tmp_t;
files_tmp_file(polaris_dmi_dmiauthd_tmp_t)
files_tmp_filetrans(polaris_dmi_dmiauthd_t, polaris_dmi_dmiauthd_tmp_t, { sock_file fifo_file })
manage_sock_files_pattern(polaris_dmi_dmiauthd_t, polaris_dmi_dmiauthd_tmp_t, polaris_dmi_dmiauthd_tmp_t)
manage_fifo_files_pattern(polaris_dmi_dmiauthd_t, polaris_dmi_dmiauthd_tmp_t, polaris_dmi_dmiauthd_tmp_t)

# dmiauthd creates diagnostic files in /tmp/netconf-yang-diag
type polaris_dmi_dmiauthd_tmp_diags_t;
files_tmp_file(polaris_dmi_dmiauthd_tmp_diags_t)
files_tmp_filetrans(polaris_dmi_dmiauthd_t, polaris_dmi_dmiauthd_tmp_diags_t, dir, "netconf-yang-diag")
polaris_dmiauthd_tmp_diags_manage(polaris_dmi_dmiauthd_t)

logging_send_syslog_msg(polaris_dmi_dmiauthd_t)

# read confd log file and push into btrace
polaris_confd_log_read(polaris_dmi_dmiauthd_t)

# from dmilib iosp_connect through libiosp iosp_token_read_from_file
# iosp_token_read_from_file reads /tmp/rp/.iosp_dmiauthd
polaris_dmiauthd_token_read(polaris_dmi_dmiauthd_t)

gen_require(
    type polaris_confd_tmp_t;
)
# This is applicable to wireless platforms running in standby monitoring mode
# wherein dmiauthd create temporary files in /tmp/confd upon switchover and
# trigger ConfD restart.
manage_files_pattern(polaris_dmi_dmiauthd_t, polaris_confd_tmp_t, polaris_confd_tmp_t)
manage_dirs_pattern(polaris_dmi_dmiauthd_t, polaris_confd_tmp_t, polaris_confd_tmp_t)

#####
# "show netconf-yang diagnostics [all | last | message]" invokes
# /usr/binos/conf/dmid_diag_logs.sh
#####

polaris_utility_domain_template(dmid_diag_logs)

polaris_bexecute_domtrans(polaris_dmi_dmiauthd_t)
polaris_bexecute_domain(polaris_dmid_diag_logs_t, polaris_dmid_diag_logs_exec_t)

# signal sent during the show cmd
polaris_send_signal_to_bexecute(polaris_dmi_dmiauthd_t)

# read files in /tmp/netconf-yang-diag
polaris_dmiauthd_tmp_diags_read(polaris_dmid_diag_logs_t)

```

```

# need write/ioctl/getattr access for pipes
polaris_dmiauthd_use_fifo(polaris_dmid_diag_logs_t)

polaris_use_btrace_fifo(polaris_dmid_diag_logs_t)
polaris_btrace_data_manage(polaris_dmid_diag_logs_t)
polaris_chasfs_read(polaris_dmid_diag_logs_t)
polaris_cpld_read(polaris_dmid_diag_logs_t)
dev_read_sysfs(polaris_dmid_diag_logs_t)
auth_use_nsswitch(polaris_dmid_diag_logs_t)
polaris_boot_tmp_read(polaris_dmid_diag_logs_t)
fs_getattr_tmpfs(polaris_dmid_diag_logs_t)

# bash tmp files, such as /tmp/sh-thd-1599654988
type polaris_dmid_diag_logs_tmp_t;
files_tmp_file(polaris_dmid_diag_logs_tmp_t)
files_tmp_filetrans(polaris_dmid_diag_logs_t, polaris_dmid_diag_logs_tmp_t, file)
manage_files_pattern(polaris_dmid_diag_logs_t, polaris_dmid_diag_logs_tmp_t, polaris_dmid_diag_logs_tmp_t)

# execute /bin/sed
corecmd_exec_bin(polaris_dmid_diag_logs_t)

#####
# Allow diagnostics feature to create log file in bootflash
#####

# execute /bin/tar
corecmd_exec_bin(polaris_dmi_dmiauthd_t)
# tar reads /etc/passwd
auth_use_nsswitch(polaris_dmi_dmiauthd_t)
# create log file in bootflash
polaris_bootflash_manage(polaris_dmi_dmiauthd_t)

#####

allow polaris_dmi_dmiauthd_t self:capability sys_resource;

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* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmidmiauthd.te
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#

```

```

/opt/confd/bin/confd -- gen_context(system_u:object_r:polaris_confd_exec_t,s0)
/opt/confd/lib/confd/lib/core/confd/priv/mmap_schema --
gen_context(system_u:object_r:polaris_mmap_schema_exec_t,s0)
/usr/binos/bin/vip-confd-startup.sh -- gen_context(system_u:object_r:polaris_confd_exec_t,s0)
/usr/bin/vconfd_script_cdb_backup.sh -- gen_context(system_u:object_r:polaris_confd_exec_t,s0)
/usr/binos/conf/execute_confd_cli.sh -- gen_context(system_u:object_r:polaris_confd_cli_exec_t,s0)
/usr/binos/conf/confd_logs.sh -- gen_context(system_u:object_r:polaris_confd_exec_t,s0)
/var/confd0(/.*)?          gen_context(system_u:object_r:polaris_confd_var_t,s0)
/dev/shm/confd(/.*)?      gen_context(system_u:object_r:polaris_confd_shm_t,s0)
/tmp/confd(/.*)?          gen_context(system_u:object_r:polaris_confd_tmp_t,s0)
/tmp/confd_cli(/.*)?      gen_context(system_u:object_r:polaris_confd_cli_tmp_t,s0)
/tmp/vconfd(/.*)?         gen_context(system_u:object_r:polaris_vconfd_tmp_t,s0)

/usr/bin/vconfd_script_*.admin_tech.*\sh -- gen_context(system_u:object_r:polaris_admin_tech_exec_t,s0)
/var/tech(/.*)? gen_context(system_u:object_r:polaris_admin_tech_var_t,s0)

/bootflash/admintech      gen_context(system_u:object_r:polaris_admin_tech_data_t,s0)
/bootflash/admintech_trace gen_context(system_u:object_r:polaris_admin_tech_data_t,s0)
/bootflash/MEMORY_LOG_*.text gen_context(system_u:object_r:polaris_admin_tech_data_t,s0)
/bootflash/collated_log_* gen_context(system_u:object_r:polaris_admin_tech_data_t,s0)

/bootflash/tracelogs/cia-netconf-trace\.* gen_context(system_u:object_r:polaris_confd_var_log_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisconfd.fc

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```

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#

```

policy\_module(polarisunconfined, 1.0);

```

## <desc>
## <p>
## IOSd runs in unconfined mode
## </p>
## </desc>
gen_tunable(polaris_unconfined_iosd, true)

```

```

## <desc>
## <p>
## All polaris processes except IOSd runs in unconfined mode
## </p>
## </desc>

```

```
gen_tunable(polaris_unconfined_all, true)
```

```
gen_require(  
    type apmd_t;  
    type auditd_t;  
    type inetd_t;  
    type init_t;  
    type initrc_t;  
    type journalctl_t;  
    type rpcbind_t;  
    type rpcd_t;  
    type sshd_t;  
    type syslogd_t;  
    type telnetd_t;  
    type udev_t;  
    type vird_t;  
    type virtlogd_t;  
    type vmtools_t;  
    type ifconfig_t;  
    type setfiles_t;  
    type iptables_t;  
    type virsh_t;  
    type svirt_t;  
    type svirt_lxc_net_t;  
    type vird_lxc_t;  
)
```

```
polaris_domain_maybe_unconfined(apmd_t)  
polaris_domain_maybe_unconfined(auditd_t)  
polaris_domain_maybe_unconfined(inetd_t)  
polaris_domain_maybe_unconfined(init_t)  
polaris_domain_maybe_unconfined(initrc_t)  
polaris_domain_maybe_unconfined(journalctl_t)  
polaris_domain_maybe_unconfined(rpcbind_t)  
polaris_domain_maybe_unconfined(rpcd_t)  
polaris_domain_maybe_unconfined(sshd_t)  
polaris_domain_maybe_unconfined(syslogd_t)  
polaris_domain_maybe_unconfined(telnetd_t)  
polaris_domain_maybe_unconfined(udev_t)  
polaris_domain_maybe_unconfined(vird_t)  
polaris_domain_maybe_unconfined(virtlogd_t)  
polaris_domain_maybe_unconfined(vmtools_t)  
polaris_domain_maybe_unconfined(ifconfig_t)  
polaris_domain_maybe_unconfined(setfiles_t)  
polaris_domain_maybe_unconfined(iptables_t)  
polaris_domain_maybe_unconfined(virsh_t)  
polaris_domain_maybe_unconfined(svirt_t)  
polaris_domain_maybe_unconfined(svirt_lxc_net_t)
```

polaris\_domain\_maybe\_unconfined(virt\_d\_lxc\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisunconfined.te

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#

# July 2020, Victor Kamensky

#

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#

/tmp/HTX-IOX(/.\*)? gen\_context(system\_u:object\_r:polaris\_htx\_iox\_tmp\_t,s0)

# /dev/sppi\_memif htx works with

/dev/sppi\_memif -c gen\_context(system\_u:object\_r:polaris\_sppi\_memif\_device\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarishtx.fc

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#

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#

/usr/binos/conf/periodic.sh -- gen\_context(system\_u:object\_r:polaris\_periodic\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisperiodic.fc

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#

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#

policy\_module(polarislua, 1.0);

#####

# Lua policy

#####

type polaris\_lua\_file\_t;

```
files_type(polaris_lua_file_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarislua.te
```

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```
#
```

```
# November 2020, Christine Hwang
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
policy_module(polariscabognss, 1.0);
```

```
gen_require(`
```

```
    type polaris_cabo_gnss_t;
```

```
`)
```

```
polaris_btrace_data_manage(polaris_cabo_gnss_t)
```

```
polaris_chasfs_manage(polaris_cabo_gnss_t)
```

```
polaris_tdlresolve_read(polaris_cabo_gnss_t)
```

```
polaris_cpld_read(polaris_cabo_gnss_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_cabo_gnss_t)
```

```
# Allow sysfs read for platform ID and
```

```
# r/w on /sys/class/gpio/export
```

```
polaris_sysfs_manage(polaris_cabo_gnss_t)
```

```
dev_manage_sysfs_dirs(polaris_cabo_gnss_t)
```

```
# Allow Cabo GNSS to access/modify to GPS GPIO
```

```
polaris_ggpio_dev_read_write(polaris_cabo_gnss_t)
```

```
# Allow Cabo GNSS access to /dev/ppp0
```

```
dev_rw_realtime_clock(polaris_cabo_gnss_t)
```

```
# allow system time capability to check for system timeout
```

```
allow polaris_cabo_gnss_t self:capability sys_time;
```

```
# Label Cabo GNSS TTY device
```

```
type polaris_cabo_gnss_device_t;
```

```
dev_node(polaris_cabo_gnss_device_t)
```

```
polaris_cabo_gnss_dev_use(polaris_cabo_gnss_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscabognss.te
```

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dnl

dnl April 2018, Victor Kamensky

dnl

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dnl

dnl WLC Platform Max Bay Limits

max\_bay\_map\_set(rp, `per\_bay', 0)

max\_bay\_map\_set(cc, `per\_bay', 1)

max\_bay\_map\_set(fp, `per\_bay', 0)

max\_bay\_ripc\_map\_set(rp, `per\_bay', 0)

max\_bay\_ripc\_map\_set(cc, `per\_bay', 1)

max\_bay\_ripc\_map\_set(fp, `per\_bay', 0)

max\_bay\_ripc\_map\_set(rp, `global', 0)

max\_bay\_ripc\_map\_set(cc, `global', 1)

max\_bay\_ripc\_map\_set(fp, `global', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(rp, `elastic', BPROC\_ODM, 1)

max\_elastic\_map\_set(cc, `elastic', BPROC\_ODM, 1)

max\_elastic\_map\_set(fp, `elasitc', BPROC\_ODM, 1)

max\_elastic\_map\_set(rp, `elastic', BPROC\_WNCD, 7)

max\_elastic\_map\_set(cc, `elastic', BPROC\_WNCD, 7)

max\_elastic\_map\_set(fp, `elastic', BPROC\_WNCD, 7)

max\_elastic\_ripc\_map\_set(rp, `elastic', BPROC\_ODM, 1)

max\_elastic\_ripc\_map\_set(cc, `elastic', BPROC\_ODM, 1)

max\_elastic\_ripc\_map\_set(fp, `elasitc', BPROC\_ODM, 1)

max\_elastic\_ripc\_map\_set(rp, `elastic', BPROC\_WNCD, 7)

max\_elastic\_ripc\_map\_set(cc, `elastic', BPROC\_WNCD, 7)

max\_elastic\_ripc\_map\_set(fp, `elastic', BPROC\_WNCD, 7)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/wlcm4

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#

# August 2017, Shawn Lu

#

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#



## <summary>Polaris rogued Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrogued.if

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#

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#

## <summary>Polaris flashcheck Policy Rules.</summary>

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisflashcheck.if

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#

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#

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#

policy\_module(polarissmd, 1.0);

gen\_require(^

    type polaris\_smd\_t;

')

#####

# mqipc manual, one that missing in platform tdl file

#####

polaris\_btrace\_data\_manage(polaris\_smd\_t)

polaris\_crft\_data\_manage(polaris\_smd\_t)

polaris\_chasfs\_manage(polaris\_smd\_t)

polaris\_tdlresolve\_read(polaris\_smd\_t)

polaris\_tdlldb\_list\_dirs(polaris\_smd\_t)

polaris\_cpld\_read(polaris\_smd\_t)

polaris\_lua\_read(polaris\_smd\_t)

polaris\_flashlib\_read(polaris\_smd\_t)

polaris\_rpc\_sman\_ui\_serv\_connect(polaris\_smd\_t)

```

# working with smd persistent/ disk files
type polaris_smd_disk_t;
polaris_disk_type(polaris_smd_disk_t)

manage_files_pattern(polaris_smd_t, polaris_smd_disk_t, polaris_smd_disk_t)

polaris_db_tdlldb_dir_use(polaris_smd_t)

# access to persist tdlldb (e.g. .dbpersist)
polaris_tdlldbpersist_setup(polaris_smd_t)

# for /dev/shm/cernno_dell
polaris_cerr_shm_manage(polaris_smd_t)

ifdef(`nyquist_platform',`
gen_require(
    type polaris_bt_logger_smd_mqipc_t;
)
# smd may start first and create this mqipc channel
polaris_mqipc_create_name(polaris_smd_t, polaris_bt_logger_smd_mqipc_t, bt_logger_smd)
)

polaris_lfts_dev_use(polaris_smd_t)

allow polaris_smd_t self:capability { sys_resource net_bind_service };

polaris_socketat_nsfs_read(polaris_smd_t)

allow polaris_smd_t self:process setrlimit;

corenet_tcp_bind_polaris_smd_devshell_port(polaris_smd_t)
corenet_tcp_bind_generic_node(polaris_smd_t)
allow polaris_smd_t self:tcp_socket { getattr setopt getopt bind create listen accept connect read write
name_connect };
allow polaris_smd_t self:capability { net_admin sys_admin };

allow polaris_smd_t self:udp_socket { create_socket_perms recv_msg send_msg };
#smutil_msg_event_cb_handler() uses netlink
allow polaris_smd_t self:netlink_socket { bind create };

# LOOK AT ME: now smd may open arbitrary port on forwarding VRF (16)
# but in SELinux there is no way to differentiate between port spaces
# across VRFs or namespaces. For now let's grant smd_t access to all ports
# regardless of VRF. In future investigate ways to be more restrictive
corenet_udp_bind_generic_port(polaris_smd_t)
corenet_udp_sendrecv_generic_port(polaris_smd_t)
# LOOK AT ME: grants access to udp_bind on any node, but if we can
# be more specific and bind only to forwarding VRF related interfaces

```

```

corenet_udp_bind_generic_node(polaris_smd_t)

# smd want to listent on http port 80 on VRF_FWD, for webauth code please see
# smd/webauth/src/webauth_io.c
corenet_tcp_bind_http_port(polaris_smd_t)

allow polaris_smd_t self:capability dac_override;

logging_send_syslog_msg(polaris_smd_t)

allow polaris_smd_t self:capability net_raw;
allow polaris_smd_t self:packet_socket { create_socket_perms recv_msg send_msg };

# for access to disk html files (for webauth)
polaris_persistent_read(polaris_smd_t)

# transition for dc_profile_dir to polaris_smd_disk_t
gen_require(
    type initrc_t;
)
polaris_bootflash_filetrans(initrc_t, polaris_smd_disk_t, dir, "dc_profile_dir")

# SANET is listening on http port(CSCvb41802)
# Hence, it needs to follow the same rule as nginx is using in polarisnginx.te
# FIXME: add interface to allow bind to port 1025-65535
corenet_tcp_bind_all_ports(polaris_smd_t)

polaris_issu_tmp_files_read(polaris_smd_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissmd.te
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#
# February 2020, Victor Kamensky
#
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#

/usr/binos/conf/cedge-tanman.sh -- gen_context(system_u:object_r:polaris_cedge_tanman_exec_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscedgetanman.fc
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#
# March 2017, Victor Kamensky

```

```

#
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#

/usr/binos/conf/droputil.sh -- gen_context(system_u:object_r:polaris_droputil_exec_t,s0)

/tmp/rp/dropbox(/.*)?    gen_context(system_u:object_r:polaris_droputil_tmp_t,s0)
/tmp/rp/droputil(/.*)?  gen_context(system_u:object_r:polaris_droputil_tmp_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdroputil.fc
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#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisvman, 1.0);

gen_require(
    type polaris_vman_t;
)

polaris_btrace_data_manage(polaris_vman_t)
polaris_crft_data_manage(polaris_vman_t)
polaris_chasfs_manage(polaris_vman_t)
polaris_tdlresolve_read(polaris_vman_t)
polaris_tdlldb_list_dirs(polaris_vman_t)
polaris_cpld_read(polaris_vman_t)
polaris_flashlib_read(polaris_vman_t)

polaris_ripc_sman_ui_serv_connect(polaris_vman_t)

polaris_db_tdlldb_dir_use(polaris_vman_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_vman_t)

polaris_rmonbifo_tmp_read(polaris_vman_t)
polaris_boot_tmp_read(polaris_vman_t)

logging_send_syslog_msg(polaris_vman_t)

modutils_read_module_deps(polaris_vman_t)

```

```

modutils_read_module_config(polaris_vman_t)
modutils_manage_module_config(polaris_vman_t)
modutils_domtrans_insmod(polaris_vman_t)
files_read_kernel_modules(polaris_vman_t)

corecmd_exec_bin(polaris_vman_t)
corecmd_exec_shell(polaris_vman_t)

# ifconfig related, ifconfig is executed in its own context
sysnet_domtrans_ifconfig(polaris_vman_t)

# VMAN calls vman_set_congestion_control_multiplex when the count
# of the bridge users reaches 2 and needs write permissions on
# contdev_multiplex
dev_rw_sysfs(polaris_vman_t)
fs_getattr_xattr_fs(polaris_vman_t)

virt_stream_connect(polaris_vman_t)
virt_read_pid_files(polaris_vman_t)

fs_rw_cgroup_files(polaris_vman_t)
kernel_read_system_state(polaris_vman_t)
# allow vman to read /dev/pts/*
term_use_generic_ptys(polaris_vman_t)
#allow polaris_vman_t polaris_udev_tmp_files_t:file open;
polaris_udev_tmp_read(polaris_vman_t)
#allow vman to run brctl in it's own domain
brctl_domtrans(polaris_vman_t)
#allow vman to run /sbin/fsck in script
fstools_domtrans(polaris_vman_t)
#allow vman to mount rootfs on polaris_disk_vman_t
allow polaris_vman_t polaris_disk_vman_t:dir mounton;
fs_mount_xattr_fs(polaris_vman_t)
#allow vman have capability for modify owner of the file
allow polaris_vman_t self:capability { chown fowner fsetid };
#allow vman to bind to unreserved tcp ports while it searches for
#port available to guest console to listen on
corenet_tcp_bind_unreserved_ports(polaris_vman_t)

# working with vman /var/ files
type polaris_var_vman_t;
files_tmp_file(polaris_var_vman_t)
files_var_filetrans(polaris_vman_t, polaris_var_vman_t, dir, "virtual-instance")
manage_files_pattern(polaris_vman_t, polaris_var_vman_t, polaris_var_vman_t)
manage_dirs_pattern(polaris_vman_t, polaris_var_vman_t, polaris_var_vman_t)
manage_sock_files_pattern(polaris_vman_t, polaris_var_vman_t, polaris_var_vman_t)

# working with vman persitsten files

```

```

type polaris_disk_vman_t;
polaris_disk_type(polaris_disk_vman_t)

gen_require(
    type polaris_disk_bootflash_t;
    type polaris_disk_harddisk_t;
)
filetrans_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t, dir,
"virtual-instance")
filetrans_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t, file,
"virtual-instance.conf")
filetrans_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t, dir,
"vman_fdb")

# allow creation of /bootflash/virtual-instance.conf file
manage_files_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t)
# allow creation of /bootflash/virtual-instance and /bootflash/vman_fdb directories
manage_dirs_pattern(polaris_vman_t, { polaris_disk_bootflash_t polaris_disk_harddisk_t }, polaris_disk_vman_t)
# vman can manage files inside of its own polaris_disk_vman_t directories
manage_files_pattern(polaris_vman_t, polaris_disk_vman_t, polaris_disk_vman_t)

# after all above transition we need to grant vman right to work with any
# persistent storage file since it needs to access and write .ova files
polaris_persistent_manage(polaris_vman_t)

# vman uses netlink socket to talk to lxc watchdog driver
# please see binos/vman/src/vman_lxc_wd.c
allow polaris_vman_t self:netlink_generic_socket { create_socket_perms sendto recvfrom};

# vman calls tpc-config which in turns wants to create AF_TIPC socket
allow polaris_vman_t self:socket create_socket_perms;

# vman uses 'ip netns exec 0 ifconfig -a' command which in turns switches
# network namespace and need access to /proc/pid/ns/net file
fs_read_nsfs_files(polaris_vman_t)

# this label is created to exchange log related information between container and host.
type polaris_vman_log_t;
# By making this label belong to polaris persistent storage combined with vman inheriting rights
# to manage polaris_disk via polaris_persistent_manage(), vman gains rights to manage below dirs.
polaris_disk_type(polaris_vman_log_t)
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdIpsAlert-IOX" )
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdUrlf-IOX" )
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdAmp-IOX" )
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdTls-IOX" )
filetrans_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_log_t, dir, "UtdLogMappings-IOX" )
allow polaris_vman_t polaris_vman_log_t:dir mounton;

```

```

# Allow vman to work with /bootflash/virtual-instance/UTD/rootfs
optional_policy(
    gen_require(
        type container_file_t;
    )
    allow polaris_vman_t container_file_t:filesystem { getattr unmount };
)

# Allow vman/ioxman to work with /tmp/HTX-IOX
optional_policy(
    gen_require(
        type polaris_htx_iox_tmp_t;
    )
    allow polaris_vman_t polaris_htx_iox_tmp_t:dir { getattr mounton open read };
)

# Allow vman to mount /tmp/binos-IOX
optional_policy(
    gen_require(
        type polaris_qfp_memif_t;
    )
    allow polaris_vman_t polaris_qfp_memif_t:dir mounton;
)

# vman_init.sh operates on /tmp/vman files
type polaris_vman_tmp_t;
files_tmp_file(polaris_vman_tmp_t)
files_tmp_filetrans(polaris_vman_t, polaris_vman_tmp_t, { file dir })
polaris_systemd_tmpfiles_tmp_filetrans(polaris_vman_tmp_t, dir, "vman")
manage_files_pattern(polaris_vman_t, polaris_vman_tmp_t,polaris_vman_tmp_t)
manage_dirs_pattern(polaris_vman_t, polaris_vman_tmp_t, polaris_vman_tmp_t)

# allow vman to work with /tmp/xml
fs_remount_tmpfs(polaris_vman_t)
fs_unmount_tmpfs(polaris_vman_t)
fs_unmount_xattr_fs(polaris_vman_t)
allow polaris_vman_t polaris_vman_tmp_t:dir mounton;
optional_policy(
    polaris_cedge_xml_tmp_manage(polaris_vman_t)
)

# relabel /bootflash/virtual-instance/UTD/tmpstaging to /dev/loopX
gen_require(
    type iso9660_t;
)
allow polaris_vman_t iso9660_t:filesystem { relabelfrom };

# configure /proc/sys/net/ipv4/conf/dpbr_0/arp_announce

```

```

kernel_search_network_sysctl(polaris_vman_t)
kernel_rw_net_sysctls(polaris_vman_t)
#configure e.g. /proc/sys/vm/nr_hugepages
kernel_rw_vm_sysctls(polaris_vman_t)

# need to do bind mount of /bootflash/SHARED-IOX
mount_domtrans(polaris_vman_t)

# vman accessing files under /tmp created by initrc like /tmp/gdev/md0/gdev-info
init_read_script_tmp_files(polaris_vman_t)

#DB persistence
polaris_tdlbpbersist_setup(polaris_vman_t)

polaris_tmp_tdlbpbersist_setup(polaris_vman_t)

gen_require(
    type initrc_t;
)
files_tmp_filetrans(initrc_t, polaris_vman_tmp_t, file, "cgroup.log")

dmidecode_domtrans(polaris_vman_t)

# read /etc/libvirt/libvirt.conf
virt_read_config(polaris_vman_t)

# vman_cgroup_yaml.sh through prep_csr_kumo (binos_functions-pd) checks for
# ovf-env.xml file existence in variety of directories includind
# /cdrom0/ovf-env.xml
fs_read_iso9660_files(polaris_vman_t)

# allow vman to manage loop device: finding free /dev/loopN device
# note vman code iterated over all /dev/loop* devices and try to lock
# them. As part of that iteration it tries /dev/loop_control
# what it should do instead is to use /dev/loop_control to get free
# device
dev_rw_loop_control(polaris_vman_t)

# PLEASE LOOK AT ME
# allow vman to read, write /dev/loopN devices that are
# under fixed_disk_device_t label. It is pretty strong premission
# and at this point it is only done for /dev/loopN devices.
# Can we do better? i.e move /dev/loopN to some other label?
storage_manage_fixed_disk(polaris_vman_t)

# when /bootflash or /harddisk are 100% full
allow polaris_vman_t self:capability sys_resource;

```



```

# allow VMAN to move disk.img to the disk
allow polaris_vman_t self:process setfscreate;

# vman mounts directories on behalf of guest containers, it uses
# specified context for guest directories, need permission to
# relabel, mount, etc.
fs_relabelfrom_xattr_fs(polaris_vman_t)
virt_relabel_sandbox_filesystem(polaris_vman_t)
virt_mounton_sandbox_file(polaris_vman_t)
virt_manage_sandbox_files(polaris_vman_t)
gen_require(`
    type svirt_sandbox_file_t;
`)
allow polaris_vman_t svirt_sandbox_file_t:filesystem mount;

# /tmp/.flashlock operations from tdllib_startup_cfg_ignored, mcp_getmonvar
allow polaris_vman_t self:capability dac_override;

# allow vman to stat /dev/kvm, executed by vman_common_init function
dev_getattr_kvm_dev(polaris_vman_t)

# vman in getfs_info_by_mediatype function inspects files in /tmp/gdev
gen_require(`
    type udev_tmp_t;
`)
read_files_pattern(polaris_vman_t, udev_tmp_t, udev_tmp_t)

# /usr/binos/conf/vman_exec.sh policy

polaris_utility_domain_template(vman_shell)

polaris_bexecute_domain(polaris_vman_shell_t, polaris_vman_shell_exec_t)
# vman_exec.sh calls mcp_chvrf.sh
polaris_chvrf_domtrans(polaris_vman_shell_t)
# mcp_chvrf.sh calls vman_exec.sh back and then it call bexec.sh
polaris_bexecute_domtrans(polaris_vman_shell_t)
corecmd_exec_bin(polaris_vman_shell_t)

# inherits stdin from telnetd
telnet_use_ptys(polaris_vman_shell_t)
#allow use of ptys for vman tech support
telnet_use_ptys(polaris_vman_tech_t)

optional_policy(`
# reads /opt/cisco/caf/config/system-config.ini
polaris_caf_files_read(polaris_vman_t)
`)

```

```

# vman_is_machine_type_initialized clone needs cap_userns sys_admin
allow polaris_vman_t self:cap_userns sys_admin;

# vman_cgroup_yaml.sh searches for ovf-env.xml on cdrom0
fs_read_removable_files(polaris_vman_t)

# vman starts vman_init.sh that in turns calls virsh
gen_require(
    type virsh_t;
    type virsh_exec_t;
)
domtrans_pattern(polaris_vman_t, virsh_exec_t, virsh_t)

polaris_bexecute_domtrans(polaris_vman_t)
polaris_send_signal_to_bexecute(polaris_vman_t)

gen_require(
    type polaris_chvrf_t;
)
# inherited as stdin/sdtout from vman
polaris_vman_use_fifo(polaris_chvrf_t)

# vman calls code_sign_verify VmanPackage
polaris_code_verify_domtrans(polaris_vman_t)

# vm_net_dev_utilization reads /proc/2962/net/dev
kernel_read_network_state(polaris_vman_t)

polaris_iosd_vcpu_read(polaris_vman_t)

# /usr/binos/conf/cgroup_reports.sh
polaris_utility_domain_template(cgroup_reports)

polaris_bexecute_domain(polaris_cgroup_reports_t, polaris_cgroup_reports_exec_t)
polaris_bexecute_domtrans(polaris_cgroup_reports_t)
# inherited as stdin/sdtout from vman
polaris_vman_use_fifo(polaris_cgroup_reports_t)

corecmd_exec_bin(polaris_cgroup_reports_t)
auth_use_nsswitch(polaris_cgroup_reports_t)

fs_read_cgroup_files(polaris_cgroup_reports_t)
fs_list_cgroup_dirs(polaris_cgroup_reports_t)

# cgroup_reports.sh creates misc files under /tmp
type polaris_cgroup_reports_tmp_t;
files_type(polaris_cgroup_reports_tmp_t)
files_tmp_filetrans(polaris_cgroup_reports_t, polaris_cgroup_reports_tmp_t, file)

```

```

manage_files_pattern(polaris_cgroup_reports_t, polaris_cgroup_reports_tmp_t, polaris_cgroup_reports_tmp_t)
fs_getattr_tmpfs(polaris_cgroup_reports_t)

# /usr/binos/conf/vman_techsupport.sh
polaris_utility_domain_template(vman_tech)

polaris_bexecute_domain(polaris_vman_tech_t, polaris_vman_tech_exec_t)
polaris_bexecute_domtrans(polaris_vman_tech_t)
# inherited as stdin/stdout from vman
polaris_vman_use_fifo(polaris_vman_tech_t)

# vman_techsupport.sh starts virsh -c qemu:///system list --all
gen_require(
    type virsh_t;
    type virsh_exec_t;
)
domtrans_pattern(polaris_vman_tech_t, virsh_exec_t, virsh_t)

# starts ip link show
sysnet_domtrans_ifconfig(polaris_vman_tech_t)

# starts brctl show
brctl_domtrans(polaris_vman_tech_t)

corecmd_exec_bin(polaris_vman_tech_t)
auth_use_nsswitch(polaris_vman_tech_t)

polaris_proc_rmonbifo_read(polaris_vman_tech_t)
polaris_chasfs_read(polaris_vman_tech_t)
polaris_cpld_read(polaris_vman_tech_t)

# starts ps aux
kernel_read_system_state(polaris_vman_tech_t)
domain_read_all_domains_state(polaris_vman_tech_t)
dev_read_sysfs(polaris_vman_tech_t)
# getattr of stdin/stdout of misc processes
term_getattr_unallocated_ttys(polaris_vman_tech_t)
term_read_console(polaris_vman_tech_t)

# reads /bootflash/virtual-instance/
polaris_disk_vman_read(polaris_vman_tech_t)

# find /etc/libvirt/lxc -name *.xml -print
virt_read_config(polaris_vman_tech_t)
# no interface that lists virt_etc_rw_t dir
gen_require(
    type virt_etc_rw_t;
)

```

```

list_dirs_pattern(polaris_vman_tech_t, virt_etc_rw_t, virt_etc_rw_t)

# find /var/run/libvirt -name *.xml -maxdepth 2 -print
virt_read_pid_files(polaris_vman_tech_t)
# no interface that lists virt_var_run_t dir
gen_require(
    type virt_var_run_t;
)
list_dirs_pattern(polaris_vman_tech_t, virt_var_run_t, virt_var_run_t)
# no interface that lists virt_lxc_var_run_t dir
gen_require(
    type virt_lxc_var_run_t;
)
list_dirs_pattern(polaris_vman_tech_t, virt_lxc_var_run_t, virt_lxc_var_run_t)
# no interface that lists qemu_var_run_t dir
gen_require(
    type qemu_var_run_t;
)
list_dirs_pattern(polaris_vman_tech_t, qemu_var_run_t, qemu_var_run_t)
#allow read of /run/libvirt/qemu
read_files_pattern(polaris_vman_tech_t, qemu_var_run_t, qemu_var_run_t)

# by some strange reason /var/run/libvirt/network is under dnsmasq_var_run_t label
dnsmasq_read_pid_files(polaris_vman_tech_t)
# no interface that lists dnsmasq_var_run_t dir
gen_require(
    type dnsmasq_var_run_t;
)
list_dirs_pattern(polaris_vman_tech_t, dnsmasq_var_run_t, dnsmasq_var_run_t)

polaris_vman_var_read(polaris_vman_tech_t)

# cat /proc/net/dev
kernel_read_network_state(polaris_vman_tech_t)

# find /sys/class/net -name intsvc* -type d -print
dev_list_sysfs(polaris_vman_tech_t)

# grep over /varied/ovf-env.xml
polaris_disk_varied_read(polaris_vman_tech_t)

# writes into /tmp/vman_techsupport
polaris_vman_tmp_manage(polaris_vman_tech_t)

# find over /sys/fs/cgroup/memory/machine
fs_list_cgroup_dirs(polaris_vman_tech_t)
# cat /sys/fs/cgroup/memory/machine/memory.limit_in_bytes
fs_read_cgroup_files(polaris_vman_tech_t)

```

```

# runs df command
fs_getattr_xattr_fs(polaris_vman_tech_t)
fs_getattr_all_fs(polaris_vman_tech_t)
files_getattr_all_dirs(polaris_vman_tech_t)
# getattr over /run/netns/2
fs_read_nsfs_files(polaris_vman_tech_t)

# check existence of vman btrace file before passing it to btdecode
polaris_vman_bt_getattr(polaris_vman_tech_t)
# check existence of pman btrace file for vman before passing it to btdecode
polaris_pman_bt_getattr(polaris_vman_tech_t)

# vman_techsupport.sh creates misc files under /tmp
type polaris_vman_tech_tmp_t;
files_type(polaris_vman_tech_tmp_t)
files_tmp_filetrans(polaris_vman_tech_t, polaris_vman_tech_tmp_t, file)
manage_files_pattern(polaris_vman_tech_t, polaris_vman_tech_tmp_t, polaris_vman_tech_tmp_t)

#allow vman tech support to read container logs including listing dirs
gen_require(
    type virt_log_t;
)
list_dirs_pattern(polaris_vman_tech_t, virt_log_t, virt_log_t)
virt_read_log(polaris_vman_tech_t)

# allow vman to access /etc/passwd
auth_map_passwd(polaris_vman_shell_t)

#vman does lvm storage management e.g. vman_libvirt_strg_available_by_pool
lvm_domtrans(polaris_vman_t)

#Allow read of pid files e.g. /run/udev/data/b7:34
udev_read_pid_files(polaris_vman_t)

#allow vman to connect to the WAAS container for serial vman_register_socket
polaris_waas_stream_connect(polaris_vman_t)

# allow vman to pgrep
# allow to get getattr of /proc file system
domain_read_all_domains_state(polaris_vman_t)

# allow vman to kill LXC container process that hasn't shutdown
# inspite of a shutdown command
gen_require(
    type virtd_lxc_t;
)

```

polaris\_vman\_kill\_process(virt\_d\_lxc\_t)

# allow vman to rsync using ioxman\_syslib.sh  
rsync\_entry\_type(polaris\_vman\_t)  
corenet\_tcp\_connect\_rsync\_port(polaris\_vman\_t)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisvman.te  
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#  
# March 2017, Victor Kamensky  
#  
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#

/tmp/.ncsshd\_authorized\_keys(/.\*)? gen\_context(system\_u:object\_r:polaris\_ncsshd\_keys\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispsd.fc  
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#

## <summary>Polaris Btrace Policy Rules.</summary>

#####  
# Obfl policy  
#####

#####  
## <summary>  
## Read obfl files (under /obfl, /varied/obfl, etc)  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>  
## </param>  
## <rolebase/>  
#

interface(`polaris\_obfl\_data\_read`,`

```

gen_require(`
    type polaris_obfl_data_t;
        type root_t;
`)

    read_lnk_files_pattern($1, root_t, polaris_obfl_data_t)
read_files_pattern($1, polaris_obfl_data_t, polaris_obfl_data_t)
    list_dirs_pattern($1, polaris_obfl_data_t, polaris_obfl_data_t)
    allow $1 polaris_obfl_data_t:file map;
`)

#####
## <summary>
##   Manage obfl files (under /obfl, /varied/obfl, etc
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_obfl_data_manage`,`
    gen_require(`
        type polaris_obfl_data_t;
        type root_t;
        type var_t;
    `)

    read_lnk_files_pattern($1, root_t, polaris_obfl_data_t)
    manage_files_pattern($1, { var_t polaris_obfl_data_t }, polaris_obfl_data_t)
    manage_dirs_pattern($1, { var_t polaris_obfl_data_t }, polaris_obfl_data_t)
    allow $1 polaris_obfl_data_t:file map;
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisobfl.if

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```

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#
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#
## <summary>Polaris Btrace Policy Rules.</summary>

```

```
#####
# RPC policy
#####

#####

## <summary>
##   Work with ripc
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_ripc',`
    corenet_tcp_bind_generic_node($1)
    allow $1 self:tcp_socket { getattr setopt getopt bind create listen accept connect read write };
    # bipc would like to issue "setsockopt(sock, SOL_SOCKET, SO_VRF," which requires
    # net_admin and sys_admin capabilities
    allow $1 self:capability { net_admin sys_admin };

    polaris_socketat_nsfs_read($1)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisripc.if

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```
#
# March 2017, Victor Kamensky
#
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#

```

```
/tmp/sw/boot(/.*)?      gen_context(system_u:object_r:polaris_boot_tmp_t,s0)
/tmp/sw/iso(/.*)?      gen_context(system_u:object_r:polaris_boot_tmp_t,s0)
/tmp/bootup_timestamp  gen_context(system_u:object_r:polaris_boot_tmp_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboot.fc

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```
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```



```

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#

# polarisservicemgr file contexts place holder

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisservicemgr.fc
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#
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#
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#

## <summary>Polaris polarisboothelper Policy Rules.</summary>

#####
## <summary>
##   Read any regular file/directory from /tmp/udev.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_udev_tmp_read`,`
    gen_require(`
        type polaris_udev_tmp_files_t;
    `)
    read_files_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
    list_dirs_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
`)

#####
## <summary>
##   Manage any regular file/directory from /tmp/udev.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_udev_tmp_manage`,`
    gen_require(`

```

```

        type polaris_udev_tmp_files_t;
    ')
    manage_dirs_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
    manage_files_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
')

```

```
#####
```

```

## <summary>
##   Listdir of any regular directory from /tmp/udev.
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_udev_tmp_list_dirs`,`
    gen_require(`
        type polaris_udev_tmp_files_t;
    `)
    list_dirs_pattern($1, polaris_udev_tmp_files_t, polaris_udev_tmp_files_t)
')

```

```
#####
```

```

## <summary>
##   Watch udev_tmp_files directories and files
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#

```

```

interface(`polaris_udev_tmp_watch`,`
    gen_require(`
        type polaris_udev_tmp_files_t;
    `)
    allow $1 polaris_udev_tmp_files_t:{ dir file } watch;
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboothelper.if

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```

#
# March 2017, Victor Kamensky
#

```

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#

/usr/cpp/bin/cpp\_driver -- gen\_context(system\_u:object\_r:polaris\_cpp\_driver\_exec\_t,s0)

/usr/cpp/bin/cpp\_driver\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_driver\_exec\_t,s0)

/usr/cpp/bin/cpp\_driver\_us\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_driver\_exec\_t,s0)

/usr/cpp/bin/cpp\_driver\_vwlc -- gen\_context(system\_u:object\_r:polaris\_cpp\_driver\_exec\_t,s0)

/usr/cpp/bin/cpp\_driver\_vwlc\_ledp -- gen\_context(system\_u:object\_r:polaris\_cpp\_driver\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscppdriver.fc

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#

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#

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#

/usr/binos/conf/mcp\_monitor\_process\_batchmode.sh --

gen\_context(system\_u:object\_r:polaris\_monitor\_process\_exec\_t,s0)

/usr/binos/conf/pkg\_summary.sh -- gen\_context(system\_u:object\_r:polaris\_pkg\_summary\_exec\_t,s0)

/usr/binos/conf/pkg\_to\_tree.sh -- gen\_context(system\_u:object\_r:polaris\_pkg\_to\_tree\_exec\_t,s0)

/tmp/myhostname gen\_context(system\_u:object\_r:polaris\_hm\_tmp\_t,s0)

/tmp/show\_provision\_tmp(/.\*)? gen\_context(system\_u:object\_r:polaris\_show\_provision\_tmp\_t,s0)

/tmp/fs\_lock\_bootflash gen\_context(system\_u:object\_r:polaris\_cli\_fs\_cmds\_tmp\_t,s0)

# used by "sh pla so filesystem bootflash: de" CLI

/usr/binos/conf/mcp\_cli\_fs\_cmds.sh -- gen\_context(system\_u:object\_r:polaris\_cli\_fs\_cmds\_exec\_t,s0)

# used by "show platform software yang-management process monitor" CLI

/usr/binos/conf/mcp\_monitor\_dmi\_proc.sh --

gen\_context(system\_u:object\_r:polaris\_monitor\_dmi\_process\_exec\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarishm.fc

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#

# August 2017, Shawn Lu

#

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#

## <summary>Polaris odm Policy Rules.</summary>

```
#####
## <summary>
## Mqipc channel in sub directory and multiple servers on TDL
## channel is not supported by autogen code. ODM odm_clnt2svr_data
## channel is one of those. Allow domain to be one server on it.
## ODM elastic value is 2 now, add more if need in the future.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="mqipc_label">
##   <summary>
##     Mqipc channel file label.
##   </summary>
## </param>
#
interface(`polaris_odm_clnt2svr_mqipc_create`,`
    gen_require(`
        type polaris_odm_client2server_data_mqipc_t;
    `)
    polaris_mqipc_create_name_dir($1, polaris_odm_client2server_data_mqipc_t, odm_clnt2svr_data-b1)
    polaris_mqipc_create_name_dir($1, polaris_odm_client2server_data_mqipc_t, odm_clnt2svr_data-b0)
    polaris_mqipc_create_name_dir($1, polaris_odm_client2server_data_mqipc_t, odm_clnt2svr_data)
)`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisodm.if

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```
#
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#

```

```
## <summary>Polaris install_mgr Policy Rules.</summary>
```

```
#####
## <summary>
##   Read /tmp/sw/inst_tmp_1 files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>

```

```

## </param>
#
interface(`polaris_install_mgr_tmp_read`,`
gen_require(
    type polaris_install_mgr_tmp_t;
)
    list_dirs_pattern($1, polaris_install_mgr_tmp_t, polaris_install_mgr_tmp_t)
    read_files_pattern($1, polaris_install_mgr_tmp_t, polaris_install_mgr_tmp_t)
    read_lnk_files_pattern($1, polaris_install_mgr_tmp_t, polaris_install_mgr_tmp_t)
)

#####
## <summary>
##   Read/Write /.installer files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_install_disk_manage`,`
gen_require(
    type polaris_disk_bootflash_t;
    type polaris_disk_install_t;
)
    filetrans_pattern(polaris_install_mgr_t,polaris_disk_bootflash_t, polaris_disk_install_t, dir, ".installer")
    filetrans_pattern(polaris_install_mgr_t,polaris_disk_bootflash_t, polaris_disk_install_t, fifo_file, "inot_fifo")
    manage_dirs_pattern($1, {polaris_disk_bootflash_t polaris_disk_install_t}, polaris_disk_install_t)
    manage_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
    manage_fifo_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
)

#####
## <summary>
##   Read /bootflash/.installer files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_install_disk_read`,`
gen_require(
    type polaris_disk_install_t;
)

```

```

    read_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
)

#####
## <summary>
##   Read copylog files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_read_user_file`,`
    gen_require(`
        type polaris_user_file_t;
        type device_t;
    `)

    read_blk_files_pattern($1, device_t, polaris_user_file_t)
    read_files_pattern($1, polaris_user_file_t, polaris_user_file_t)
    read_lnk_files_pattern($1, polaris_user_file_t, polaris_user_file_t)
)

#####
## <summary>
##   getattr for copylog files (location varies by platform)
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_user_file_getattr`,`
    gen_require(`
        type polaris_user_file_t;
        type device_t;
    `)

    getattr_files_pattern($1, polaris_user_file_t, polaris_user_file_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisinstallmgr.if

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```
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#
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisjvm.fc
```

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```
dnl  
dnl April 2018, Victor Kamensky  
dnl  
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dnl  
dnl Crankshaft (Overlord, Utah, Goldbeach, Neptune, TSN and Supernova) Platform Max Bay Limits  
max_bay_map_set(`rp', `per_bay', 0)  
max_bay_map_set(`cc', `per_bay', 19)  
max_bay_map_set(`fp', `per_bay', 0)  
  
max_bay_ripc_map_set(`rp', `per_bay', 0)  
max_bay_ripc_map_set(`cc', `per_bay', 19)  
max_bay_ripc_map_set(`fp', `per_bay', 0)  
  
max_bay_ripc_map_set(`rp', `global', 0)  
max_bay_ripc_map_set(`cc', `global', 19)  
max_bay_ripc_map_set(`fp', `global', 0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/crankshaftmaps.m4
```

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```
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#
```

```
/usr/bin/vconfd_script_reboot\sh -- gen_context(system_u:object_r:polaris_vconfd_reboot_exec_t,s0)  
/usr/bin/vconfd_script_if_reset\sh -- gen_context(system_u:object_r:polaris_vconfd_ifreset_exec_t,s0)  
/usr/bin/vconfd_script_get_config\sh -- gen_context(system_u:object_r:polaris_vconfd_cfg_exec_t,s0)  
/usr/bin/vconfd_script_vmanage_list_stats\sh --
```

```

gen_context(system_u:object_r:polaris_vconfd_history_exec_t,s0)
/usr/bin/vconfd_script_vmanage_clear_stats\,sh --
gen_context(system_u:object_r:polaris_vconfd_history_exec_t,s0)
/usr/bin/vconfd_script_activate\,sh -- gen_context(system_u:object_r:polaris_vconfd_software_exec_t,s0)
/usr/bin/mcp_upgrade_wrapper\,sh -- gen_context(system_u:object_r:polaris_vconfd_software_exec_t,s0)
/usr/bin/vconfd_script_nms_action\,sh -- gen_context(system_u:object_r:polaris_vconfd_nms_exec_t,s0)
/usr/bin/vconfd_script_add_chassis_numbers_to_ztp\,sh --
gen_context(system_u:object_r:polaris_vconfd_device_exec_t,s0)
/usr/bin/vconfd_script_remove_chassis_numbers_from_ztp\,sh --
gen_context(system_u:object_r:polaris_vconfd_device_exec_t,s0)
/usr/bin/vconfd_script_upload_chassis_number_file\,sh --
gen_context(system_u:object_r:polaris_vconfd_device_exec_t,s0)
/usr/bin/reset-conf -- gen_context(system_u:object_r:polaris_vconfd_reset_exec_t,s0)
/usr/bin/reset-logs -- gen_context(system_u:object_r:polaris_vconfd_reset_exec_t,s0)
/usr/bin/patch\,sh -- gen_context(system_u:object_r:polaris_vconfd_software_exec_t,s0)
/usr/bin/vconfd_script_reset_vsmart_serial_list\,sh --
gen_context(system_u:object_r:polaris_vconfd_reset_exec_t,s0)

/usr/bin/vconfd_script_cert\,sh -- gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_show_cert\,sh -- gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_show_root_ca_cert\,sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_upload_root_ca_cert_chain\,sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_uninstall_root_ca_cert_chain\,sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_tlsproxy_install_certs\,sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)
/usr/bin/vconfd_script_tlsproxy_remove_certs\,sh --
gen_context(system_u:object_r:polaris_vconfd_cert_exec_t,s0)

/usr/bin/vconfd_script_csr\,sh -- gen_context(system_u:object_r:polaris_vconfd_csr_exec_t,s0)
/usr/bin/vconfd_script_show_csr\,sh -- gen_context(system_u:object_r:polaris_vconfd_csr_exec_t,s0)
/usr/bin/vconfd_script_sign_csr\,sh -- gen_context(system_u:object_r:polaris_vconfd_csr_exec_t,s0)
/usr/bin/vconfd_script_upload_vsmart_serial_numbers\,sh --
gen_context(system_u:object_r:polaris_vconfd_serialnum_exec_t,s0)
/usr/bin/vconfd_script_upload_vedge_serial_numbers\,sh --
gen_context(system_u:object_r:polaris_vconfd_serialnum_exec_t,s0)
/usr/bin/vconfd_script_fetch_core_info\,sh -- gen_context(system_u:object_r:polaris_vconfd_crash_exec_t,s0)
# admin-tech scripts skipped defined in some other place
/usr/bin/list_crashtech_files\,sh -- gen_context(system_u:object_r:polaris_vconfd_crash_exec_t,s0)
/usr/bin/vconfd_script_unlock_user\,sh -- gen_context(system_u:object_r:polaris_vconfd_aaa_exec_t,s0)
/usr/bin/vconfd_script_set_password\,sh -- gen_context(system_u:object_r:polaris_vconfd_aaa_exec_t,s0)
/usr/bin/vconfd_script_container\,sh -- gen_context(system_u:object_r:polaris_vconfd_contr_exec_t,s0)
/usr/bin/polaris_iox_precheck\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_install\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_upgrade\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_uninstall\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)

```



```
/usr/bin/polaris_iox_reset\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_postcheck\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_download\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_remove\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_iox_activate\,sh -- gen_context(system_u:object_r:polaris_vconfd_iox_exec_t,s0)
/usr/bin/polaris_utd_sigupdate\,sh -- gen_context(system_u:object_r:polaris_vconfd_utd_exec_t,s0)
/usr/bin/polaris_geo_db_update\,sh -- gen_context(system_u:object_r:polaris_vconfd_geo_exec_t,s0)
/usr/bin/vconfd_script_vping\,sh -- gen_context(system_u:object_r:polaris_vconfd_net_exec_t,s0)
/usr/bin/vconfd_script_vnping\,sh -- gen_context(system_u:object_r:polaris_vconfd_net_exec_t,s0)
/usr/bin/vconfd_script_vtraceroute\,sh -- gen_context(system_u:object_r:polaris_vconfd_net_exec_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscedge.fc

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```
#
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#
```

policy\_module(polaristdlresolve, 1.0);

```
#####
# TDLresolve policy
#####
gen_require(
    attribute polaris_extended_domain;
)
```

```
type polaris_tdlresolve_t;
files_type(polaris_tdlresolve_t)
```

```
files_tmp_filetrans(polaris_extended_domain, polaris_tdlresolve_t, dir, "tdlresolve")
# tdl_boottime.sh uses /tmp/tdlresolve_tmp for some temp files
# which are moved into /tmp/tdlresolve latter
files_tmp_filetrans(polaris_extended_domain, polaris_tdlresolve_t, dir, "tdlresolve_tmp")
```

```
type polaris_global_service_t;
files_type(polaris_global_service_t);
```

```
#####
# rsync policy
#####
gen_require(
    type rsync_t;
    type polaris_btrace_base_t;
```

```
)  
#tdl_cleanup_epochs.sh uses btrace  
allow rsync_t polaris_btrace_base_t:file map;  
#rsync invokes tdl_cleanup_epochs.sh as part of this set /proc/[pid]/oom_score_adj is done  
allow rsync_t self:capability sys_resource;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristdresolve.te
```

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```
#  
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```

```
policy_module(polarisqfp, 1.0);
```

```
polaris_process_domain_template(qfp)
```

```
polaris_cpp_process(polaris_qfp_t)  
polaris_cpp_dev_use(polaris_qfp_t)  
polaris_btrace_data_manage(polaris_qfp_t)  
polaris_crft_data_manage(polaris_qfp_t)  
polaris_chasfs_manage(polaris_qfp_t)  
polaris_lsmapi_dev_use(polaris_qfp_t)  
polaris_persistent_list_dirs(polaris_qfp_t);
```

```
# allow for hot add on azure
```

```
kernel_read_irq_sysctls(polaris_iodbd_t)  
kernel_rw_irq_sysctls(polaris_iodbd_t)
```

```
# allow read variety of system information from sysfs, as well as write
```

```
# into configuration of some pcie devices
```

```
# type=AVC msg=audit(1479597040.739:218): avc: denied { write } for pid=30997 comm="ucode_ctl_rx"  
name="config" dev="sysfs" ino=22363 scontext=system_u:system_r:polaris_qfp_t:s0  
tcontext=system_u:object_r:sysfs_t:s0 tclass=file  
dev_rw_sysfs(polaris_qfp_t)
```

```
# allow to send message to /dev/log
```

```
logging_send_syslog_msg(polaris_qfp_t)
```

```
# allow access to uio devices like /dev/uio0
```

```
dev_rw_userio_dev(polaris_qfp_t)
```

```
# Platforms with QAT v1.7 need map permission also
```

```
# qae device (/dev/icp_adf_ctl)
```

```

type polaris_icp_device_t;
dev_node(polaris_icp_device_t)

allow polaris_qfp_t userio_device_t:chr_file map;

# allow to read /proc/meminfo
kernel_read_system_state(polaris_qfp_t)

# qfp FIA (Feature Invocation Array) resides in /dev/shm/cpp_ucose_dram
# Those are set of instructions assembled by cpp control plane and passed
# to qfp to execute.
polaris_cpp_tmpfs_exec(polaris_qfp_t)

# qfp /var/run pid file
type polaris_qfp_var_run_t;
files_pid_file(polaris_qfp_var_run_t)
manage_files_pattern(polaris_qfp_t, polaris_qfp_var_run_t, polaris_qfp_var_run_t)
manage_dirs_pattern(polaris_qfp_t, polaris_qfp_var_run_t, polaris_qfp_var_run_t)
files_pid_filetrans(polaris_qfp_t, polaris_qfp_var_run_t, { file dir })
# mmap /var/run/dpdk/rte/config
allow polaris_qfp_t polaris_qfp_var_run_t:file map;

# qfp memif directory and file
type polaris_qfp_memif_t;
files_tmp_file(polaris_qfp_memif_t);
# qfp memif interface for binos clients in /tmp/memif
files_tmp_filetrans(polaris_qfp_t, polaris_qfp_memif_t, dir, "memif")
# creates /tmp/binos-IOX/memif
files_tmp_filetrans(polaris_qfp_t, polaris_qfp_memif_t, dir, "binos-IOX")
polaris_qfp_memif_manage(polaris_qfp_t)
# qfp memif interface for container in /bootflash/SHARED-IOX/memif
polaris_disk_type(polaris_qfp_memif_t)
gen_require(
    type polaris_disk_bootflash_t;
)
filetrans_pattern(polaris_qfp_t, polaris_disk_bootflash_t, polaris_qfp_memif_t, dir, "memif")

# work with /bootflash/SHARED-IOX/memif/memif-dp-svr
polaris_utdl_container_dgram_send(polaris_qfp_t)

# work (create/open/read/write) with hugetlfs files
fs_manage_hugetlfs_dirs(polaris_qfp_t)
fs_rw_hugetlfs_files(polaris_qfp_t)
gen_require(
    type hugetlfs_t;
)
allow polaris_qfp_t hugetlfs_t:file create;
# dpdk may unlinks unneeded pages in unmap_unneeded_hugepages function

```

```

allow polaris_qfp_t hugetlbfs_t:file unlink;

allow polaris_qfp_t self:capability { sys_rawio sys_nice sys_admin };
allow polaris_qfp_t self:process setsched;

# is_nic_netmap_capable function, which is used by vnic_cfg_port, needs socket to
# work with interface parameters
allow polaris_qfp_t self:udp_socket create_socket_perms;

ifdef(`crankshaft_family',`
polaris_icc_broken_relocations(polaris_qfp_t)
')

# access to /dev/dash_XXX devices on cranshaft platforms
optional_policy(`
    polaris_dash_dev_use(polaris_qfp_t)
')

# netmap device (/dev/netmap)
type polaris_netmap_device_t;
dev_node(polaris_netmap_device_t)

polaris_netmap_dev_use(polaris_qfp_t)

# access to /dev/icp_XXX device on crankshaft platforms
optional_policy(`
    polaris_icp_dev_use(polaris_qfp_t)
')

# netmap device (/dev/svc_eng_puntNN)
type polaris_sep_device_t;
dev_node(polaris_sep_device_t)

polaris_svc_eng_punt_dev_use(polaris_qfp_t)

# transition and access to /var/log/cdal-tsn-info.log
ifdef(`tsn_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
')

# transition and access to /var/log/cdal-tsn-info.log
ifdef(`blackheart_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
')

# aventus needs access to /sys/devices/platform/cpn-110-master/cpn-110-master
# for boot configuration
# transition and access to /var/log/cdal-tsn-info.log

```

```

ifdef(`aventus_platform',`
gen_require(`
    type syslogd_t;
    ')
polaris_qfp_log_manage("cdal-tsn-info.log")
polaris_ggpio_dev_read_write(polaris_qfp_t)
polaris_ggpio_dev_read_write(syslogd_t)
')

# transition and access to /var/log/cdal-tsn-info.log
ifdef(`cabo_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
    ')

# transition and access to /var/log/cdal-tsn-info.log
ifdef(`supernova_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
    ')

# LOOK AT ME: qfp process links libcrypto.so.1.0.0 which has DT_TEXTREL
# that should be addressed by CSCvj99896, once that is fixed remove below
# under CSCvj99905.
gen_require(`
    type lib_t;
    ')

allow polaris_qfp_t lib_t:file execmod;

# LOOK AT ME: qfp process on TSN LE has executable stack with GNU_STACK marked RWE
# that should be addressed by CSCvk66808, once that is fixed remove below
# under CSCvk66832.
ifdef(`tsn_platform',`
allow polaris_qfp_t self:process execmem;
    ')

# lsmpi replacement punt/inject over domain sockets
polaris_pi_uds_manage(polaris_qfp_t)
polaris_iosd_dgram_send(polaris_qfp_t)

# dpdk code reads CPU model specific register (MSR)
dev_read_cpuid(polaris_qfp_t)

# dpdk code in rte_mp_channel_init function creates and works
# with /var/run/dpdk/rte/mp_socket socket
manage_sock_files_pattern(polaris_qfp_t, polaris_qfp_var_run_t, polaris_qfp_var_run_t)

# dpdk code in dev_uev_socket_fd_create creates and work with
# netlink_kobject_uevent_socket socket

```

```

# Note: radium with QAT v1.7 requires getattr and setopt
allow polaris_qfp_t self:netlink_kobject_uevent_socket { getattr setopt bind create };

# hal_random32_init calls hw_random32_init and it opens /dev/random
dev_read_rand(polaris_qfp_t)

gen_require(
    type sysfs_t;
)
mmap_files_pattern(polaris_qfp_t, sysfs_t, sysfs_t)

# LOOK AT ME: remove after CSCvs34007 fixed
# qfp runs hidedir hide /bootflash/SHARED-IOX/memif
corecmd_exec_bin(polaris_qfp_t)
corecmd_exec_shell(polaris_qfp_t)
auth_use_nsswitch(polaris_qfp_t)

# CSR & C8KV use infiniband and tun/tap devices for Azure
type polaris_infiniband_device_t;
dev_node(polaris_infiniband_device_t)

polaris_infiniband_dev_use(polaris_qfp_t)

kernel_request_load_module(polaris_qfp_t)
allow polaris_qfp_t self:netlink_rdma_socket { bind create setopt };
allow polaris_qfp_t self:capability { ipc_lock net_admin net_raw };
allow polaris_qfp_t self:netlink_route_socket rw_netlink_socket_perms;
allow polaris_qfp_t self:tun_socket { create relabelfrom relabelto };
corenet_rw_tun_tap_dev(polaris_qfp_t)

# CSR Azure IO model requies read access
gen_require(
    type proc_net_t;
)
allow polaris_qfp_t proc_net_t:file { read };

# manange MLX NIC socket files in /var/tmp/net_mlx5*
type polaris_qfp_var_tmp_t;
files_tmp_file(polaris_qfp_var_tmp_t);
files_tmp_filetrans(polaris_qfp_t, polaris_qfp_var_tmp_t, { sock_file })
manage_sock_files_pattern(polaris_qfp_t, polaris_qfp_var_tmp_t, polaris_qfp_var_tmp_t)

# rm from coreutils-8.30 wants to know filesystem type
fs_getattr_xattr_fs(polaris_qfp_t)

# allow create of dir /bootflash/SHARED-IOX on first install of VM
create_dirs_pattern(polaris_qfp_t, polaris_disk_bootflash_t, polaris_disk_bootflash_t)

```

```

polaris_cpld_read(polaris_qfp_t, polaris_sysfs_cpld_t, polaris_sysfs_cpld_t)

# tsn needs access to /sys/devices/platform/cpn-110-master/cpn-110-master
# for boot configuration
#ifdef(^tsn_platform',`
    polaris_ggpio_dev_read_write(polaris_qfp_t)
`)

# blackheart needs access to /sys/devices/platform/cpn-110-master/cpn-110-master
# for boot configuration
#ifdef(^blackheart_platform',`
    polaris_ggpio_dev_read_write(polaris_qfp_t)
`)

# sparrow needs access to /sys/devices/platform/cpn-110-master/cpn-110-master
# for boot configuration
# Also needs access to cdal-tsn-info.log
#ifdef(^sparrow_platform',`
    polaris_qfp_log_manage("cdal-tsn-info.log")
    polaris_ggpio_dev_read_write(polaris_qfp_t)
`)

# ucode also needs access to ttyUSB4
#ifdef(^cabo_platform',`
    term_use_usb_ttys(polaris_qfp_t)
`)

# qfp starts /usr/binos/bin/net_hotremove-vxe.sh
init_read_script_files(polaris_qfp_t)

# access to /dev/dash_XXX devices on cranshaft platforms
optional_policy(`
    polaris_htx_dgram_send(polaris_qfp_t)
`)

# net_hotremove-vxe.sh that works with /tmp/iodb
polaris_iodb_tmp_manage(polaris_qfp_t)
# net_hotremove-vxe.sh sends signal to iodbd.sh
gen_require(`
    type polaris_iodbd_t;
`)
allow polaris_qfp_t polaris_iodbd_t:process signal;
# net_hotremove-vxe.sh reads /proc/sys/vm/nr_hugepages
kernel_read_vm_sysctls(polaris_qfp_t)

# long running helper script iodbd.sh

```

```

polaris_process_domain_template(iodbd)

# iodbd.sh started by /etc/init.d/binos that runs under initrc_t
gen_require(
    type initrc_t;
)
polaris_iodbd_domtrans(initrc_t)

polaris_boot_tmp_read(polaris_iodbd_t)
polaris_chasfs_manage(polaris_iodbd_t)
polaris_cpld_read(polaris_iodbd_t)
polaris_rmonbifo_tmp_read(polaris_iodbd_t)

auth_use_nsswitch(polaris_iodbd_t)
corecmd_exec_bin(polaris_iodbd_t)

# hot add interfaces virtio/sriov
dev_manage_sysfs_dirs(polaris_iodbd_t)
polaris_sysfs_manage(polaris_iodbd_t)

# write into sysfs file like /sys/devices/pci0000:00/0000:00:03.2/config
dev_rw_sysfs(polaris_iodbd_t)

# read/write /run/dpdk/rte/config
manage_files_pattern(polaris_iodbd_t, polaris_qfp_var_run_t, polaris_qfp_var_run_t)

# lspci reads /etc/modprobe.d
modutils_read_module_config(polaris_iodbd_t)
# lspci reads /lib/modules/5.4.40/modules.softdep
files_read_kernel_modules(polaris_iodbd_t)
files_map_kernel_modules(polaris_iodbd_t)

# runs dmidecode
dmidecode_domtrans(polaris_iodbd_t)
# dmidecode when run in this context needs access initrc stdin/stdout
gen_require(
    type dmidecode_t;
)
init_rw_stream_sockets(dmidecode_t)

# calls ethtool -i intsvc0
sysnet_domtrans_ifconfig(polaris_iodbd_t)

# reads /etc/rc.d/init.d/binos_functions-pd-iodb
init_read_script_files(polaris_iodbd_t)

# read /proc/sys/vm/nr_hugepages
kernel_read_vm_sysctls(polaris_iodbd_t)

```



```

# cat /sys/class/net/intsvc0/address
dev_read_sysfs(polaris_iodbd_t)

# read /proc/cmdline
kernel_read_system_state(polaris_iodbd_t)

polaris_iodb_tmp_manage(polaris_iodbd_t)

type polaris_iodb_tmp_t;
files_tmp_file(polaris_iodb_tmp_t)

# /tmp/iodb is created by /etc/init.d/binos that runs under initrc_t
gen_require(`
    type initrc_t;
`)
files_tmp_filetrans(initrc_t, polaris_iodb_tmp_t, dir, "iodb")
polaris_iodb_tmp_manage(initrc_t)

# udev_t can drop entries into /tmpi/iodb to process
gen_require(`
    type udev_t;
`)
polaris_iodb_tmp_manage(udev_t)

# Radium and Thallium need to check rommon version when initializing static
# interface table (access /proc/rmonbifo).
optional_policy(`
    polaris_proc_rmonbifo_read(polaris_qfp_t)
`)

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## <summary>Polaris cpp_ha Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppha.if
No license file was found, but licenses were detected in source scan.

```

```
#
# March 2017, Victor Kamensky
#
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#

policy_module(polarisngwctblmgr, 1.0);

gen_require(
    type polaris_ngwc_tbl_mgr_t;
)

polaris_btrace_data_manage(polaris_ngwc_tbl_mgr_t)
polaris_crft_data_manage(polaris_ngwc_tbl_mgr_t)
polaris_chasfs_manage(polaris_ngwc_tbl_mgr_t)
polaris_tdlresolve_read(polaris_ngwc_tbl_mgr_t)
polaris_tdlldb_list_dirs(polaris_ngwc_tbl_mgr_t)
polaris_cpld_read(polaris_ngwc_tbl_mgr_t)
polaris_lua_read(polaris_ngwc_tbl_mgr_t)
polaris_flashlib_read(polaris_ngwc_tbl_mgr_t)

polaris_ripc_sman_ui_serv_connect(polaris_ngwc_tbl_mgr_t)

allow polaris_ngwc_tbl_mgr_t self:capability dac_override;

polaris_dyncfg_tmp_read(polaris_ngwc_tbl_mgr_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisngwctblmgr.te

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
# polarisfmanrp file contexts place holder
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfmanrp.fc

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```
dnl
dnl April 2018, Victor Kamensky
dnl
```

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dnl

```
define(`polaris_ripc_service_server_aux',`dnl
```

```
polaris_ripc_$2_bind($3)
```

```
polaris_ripc($3)
```

```
')
```

```
define(`polaris_ripc_service_server_full',`dnl
```

```
polaris_ripc_service_server_aux(ripc_label($1), ripc_stem($1), process_label($2))
```

```
')
```

```
define(`polaris_ripc_service_server',`dnl
```

```
ifelse(ripc_type_map($1), `', `polaris_ripc_service_server_full($1, $2, $3, $4, $5)')
```

```
ripc_type_map_set(ripc_label($1), process_label($2))
```

```
')
```

```
define(`polaris_ripc_service_client_aux',`dnl
```

```
polaris_ripc($3)
```

```
polaris_ripc_$2_connect($3)
```

```
')
```

```
define(`polaris_ripc_service_client',`dnl
```

```
polaris_ripc_service_client_aux(ripc_label($1), ripc_stem($1), process_label($2))dnl
```

```
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/polaris\_ipc\_ripc\_te.m4

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#

# August 2017, Victor Kamensky

#

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#

```
/usr/binos/conf/audit_log.sh -- gen_context(system_u:object_r:polaris_audit_log_exec_t,s0)
```

```
/usr/binos/conf/audit_snapshot.sh -- gen_context(system_u:object_r:polaris_audit_log_exec_t,s0)
```

```
/tmp/package_biv_sums -- gen_context(system_u:object_r:polaris_kgv_data_t,s0)
```

```
/usr/bin/code_sign_verify -- gen_context(system_u:object_r:polaris_code_verify_exec_t,s0)
```

```
/usr/sbin/boot_verify_package -- gen_context(system_u:object_r:polaris_code_verify_exec_t,s0)
```

```
/usr/sbin/kgv_update -- gen_context(system_u:object_r:polaris_code_verify_exec_t,s0)
```

```
/dev/shm/sem\updatepcr8d_msg_sem gen_context(system_u:object_r:polaris_code_verify_tmpfs_t,s0)
```

```
# /dev/aikido
```

```
/dev/aikido -c gen_context(system_u:object_r:polaris_aikido_device_t,s0)
```

```

/usr/binos/conf/mcp_upgrade_hwprg.sh      gen_context(system_u:object_r:polaris_hw_upgrade_exec_t,s0)
/usr/binos/conf/mcp_upgrade_hwprg_fpga.sh  gen_context(system_u:object_r:polaris_hw_upgrade_exec_t,s0)
/usr/binos/conf/mcp_upgrade_hwprg_cpld.sh  gen_context(system_u:object_r:polaris_hw_upgrade_exec_t,s0)
/usr/binos/conf/mcp_upgrade_hwprg_cmds.sh  gen_context(system_u:object_r:polaris_hw_upgrade_exec_t,s0)
/usr/binos/conf/mcp_upgrade_hwprg_utils.sh gen_context(system_u:object_r:polaris_hw_upgrade_exec_t,s0)
/usr/binos/bin/tam_fw_upgrade              gen_context(system_u:object_r:polaris_hw_upgrade_exec_t,s0)

/usr/binos/conf/mcp_upgrade_rommon.sh      gen_context(system_u:object_r:polaris_rom_upgrade_exec_t,s0)
/usr/binos/conf/mcp_upgrade_rommon_cmds.sh gen_context(system_u:object_r:polaris_rom_upgrade_exec_t,s0)
/usr/binos/conf/mcp_upgrade_rommon_helper.sh gen_context(system_u:object_r:polaris_rom_upgrade_exec_t,s0)
/usr/binos/conf/mcp_upgrade_rommon_x86.sh  gen_context(system_u:object_r:polaris_rom_upgrade_exec_t,s0)

/dev/scansta                              -c gen_context(system_u:object_r:polaris_scansta_device_t,s0)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristws.fc

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```

#
# June 2020, Cuiyan Ma
#
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#

policy_module(polarisissucompcheck, 1.0);
polaris_process_domain_template(issu_comp_check)

corecmd_exec_bin(polaris_issu_comp_check_t)
corecmd_exec_shell(polaris_issu_comp_check_t)

polaris_chasfs_manage(polaris_issu_comp_check_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_issu_comp_check_t)

# For reading tracekey from /tmp/tmppub/tracekey_cache/usr/bin/rotee
polaris_btrace_tmppub_read(polaris_issu_comp_check_t)

# For reading /sys/devices/platform/cpld/platform_type
polaris_cpld_read(polaris_issu_comp_check_t)

# For reading /tmp/sw/boot/pkginfo
polaris_boot_tmp_read(polaris_issu_comp_check_t)

# For ls on /tmp/ufs/crashinfo
optional_policy(`

```

```

polaris_ncd_tmp_read(polaris_issu_comp_check_t
')

# work with /tmp files
type polaris_issu_comp_check_tmp_t;
files_tmp_file(polaris_issu_comp_check_tmp_t)
manage_dirs_pattern(polaris_issu_comp_check_t, tmp_t, polaris_issu_comp_check_tmp_t)
manage_files_pattern(polaris_issu_comp_check_t, polaris_issu_comp_check_tmp_t,
polaris_issu_comp_check_tmp_t)
files_tmp_filetrans(polaris_issu_comp_check_t, polaris_issu_comp_check_tmp_t, { file dir })

# For using push_using_rsync
polaris_chvrf_domtrans(polaris_issu_comp_check_t)

gen_require(
    type rsync_t;
)
rsync_entry_domtrans(polaris_issu_comp_check_t, rsync_t)
polaris_manage_rsync_tmplog_dir(polaris_issu_comp_check_t)

# rsync inherits issu_comp_check.sh's stdout/stderr fifo files
allow rsync_t polaris_issu_comp_check_t:fifo_file write;

allow polaris_issu_comp_check_t self:capability sys_resource;

# reads /tmp/remote_sw_verinfo.txt
gen_require(
    type rsync_tmp_t;
)
read_files_pattern(polaris_issu_comp_check_t, rsync_tmp_t, rsync_tmp_t)

# use of errmsg.sh
polaris_script_errmsg_use(polaris_issu_comp_check_t)

# hwutil modifies /sys/bus/i2c/drivers/pca9548/1-0076/reg_control
# TODO: label sysfs so that reg control gets its own label
dev_rw_sysfs(polaris_issu_comp_check_t)

# allow locking of /tmp/sysctrl_i2c.lck
# TODO: this file probably deserves its own label when created by cm_rp
polaris_cm_rp_tmp_manage(polaris_issu_comp_check_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisissucompcheck.te
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#
# April 2017, Victor Kamensky

```

```

#
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#

## <summary>Polaris dmi_opdatamgrd Policy Rules.</summary>

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisdmiopdatamgrd.if
No license file was found, but licenses were detected in source scan.

#
# May 2017, Victor Kamensky
#
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#

policy_module(polarisptcd, 1.0);

gen_require(
    type polaris_pttcd_t;
)

polaris_btrace_data_manage(polaris_pttcd_t)
polaris_crft_data_manage(polaris_pttcd_t)
polaris_chasfs_manage(polaris_pttcd_t)
polaris_tdlresolve_read(polaris_pttcd_t)
polaris_tdlldb_list_dirs(polaris_pttcd_t)
polaris_lua_read(polaris_pttcd_t)
polaris_flashlib_read(polaris_pttcd_t)

auth_use_nsswitch(polaris_pttcd_t)
polaris_cpld_read(polaris_pttcd_t)

allow polaris_pttcd_t self:netlink_route_socket r_netlink_socket_perms;

polaris_disk_bootflash_search(polaris_pttcd_t)
polaris_bootflash_manage(polaris_pttcd_t)
polaris_persistent_getattr(polaris_pttcd_t)

type polaris_pttcd_tmp_t;
files_tmp_file(polaris_pttcd_tmp_t)
polaris_systemd_tmpfiles_tmp_filetrans(polaris_pttcd_tmp_t, dir, "interceptor")
gen_require(
    type polaris_btrace_tmppub_t;
)
manage_dirs_pattern(polaris_pttcd_t, { polaris_pttcd_tmp_t polaris_btrace_tmppub_t }, polaris_pttcd_tmp_t)

```

```
manage_files_pattern(polaris_pttcd_t, { polaris_pttcd_tmp_t polaris_btrace_tmppub_t }, polaris_pttcd_tmp_t)
manage_lnk_files_pattern(polaris_pttcd_t, { polaris_pttcd_tmp_t polaris_btrace_tmppub_t }, polaris_pttcd_tmp_t)
```

```
allow polaris_pttcd_t self:tcp_socket create_stream_socket_perms;
allow polaris_pttcd_t self:udp_socket create_socket_perms;
```

```
corenet_tcp_bind_generic_node(polaris_pttcd_t)
corenet_tcp_bind_polaris_pttcd_port(polaris_pttcd_t)
corenet_tcp_connect_polaris_pttcd_port(polaris_pttcd_t)
corenet_udp_sendrecv_polaris_pttcd_port(polaris_pttcd_t)
```

```
sysnet_read_config(polaris_pttcd_t)
```

```
allow polaris_pttcd_t self:capability sys_resource;
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispttcd.te
```

No license file was found, but licenses were detected in source scan.

```
#
# August 2017, Shawn Lu
#
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#
```

```
policy_module(polarisrrmmgr, 1.0);
```

```
gen_require(^
    type polaris_rrm_mgr_t;
')
```

```
polaris_btrace_data_manage(polaris_rrm_mgr_t)
polaris_chasfs_manage(polaris_rrm_mgr_t)
polaris_tdlresolve_read(polaris_rrm_mgr_t)
polaris_tdlldb_list_dirs(polaris_rrm_mgr_t)
polaris_cpld_read(polaris_rrm_mgr_t)
polaris_lua_read(polaris_rrm_mgr_t)
polaris_flashlib_read(polaris_rrm_mgr_t)
```

```
polaris_ripc_sman_ui_serv_connect(polaris_rrm_mgr_t)
```

```
polaris_db_tdlldb_dir_use(polaris_rrm_mgr_t)
```

```
# allow to use setrlimit
allow polaris_rrm_mgr_t self:process setrlimit;
allow polaris_rrm_mgr_t self:capability sys_resource;
allow polaris_rrm_mgr_t self:capability dac_override;
```

```
# stuff related to vrf support of the socket
polaris_lfts_dev_use(polaris_rrm_mgr_t)
polaris_socketat_nsfs_read(polaris_rrm_mgr_t)

# allow to open udp socket on port 12134
corenet_udp_bind_polaris_rrm_mgr_port(polaris_rrm_mgr_t)
corenet_udp_bind_generic_node(polaris_rrm_mgr_t)
allow polaris_rrm_mgr_t self:udp_socket { create_socket_perms recv_msg send_msg };

corenet_udp_bind_polaris_rrm_clnt_port(polaris_rrm_mgr_t)

polaris_odm_clnt2svr_mqipc_create(polaris_rrm_mgr_t)

# access "/bootflash/.dbpersist"
polaris_tdlldbpersist_setup(polaris_rrm_mgr_t)

# access /tmp/rp/tdldb/persistent-config/ dir and files in this dir
polaris_tmp_tdlldb_persist_setup(polaris_rrm_mgr_t)

logging_send_syslog_msg(polaris_rrm_mgr_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrrmmgr.te

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```
#
# April 2017, Victor Kamensky
#
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#
```

```
policy_module(polariscyan, 1.0);
```

```
# dyncfg_setup.sh runs under cmand label
```

```
polaris_process_domain_template(dyncfg)
```

```
polaris_btrace_data_manage(polaris_dyncfg_t)
```

```
polaris_cpld_read(polaris_dyncfg_t)
```

```
polaris_lua_read(polaris_dyncfg_t)
```

```
polaris_cpld_dev_use(polaris_dyncfg_t)
```

```
polaris_rmonbifo_tmp_read(polaris_dyncfg_t)
```

```
polaris_chasfs_read(polaris_dyncfg_t)
```

```
# this script works with /tmp/dyncfg files
```

```
type polaris_dyncfg_tmp_t;
```



```

files_tmp_file(polaris_dynconf_t)

files_tmp_filetrans(polaris_dynconf_t, polaris_dynconf_tmp_t, dir, "cyan")
files_tmp_filetrans(polaris_dynconf_t, polaris_dynconf_tmp_t, file)

manage_files_pattern(polaris_dynconf_t, polaris_dynconf_tmp_t, polaris_dynconf_tmp_t)
manage_dirs_pattern(polaris_dynconf_t, polaris_dynconf_tmp_t, polaris_dynconf_tmp_t)
manage_lnk_files_pattern(polaris_dynconf_t, polaris_dynconf_tmp_t, polaris_dynconf_tmp_t)

corecmd_exec_bin(polaris_dynconf_t)
corecmd_exec_shell(polaris_dynconf_t)

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_dynconf_t)

# allow to read /proc/meminfo
kernel_read_system_state(polaris_dynconf_t)

# dynconf_setup calls luajit and luajit needs execute JIT generated code
allow polaris_dynconf_t self:process execmem;

# allow objstore access
polaris_disk_objstore_read(polaris_dynconf_t)

type polaris_dynconf_log_t;
files_tmp_file(polaris_dynconf_log_t)

gen_require(`
    attribute polaris_domain;
`)

filetrans_pattern(polaris_domain, polaris_dynconf_tmp_t, polaris_dynconf_log_t, file, "cyan.log")
filetrans_pattern(polaris_domain, polaris_dynconf_tmp_t, polaris_dynconf_log_t, file, "cyan_runtime.log")
files_tmp_filetrans(polaris_domain, polaris_dynconf_log_t, file, "cyan.lock")
manage_files_pattern(polaris_domain, polaris_dynconf_tmp_t, polaris_dynconf_log_t)

polaris_dynconf_tmp_read(polaris_domain)

# on utah need to get model info
optional_policy(`
    polaris_dash_dev_use(polaris_dynconf_t)
`)

#access to /dev/dash_fpga device on fugazi platform
ifdef(`fugazi_platform',`
    polaris_dash_dev_mcp_use(polaris_dynconf_t)
`)

```

```

# allow search and read under /tmp/boot directory
polaris_boot_tmp_read(polaris_dyncfg_t)

logging_send_syslog_msg(polaris_dyncfg_t)

# dyncfg needs access to idprom. Idprom is accessed differently depending on
# platform

# on utah idprom is in quack chip: hw_esg_read_midplane_idprom
# on platforms with idprom in quack chip need access to
# quack device as part of hw_esg_read_midplane_idprom call.
#ifdef(^crankshaft_family',`
polaris_quack_dev_use(polaris_dyncfg_t)
`)
#ifdef(^starfleet_platform',`
polaris_quack_dev_use(polaris_dyncfg_t)
`)

# on 1ng idprom is i2c device in sysfs like:
# /sys/devices/pci0000:00/0000:00:1f.3/i2c-0/i2c-1/1-0056/eeprom
# on ultra it is still emulated by i2c driver like:
# /sys/devices/i2c-0/i2c-1/1-0056/eeprom
dev_rw_sysfs(polaris_dyncfg_t)

# on nyquist and 1ng idprom value retrieved by flashlib and needs dac_override
allow polaris_dyncfg_t self:capability dac_override;
polaris_flashlib_read(polaris_dyncfg_t)

# LOOK AT ME on quake even rommon var read operation needs write access
# i.e flashutil -c getvar -N MODEL_NUM does open with O_RDWR
#ifdef(^quake_platform',`
polaris_flashlib_write(polaris_dyncfg_t)
`)

# In chassis_attrs.lua method THIS.WIRELESS checks whether wireless package is installed
# by opening (why open, not stat) wncmgrd binary.
optional_policy(`
    gen_require(`
        type polaris_wncmgrd_exec_t;
    `)
    read_files_pattern(polaris_dyncfg_t, bin_t, polaris_wncmgrd_exec_t)
`)

# lua/cyan/vwlc_chassis_attrs.lua needs to read /bootflash/rommon_vars file on vwlc
#ifdef(^wlc_family',`
polaris_bootflash_read(polaris_dyncfg_t)
`)

```

```

# lua/cyan/vwlc_chassis_attrs.lua needs to read /boot/vcpu_template file on vwlc
ifdef(`wlc_family',`
polaris_disk_varied_read(polaris_dyncfg_t)
')

# on macallan passport SUP card idprom is in act2 chip.
# hw_passport_read_midplane_idprom invoked from cyan_init
# reads /dev/act2 device.
ifdef(`ngwc_family',`
polaris_act2_dev_use(polaris_dyncfg_t)
')

ifdef(`passport_platform',`
# open /dev/ttyS0 console in hw_passport_read_midplane_idprom, invoked by
# cyaninit
term_use_unallocated_ttys(polaris_dyncfg_t)
')

# during wlc subpackage install cyan_init.sh called from
# C9800-Wireless_startup_script.sh script and output redirected
# into some install_tmp file
ifdef(`ngwc_family',`
polaris_install_tmp_log_write(polaris_dyncfg_t)
')

# /dev/aikido access
polaris_aikido_dev_use(polaris_dyncfg_t)

gen_require(`
    type rsync_t;
')

rsync_entry_domtrans(polaris_dyncfg_t, rsync_t)
corenet_tcp_connect_rsync_port(polaris_dyncfg_t)

ifdef(`sumatra_platform',`
# LOOK AT ME: After direct usage of /dev/mem is removed (CSCvw80796)
# /dev/mem
polaris_dev_mem_use(polaris_dyncfg_t)
')

# For Cabo, allow for stronger permissions to access env_var
ifdef(`cabo_platform',`
polaris_proc_rmonbifo_read(polaris_dyncfg_t)
')

# For Cabo, also allow access to i2c-0

```

```
ifdef(`cabo_platform',`
polaris_i2c_use(polaris_dynconf_t)
')
```

```
# /dev/i2c-0 access
ifdef(`petra_platform',`
polaris_i2c_use(polaris_dynconf_t)
')
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscyan.te

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```
#
# August 2017, Victor Kamensky
#
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#
```

```
policy_module(polarisflashcheck, 1.0);
```

```
gen_require(`
    type polaris_flashcheck_t;
')
```

```
# allow read of /etc/passwd
auth_use_nsswitch(polaris_flashcheck_t)
```

```
corecmd_exec_bin(polaris_flashcheck_t)
```

```
# allow to read /proc/meminfo
kernel_read_system_state(polaris_flashcheck_t)
```

```
# uses pidof
domain_read_all_domains_state(polaris_flashcheck_t)
dev_read_sysfs(polaris_flashcheck_t)
```

```
# df on "/" needs fs_t.filesystem getattr
fs_getattr_xattr_fs(polaris_flashcheck_t)
```

```
polaris_btrace_data_manage(polaris_flashcheck_t)
polaris_chasfs_manage(polaris_flashcheck_t)
polaris_cpuid_read(polaris_flashcheck_t)
```

```
polaris_read_debug_conf(polaris_flashcheck_t)
polaris_boot_tmp_read(polaris_flashcheck_t)
```

```

logging_send_syslog_msg(polaris_flashcheck_t)

# directly output to /dev/ttyS0
term_use_unallocated_ttys(polaris_flashcheck_t)

polaris_bootflash_read(polaris_flashcheck_t)

allow polaris_flashcheck_t self:capability { sys_resource dac_override };

# pidof needs below
allow polaris_flashcheck_t self:capability sys_ptrace;

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_flashcheck_t)

# access of crashinfo dir for flash_check.sh, it does source of pglobals.sh
# which needs acces to /crashinfo
polaris_disk_crashinfo_getattr(polaris_flashcheck_t)

# this is for NFS access mounted in a dir of ncd context
optional_policy(`
    polaris_ncd_tmp_read(polaris_flashcheck_t)
`)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisflashcheck.te
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#
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#

## <summary>Polaris caf Policy Rules.</summary>

#####
## <summary>
##   Read /bootflash/iox/ files or harddisk IOX files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_files_read`,`

```

```

gen_require(
    type polaris_iox_files_t;
    type polaris_disk_bootflash_t;
    type polaris_disk_harddisk_t;
    type polaris_iox_shared_files_t;
    type polaris_iox_alt_hdd_files_t;
)

read_files_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
list_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
allow $1 polaris_iox_files_t:file map;

)

#####
## <summary>
##   Manage /bootflash/iox/ files or harddisk IOX files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface('polaris_iox_files_manage',`
gen_require(
    type polaris_iox_files_t;
    type polaris_disk_bootflash_t;
    type polaris_disk_harddisk_t;
    type polaris_iox_shared_files_t;
    type polaris_iox_alt_hdd_files_t;
)

manage_files_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
manage_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
manage_lnk_files_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
allow $1 polaris_iox_files_t:file map;

)

#####
## <summary>

```

```

## List /bootflash/iox/ dir or harddisk IOX dir
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_iox_dir_list`,`
    gen_require(`
        type polaris_iox_files_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type httpd_var_run_t;
        type polaris_caf_var_run_t;
        type polaris_iox_shared_files_t;
        type polaris_iox_alt_hdd_files_t;
    `)

    list_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_iox_files_t)
    list_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, httpd_var_run_t)
    list_dirs_pattern($1, { polaris_iox_files_t polaris_disk_bootflash_t polaris_disk_harddisk_t
polaris_iox_shared_files_t polaris_iox_alt_hdd_files_t }, polaris_caf_var_run_t)

)

#####
## <summary>
## Search /bootflash/iox/ dir or harddisk IOX
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_iox_dir_search`,`
    gen_require(`
        type polaris_iox_files_t;
        type polaris_iox_shared_files_t;
    `)

    search_dirs_pattern($1, polaris_iox_files_t, polaris_iox_files_t)
)

#####

```

```

## <summary>
##   Read files like /guestshell/guestshell_set_netns.sh
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_guestshell_files_read',`
    gen_require(`
        type polaris_guestshell_t;
        type polaris_iox_shared_files_t;
    `)

    read_files_pattern($1, { polaris_guestshell_t polaris_iox_shared_files_t }, polaris_guestshell_t)
    read_lnk_files_pattern($1, { polaris_guestshell_t polaris_iox_shared_files_t }, polaris_guestshell_t)
)

```

```
#####
```

```

## <summary>
##   Execute files with polaris_guestshell_exec_t type
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface('polaris_guestshell_exec_files_exec',`
    gen_require(`
        type polaris_guestshell_exec_t;
    `)

    exec_files_pattern($1, polaris_guestshell_exec_t, polaris_guestshell_exec_t)
)

```

```
#####
```

```

## <summary>
##   Manage /var/run/netns/guestshell files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>

```



```

#
interface(`polaris_guestshell_var_run_files_manage`,`
    gen_require(`
        type polaris_guestshell_var_run_t;
        type var_run_t;
    `)

    manage_files_pattern($1, { polaris_guestshell_var_run_t var_run_t }, polaris_guestshell_var_run_t)
    manage_dirs_pattern($1, { polaris_guestshell_var_run_t var_run_t }, polaris_guestshell_var_run_t)
)

#####
## <summary>
##   Read CAF tmp files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_tmp_files_read`,`
    gen_require(`
        type polaris_caf_tmp_files_t;
    `)

    read_files_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
    read_lnk_files_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
    list_dirs_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
)

#####
## <summary>
##   Manage CAF tmp files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_tmp_files_manage`,`
    gen_require(`
        type polaris_caf_tmp_files_t;
    `)

    manage_files_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
    manage_dirs_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
)

```

```
#####
## <summary>
##   Getattr CAF tmp files
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_tmp_files_getattr`,`
    gen_require(`
        type polaris_caf_tmp_files_t;
    `)
    getattr_files_pattern($1, polaris_caf_tmp_files_t, polaris_caf_tmp_files_t)
`)
```

```
#####
## <summary>
##   Read CAF files. Typically at /opt/cisco/caf/
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_files_read`,`
    gen_require(`
        type polaris_caf_files_t;
    `)

    read_files_pattern($1, polaris_caf_files_t, polaris_caf_files_t)
    read_lnk_files_pattern($1, polaris_caf_files_t, polaris_caf_files_t)
    list_dirs_pattern($1, polaris_caf_files_t, polaris_caf_files_t)
`)
```

```
#####
## <summary>
##   Manage ../guestshell/rootfs_mnt/cisco/cisco_cli/
## This files are used to communicate between guestshell container
## iosd, and shell_exec.sh
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
```

```

## <rolebase/>
#
interface('polaris_caf_var_run_files_manage',`
optional_policy(`
    gen_require(`
        type polaris_caf_var_run_t;
    `)

    manage_files_pattern($1, polaris_caf_var_run_t, polaris_caf_var_run_t)
    manage_dirs_pattern($1, polaris_caf_var_run_t, polaris_caf_var_run_t)
`)
)

```

#####

```

## <summary>
##   Read /etc/guestshell_rsa_key file
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface('polaris_guestshell_key_read',`
    gen_require(`
        type etc_t;
        type polaris_guestshell_ssh_key_t;
    `)

    read_files_pattern($1, etc_t, polaris_guestshell_ssh_key_t)
)

```

#####

```

## <summary>
##   Manage ../local/local1/core_dir/
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface('polaris_caf_local_core_files_manage',`
optional_policy(`
    gen_require(`
        type polaris_caf_core_files_t;
    `)
)

```

```

)

manage_files_pattern($1, polaris_caf_core_files_t, polaris_caf_core_files_t)
manage_dirs_pattern($1, polaris_caf_core_files_t, polaris_caf_core_files_t)
manage_lnk_files_pattern($1, polaris_caf_core_files_t, polaris_caf_core_files_t)
)
)

#####
## <summary>
##   Manage /mnt/sd3/iox_alt_hdd.dsk and
##   /mnt/sd3/iox_alt_hdd_mount_dir
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_iox_alt_hdd_manage`,`
optional_policy(`
  gen_require(`
    type polaris_disk_bootflash_t;
    type polaris_disk_harddisk_t;
    type polaris_iox_alt_hdd_files_t;
  `)

  manage_files_pattern($1, polaris_iox_alt_hdd_files_t, polaris_iox_alt_hdd_files_t)
  manage_dirs_pattern($1, polaris_iox_alt_hdd_files_t, polaris_iox_alt_hdd_files_t)
)
)

#####
## <summary>
##   Getattr alternate harddisk files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_iox_alt_hdd_getattr`,`
  gen_require(`
    type polaris_iox_alt_hdd_files_t;
  `)
)

```

```

    allow $1 polaris_iox_alt_hdd_files_t:filesystem getattr;
)

#####
## <summary>
##   Manage tty device link files. Typically at /dev/
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_tty_lnk_manage`,`
    gen_require(`
        type polaris_caf_tty_file_t;
    `)

    create_lnk_files_pattern($1, polaris_caf_tty_file_t, polaris_caf_tty_file_t)
    read_lnk_files_pattern($1, polaris_caf_tty_file_t, polaris_caf_tty_file_t)
    delete_lnk_files_pattern($1, polaris_caf_tty_file_t, polaris_caf_tty_file_t)
)

#####
## <summary>
##   Manage tty device chr files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_caf_chr_file_read`,`
    gen_require(`
        type devpts_t;
    `)

    setattr_chr_files_pattern($1, devpts_t, devpts_t)
    read_chr_files_pattern($1, devpts_t, devpts_t)
)

#####
## <summary>
## Execute caf in the polaris_caf domain.
## </summary>
## <param name="domain">
## <summary>

```

```

## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_caf_domtrans`,`
gen_require(`
type polaris_caf_t, polaris_caf_exec_t;
`)

domtrans_pattern($1, polaris_caf_exec_t, polaris_caf_t)
`)

#####
## <summary>
## Provide process signal perms.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_caf_proc_signal_perms`,`
gen_require(`
type polaris_caf_t;
`)

allow $1 polaris_caf_t:process sigkill;
`)

#####
## <summary>
## Write/read /tmp/ioxss_up file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_ioxss_rp_tmp_manage`,`
gen_require(`
type polaris_ioxss_rp_tmp_t;
`)

manage_files_pattern($1, { polaris_ioxss_rp_tmp_t }, polaris_ioxss_rp_tmp_t)
`)

```

```
#####
## <summary>
##   Getattr of iosd_portal_app_lipc socket file
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_iosd_portal_app_lipc_getattr`,
  gen_require(`
    type polaris_iosd_portal_app_lipc_t;
  `)
  getattr_sock_files_pattern($1, polaris_iosd_portal_app_lipc_t, polaris_iosd_portal_app_lipc_t)
)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscaf.if
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
/usr/cpp/bin/cpp_cp_svr -- gen_context(system_u:object_r:polaris_cpp_cp_exec_t,s0)
/usr/cpp/bin/cpp_cp_svr_ledp -- gen_context(system_u:object_r:polaris_cpp_cp_exec_t,s0)
/usr/cpp/bin/cpp_cp_svr_us_ledp -- gen_context(system_u:object_r:polaris_cpp_cp_exec_t,s0)
/usr/cpp/bin/cpp_cp_svr_vwlc -- gen_context(system_u:object_r:polaris_cpp_cp_exec_t,s0)
/usr/cpp/bin/cpp_cp_svr_vwlc_ledp -- gen_context(system_u:object_r:polaris_cpp_cp_exec_t,s0)
/usr/binos/conf/geo_ipv4_db -- gen_context(system_u:object_r:polaris_geodb_files_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscppcp.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2017-2020 by Cisco Systems, Inc.
# All rights reserved
#
```

```
# polarisnifmgr file contexts place holder
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnifmgr.fc

No license file was found, but licenses were detected in source scan.

#

# November 2017, Victor Kamensky

#

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# All rights reserved

#

policy\_module(polarisgnmib, 1.0);

gen\_require(`

    type polaris\_gnmib\_t;

')

polaris\_btrace\_data\_manage(polaris\_gnmib\_t)

polaris\_crft\_data\_manage(polaris\_gnmib\_t)

polaris\_chasfs\_manage(polaris\_gnmib\_t)

polaris\_tdlresolve\_read(polaris\_gnmib\_t)

polaris\_tdlldb\_list\_dirs(polaris\_gnmib\_t)

polaris\_cpld\_read(polaris\_gnmib\_t)

polaris\_lua\_read(polaris\_gnmib\_t)

polaris\_flashlib\_read(polaris\_gnmib\_t)

polaris\_db\_tdlldb\_dir\_use(polaris\_gnmib\_t)

optional\_policy(`

# deals with /dev/shm/confd setup (schema and pid)

polaris\_confd\_shm\_setup(polaris\_gnmib\_t)

# and allow read shared schema

polaris\_confd\_shared\_schema\_read(polaris\_gnmib\_t)

# from evconfd\_dynamic\_load

polaris\_confd\_shared\_schema\_watch(polaris\_gnmib\_t)

# read /proc/confd\_pid/exe file

polaris\_confd\_read(polaris\_gnmib\_t)

')

allow polaris\_gnmib\_t self:capability dac\_override;

logging\_send\_syslog\_msg(polaris\_gnmib\_t)

# create ndbutil directory under /var/lock

polaris\_confd\_ndbutil\_create(polaris\_gnmib\_t)

polaris\_ndbutil\_lock\_template(polaris\_gnmib\_t, gnmib, ".l.schema\_use.gnmib")



```

# grpc library through sysconf accesses /sys/devices/system/cpu
# to get number of CPUs
dev_read_sysfs(polaris_gnmib_t)

# gnmib uses multiple (configurable) tcp ports for secure and insecure mode
corenet_tcp_bind_generic_port(polaris_gnmib_t)
allow polaris_gnmib_t self:tcp_socket { shutdown };
corenet_tcp_connect_all_ports(polaris_gnmib_t)

# iospc_token_read_from_file reads /tmp/rp/.iospc_gnmib
polaris_gnmib_token_read(polaris_gnmib_t)

# gnmib creates /var/tmp/gnmib.pid
type polaris_gnmib_var_t;
files_tmp_file(polaris_gnmib_var_t);
files_tmp_filetrans(polaris_gnmib_t, polaris_gnmib_var_t, file, "gnmib.pid");
manage_files_pattern(polaris_gnmib_t, polaris_gnmib_var_t, polaris_gnmib_var_t)
manage_dirs_pattern(polaris_gnmib_t, polaris_gnmib_var_t, polaris_gnmib_var_t)
manage_lnk_files_pattern(polaris_gnmib_t, polaris_gnmib_var_t, polaris_gnmib_var_t)

# read access to /dev/random
dev_read_rand(polaris_gnmib_t)

kernel_read_net_sysctls(polaris_gnmib_t)

type polaris_gnmib_gnoi_images_t;
files_type(polaris_gnmib_gnoi_images_t);
polaris_bootflash_filetrans(polaris_gnmib_t, polaris_gnmib_gnoi_images_t, file,);
manage_files_pattern(polaris_gnmib_t, polaris_disk_bootflash_t, polaris_gnmib_gnoi_images_t)

# need to execute install engine scripts
polaris_install_engine_domtrans(polaris_gnmib_t)

# need access to shell to execute install scripts
corecmd_exec_shell(polaris_gnmib_t)
corecmd_exec_bin(polaris_gnmib_t)

# install script needs rmonbifo
polaris_rmonbifo_tmp_read(polaris_gnmib_t)

# not sure why this is needed
auth_map_passwd(polaris_gnmib_t)

#DB persistence
polaris_tdlbpersist_setup(polaris_gnmib_t)
polaris_tmp_tdlb_persist_setup(polaris_gnmib_t)

```

```

allow polaris_gnmib_t self:capability sys_resource;

# needed to fstat and check space when transferring image for os.proto install rpc
fs_getattr_xattr_fs(polaris_gnmib_t)

# needed by gnmib ui because uipeer heartbeat timer accesses TDL epoch files
polaris_issu_tmp_files_read(polaris_gnmib_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisgnmib.te
No license file was found, but licenses were detected in source scan.

#
# October 2019, Patrick O'Halloran
#
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#

/usr/binos/conf/mcp_crft_request.sh -- gen_context(system_u:object_r:polaris_crft_request_exec_t,s0)

#NGWC - nyquist, edison, bigbang
/mnt/sd3/user/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/mnt/sd3/user/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/mnt/sd3/user/.CRFT/archive(/.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)

#NGWC - macallan, starfleet
/flash1/user/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash1/user/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash1/user/.CRFT/archive(/.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)

#MCP, QWLC
/vol/harddisk/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/vol/harddisk/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/vol/harddisk/.CRFT/archive(/.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)

#VXE, WLC, CRANKSHAFT, MCP
/bootflash/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/bootflash/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/bootflash/.CRFT/archive(/.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)

#CRANKSHAFT - blackheart, sparrow
/flash1/.CRFT(/.*)?      gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash1/.CRFT/[0-9]*(.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash1/.CRFT/archive(/.*)?  gen_context(system_u:object_r:polaris_crft_data_t,s0)

#PETRA - petra
# USER is a reserved selinux keyword - escape it like this

```

```
/flash10/USE[R]/.CRFT(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash10/USE[R]/.CRFT/[0-9]*(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
/flash10/USE[R]/.CRFT/archive(/.*)? gen_context(system_u:object_r:polaris_crft_data_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscrft.fc
```

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```
#
# March 2017, Victor Kamensky
#
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#
```

```
# polariscmm file contexts place holder
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscmm.fc
```

No license file was found, but licenses were detected in source scan.

```
#
# July 2017, Victor Kamensky
#
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#
```

```
## <summary>Polaris install Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Read polaris_sw_data_t, effectively path to read polaris
```

```
## base image packages
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed access.
```

```
## </summary>
```

```
## </param>
```

```
#
```

```
interface(`polaris_sw_data_read`,`
```

```
gen_require(`
```

```
type polaris_sw_data_t;
```

```
type tmp_t;
```

```
`)
```

```
read_files_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
```

```
read_lnk_files_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
```

```

    list_dirs_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t
)

#####
## <summary>
## Map polaris_sw_data_t, effectively path to map polaris
## base image packages
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_sw_data_map`,`
gen_require(`
type polaris_sw_data_t;
)
allow $1 polaris_sw_data_t:file map;
)

#####
## <summary>
## Manage polaris_sw_data_t, effectively path to set up polaris
## base image packages house holding
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_sw_data_manage`,`
gen_require(`
type polaris_sw_data_t;
type tmp_t;
)
manage_files_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
manage_lnk_files_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
manage_dirs_pattern($1, { tmp_t polaris_sw_data_t }, polaris_sw_data_t)
allow $1 polaris_sw_data_t:dir mounton;
)

#####
## <summary>
## Read polaris_patch_data_t, effectively path to read polaris
## smu patch or optional packages

```

```

## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_patch_data_read`,`
gen_require(`
type polaris_patch_data_t;
type tmp_t;
`)
read_files_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
read_lnk_files_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
list_dirs_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
`)

#####
## <summary>
## Manage polaris_patch_data_t, effectively path to set up polaris
## smu patch or optional packages house holding
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_patch_data_manage`,`
gen_require(`
type polaris_patch_data_t;
type tmp_t;
`)
manage_files_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
manage_lnk_files_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
manage_dirs_pattern($1, { tmp_t polaris_patch_data_t }, polaris_patch_data_t)
`)

#####
## <summary>
## Watch patch_data directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>

```

```

#
interface(`polaris_patch_data_watch',`
gen_require(`
type polaris_patch_data_t;
`)
allow $1 polaris_patch_data_t:dir watch;
`)

#####
## <summary>
## Write into tmp files created by install_show.sh
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_install_show_tmp_write',`
gen_require(`
type polaris_install_show_tmp_t;
type tmp_t;
`)
write_files_pattern($1, { tmp_t polaris_install_show_tmp_t }, polaris_install_show_tmp_t)
`)

#####
## <summary>
## Read tmp files created by install_show.sh
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_install_show_tmp_read',`
gen_require(`
type polaris_install_show_tmp_t;
type tmp_t;
`)
read_files_pattern($1, { tmp_t polaris_install_show_tmp_t }, polaris_install_show_tmp_t)
`)

#####
## <summary>
## Manage tmp installer files and directories

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_install_show_tmp_manage`,`
gen_require(`
  type polaris_install_show_tmp_t;
`)
  manage_dirs_pattern($1, polaris_install_show_tmp_t, polaris_install_show_tmp_t)
  manage_files_pattern($1, polaris_install_show_tmp_t, polaris_install_show_tmp_t)
  manage_lnk_files_pattern($1, polaris_install_show_tmp_t, polaris_install_show_tmp_t)
`)

#####
## <summary>
##   Manage /bootflash/.issu_loc_lock files
## TODO: provfunc.sh and hman have reference to /bootflash/$ISSU_LOCAL_LOCK_FILE.
##   For now, I am keeping manage_dirs_pattern for polaris_disk_bootflash_t.
##   Need to re-visit so that callers to this macro do not have write-permission
##   to all of bootflash..
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_issu_files_manage`,`
gen_require(`
  type polaris_issu_files_t;
  type polaris_disk_bootflash_t;
`)

  filetrans_pattern($1, polaris_disk_bootflash_t, polaris_issu_files_t, file, ".issu_loc_lock")
  manage_files_pattern($1, polaris_issu_files_t, polaris_issu_files_t)
  manage_dirs_pattern($1, polaris_disk_bootflash_t, polaris_issu_files_t)
`)

#####
## <summary>
## Manage ISSU tmp files, allowing to record and
## check upgrade progress
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_issu_tmp_files_manage`,`
gen_require(`
type polaris_issu_tmp_files_t;
type tmp_t;
`)
manage_files_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
manage_lnk_files_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
manage_dirs_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
`)

```

```
#####
```

```

## <summary>
## Write/read any regular file/directory from /bootflash/.install
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_install_manage`,`
gen_require(`
type polaris_disk_install_t;
`)
manage_dirs_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
manage_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
manage_lnk_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
allow $1 polaris_disk_install_t:dir watch;
`)

```

```
#####
```

```

## <summary>
## Read any regular file/directory from /bootflash/.install
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_install_read`,`
gen_require(`
type polaris_disk_install_t;
`)

```



```
)
search_dirs_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
read_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
read_lnk_files_pattern($1, polaris_disk_install_t, polaris_disk_install_t)
allow $1 polaris_disk_install_t:dir {watch read};
)
```

```
#####
```

```
## <summary>
##   Get attributes of any regular file/directory from /bootflash/.install
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_install_fs_getattr`,`
  gen_require(`
    type polaris_disk_install_t;
  `)
  allow $1 polaris_disk_install_t:filesystem getattr;
)
```

```
#####
```

```
## <summary>
##   Manage /tmp/installer files and directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_install_tmp_manage`,`
  gen_require(`
    type polaris_install_tmp_t;
  `)
  manage_dirs_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
  manage_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
  manage_lnk_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
  manage_fifo_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
)
```

```
#####
```

```
## <summary>
##   Read /tmp/installer files and directories
## </summary>
```

```

## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_install_tmp_read`,`
  gen_require(`
    type polaris_install_tmp_t;
  `)
  list_dirs_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
  read_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
  read_lnk_files_pattern($1, polaris_install_tmp_t, polaris_install_tmp_t)
  allow $1 polaris_install_tmp_t:dir watch;
  allow $1 polaris_install_tmp_t:file map;
)

#####
## <summary>
##   Execute install related scripts in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_install_engine_domtrans`,`
  gen_require(`
    type polaris_install_engine_t, polaris_install_engine_exec_t;
  `)

  domtrans_pattern($1, polaris_install_engine_exec_t, polaris_install_engine_t)
)

#####
## <summary>
##   Write into tmp log files created by install engine
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_install_tmp_log_write`,`
  gen_require(`
    type polaris_install_tmp_log_t;

```

```

    ')
    write_files_pattern($1, polaris_install_tmp_log_t, polaris_install_tmp_log_t)
')

#####
## <summary>
##   Execute install selinux related scripts in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_install_selinux_domtrans`,`
    gen_require(`
        type polaris_install_selinux_t, polaris_install_selinux_exec_t;
    `)

    domtrans_pattern($1, polaris_install_selinux_exec_t, polaris_install_selinux_t)
')

#####
## <summary>
##   Execute wireless install related scripts in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_install_wireless_domtrans`,`
    gen_require(`
        type polaris_install_wireless_t, polaris_install_wireless_exec_t;
    `)

    domtrans_pattern($1, polaris_install_wireless_exec_t, polaris_install_wireless_t)
')

#####
## <summary>
##   Execute install show scripts in its own domain.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>

```

```

## </param>
#
interface(`polaris_install_show_domtrans`,`
    gen_require(`
        type polaris_install_show_t, polaris_install_show_exec_t;
    `)

    domtrans_pattern($1, polaris_install_show_exec_t, polaris_install_show_t)
`)

#####
## <summary>
##   Allow the specified domain to manage KGV data files
## I.e under /tmp/pkg_cs_debug created by function verify_pkg
## common scripts file.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pkg_cs_debug_manage`,`
    gen_require(`
        type polaris_pkg_cs_debug_t;
    `)
    files_tmp_filetrans($1, polaris_pkg_cs_debug_t, dir, "pkg_cs_debug")
    fs_tmpfs_filetrans($1, polaris_pkg_cs_debug_t, dir, "pkg_cs_debug")
    manage_dirs_pattern($1, polaris_pkg_cs_debug_t, polaris_pkg_cs_debug_t)
    manage_files_pattern($1, polaris_pkg_cs_debug_t, polaris_pkg_cs_debug_t)
`)

#####
## <summary>
##   Manage /file which is generated on "flock -u file /tmp/sysctrl_i2c.lck"
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_i2c_lock_file_manage`,`
    gen_require(`
        type polaris_i2c_lock_file_t;
    `)
    manage_dirs_pattern($1, polaris_i2c_lock_file_t, polaris_i2c_lock_file_t)
    manage_files_pattern($1, polaris_i2c_lock_file_t, polaris_i2c_lock_file_t)
`)

```

)

#####

## <summary>

## write /tmp/installer files and directories

## </summary>

## <param name="domain">

## <summary>

## Domain allowed to transition.

## </summary>

## </param>

#

interface(`polaris\_install\_tmp\_write`,`

gen\_require(`

type polaris\_install\_tmp\_t;

`)

write\_files\_pattern(\$1, polaris\_install\_tmp\_t, polaris\_install\_tmp\_t)

allow \$1 polaris\_install\_tmp\_t:dir watch;

)

#####

## <summary>

## Read/Write /.images files and directories

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_install\_images\_manage`,`

gen\_require(`

type polaris\_install\_images\_t;

`)

manage\_dirs\_pattern(\$1, polaris\_install\_images\_t, polaris\_install\_images\_t)

manage\_files\_pattern(\$1, polaris\_install\_images\_t, polaris\_install\_images\_t)

)

#####

## <summary>

## Read ISSU tmp files

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

```

#
interface(`polaris_issu_tmp_files_read`,
gen_require(`
type polaris_issu_tmp_files_t;
type tmp_t;
`)
list_dirs_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
read_files_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
read_lnk_files_pattern($1, { tmp_t polaris_issu_tmp_files_t }, polaris_issu_tmp_files_t)
allow $1 polaris_issu_tmp_files_t:file map;
')

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisinstall.if

No license file was found, but licenses were detected in source scan.

```

#
# August 2017, Shawn Lu
#
# Copyright (c) 2017-2019 by Cisco Systems, Inc.
# All rights reserved
#

```

```

policy_module(polarisodm, 1.0);

```

```

gen_require(`
type polaris_odm_t;
`)

```

```

polaris_btrace_data_manage(polaris_odm_t)
polaris_crft_data_manage(polaris_odm_t)
polaris_chasfs_manage(polaris_odm_t)
polaris_tdlresolve_read(polaris_odm_t)
polaris_tdlldb_list_dirs(polaris_odm_t)
polaris_cpld_read(polaris_odm_t)
polaris_lua_read(polaris_odm_t)
polaris_flashlib_read(polaris_odm_t)

```

```

polaris_rpc_sman_ui_serv_connect(polaris_odm_t)

```

```

polaris_db_tdlldb_dir_use(polaris_odm_t)

```

```

# allow setrlimit
allow polaris_odm_t self:capability sys_resource;
allow polaris_odm_t self:process setrlimit;
allow polaris_odm_t self:capability dac_override;

```

```

# odm_svr2clnt_data uses subdirectory for channels needs explicit rule

```

```
# to allow it. ODM elastic value is 2 now, add more if need in the
# future.
gen_require(
    type polaris_odm_server2client_data_mqipc_t;
)
polaris_mqipc_create_name_dir(polaris_odm_t, polaris_odm_server2client_data_mqipc_t, odm_svr2clnt_data-b1)
polaris_mqipc_create_name_dir(polaris_odm_t, polaris_odm_server2client_data_mqipc_t, odm_svr2clnt_data-b0)
polaris_mqipc_create_name_dir(polaris_odm_t, polaris_odm_server2client_data_mqipc_t, odm_svr2clnt_data)

logging_send_syslog_msg(polaris_odm_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisodm.te

No license file was found, but licenses were detected in source scan.

```
#
# March 2017, Victor Kamensky
#
# Copyright (c) 2016-2019 by Cisco Systems, Inc.
# All rights reserved
#
```

```
## <summary>Polaris polarisreflector Policy Rules.</summary>
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisreflector.if

No license file was found, but licenses were detected in source scan.

```
#
# June 2017, Victor Kamensky
#
# Copyright (c) 2017-2021 by Cisco Systems, Inc.
# All rights reserved
#
```

```
policy_module(polariscontainer, 1.0);
```

```
# polaris_default_container_t type for not labeled container
```

```
polaris_container_domain_template(default)
```

```
# polaris_utd_container_t type for snort container
```

```
polaris_container_domain_template(utd)
```

```
polaris_utd_container(polaris_utd_container_t)
```

```
# polaris_utdl_container_t type for snort container, that has
```

```
# legacy configuration, need more permissions
```

```
polaris_container_domain_template(utdl)
```

```
polaris_utd_container(polaris_utdl_container_t)
```

```

# manage /tmp/xml/{Utd*} dirs
polaris_vman_log_files_manage(polaris_utdl_container_t)
optional_policy(
    polaris_cedge_xml_tmp_manage(polaris_utdl_container_t)
)

allow polaris_utdl_container_t ramfs_t:file map;

polaris_iox_container_watch(polaris_utdl_container_t)

# work with memif
optional_policy(
    polaris_qfp_dgram_send(polaris_utdl_container_t)
)

# creates /tmp/HTX-IOX/sw-htx-service
optional_policy(
    polaris_htx_iox_tmp_manage(polaris_utdl_container_t)
)
optional_policy(
    polaris_htx_use_client_socket(polaris_utdl_container_t)
)

# allow container to work with /tmp/binos-IOX
optional_policy(
    polaris_qfp_memif_manage(polaris_utdl_container_t)
)

# snort works with /dev/shm/SPO_DAQ_MMAP_OBJ_
fs_exec_tmpfs_files(polaris_utdl_container_t)

# allow container to work with /tmp/xml/* files
optional_policy(
    polaris_vman_tmp_manage(polaris_utdl_container_t)
)

gen_require(
    type container_file_t;
)
polaris_disk_type(container_file_t)

# legacy utd (snort) container in /etc/init.d/rc.local does unconditional
# mount of ramfs on /tmp/snortlogs
fs_mount_ramfs(polaris_utdl_container_t)
# legacy utd (snort) container in /etc/init.d/rc.local does unconditional
# mount of tmpfs on /dev/shm
fs_mount_tmpfs(polaris_utdl_container_t)

```



```

fs_manage_tmpfs_dirs(polaris_utdl_container_t)
fs_manage_tmpfs_files(polaris_utdl_container_t)
fs_manage_tmpfs_symlinks(polaris_utdl_container_t)

# Allow ramfs access to utd container
fs_manage_ramfs_dirs(polaris_utdl_container_t)
fs_manage_ramfs_files(polaris_utdl_container_t)

# Allow link file access from cron to crond
kernel_read_state(polaris_utdl_container_t)

# Allow Snort
allow polaris_utdl_container_t self:packet_socket map;

# polaris_iox_container_t type for generic IOx containers
polaris_container_domain_template(iox)

fs_mount_tmpfs(polaris_iox_container_t)
fs_manage_tmpfs_dirs(polaris_iox_container_t)
fs_manage_tmpfs_files(polaris_iox_container_t)
fs_manage_tmpfs_symlinks(polaris_iox_container_t)
fs_manage_tmpfs_sockets(polaris_iox_container_t)
# fs_manage_tmpfs_fifo_files is missing
gen_require(
    type tmpfs_t;
)
manage_fifo_files_pattern(polaris_iox_container_t, tmpfs_t, tmpfs_t)
fs_mounon_tmpfs(polaris_iox_container_t)
# container systemd file mmaps tmpfs_t, i.e /usr/lib/systemd/systemd-journald
allow polaris_iox_container_t tmpfs_t:file map;

# container reads ip netns identity <pid>
fs_read_nsfs_files(polaris_iox_container_t)

# container systemd does remount of some file systems
gen_require(
    type svirt_sandbox_file_t;
)
allow polaris_iox_container_t svirt_sandbox_file_t:filesystem { remount };

polaris_caf_var_run_files_manage(polaris_iox_container_t)
# permit access to /local core files between host and container
polaris_caf_local_core_files_manage(polaris_iox_container_t)

allow polaris_iox_container_t self:cap_userns { chown dac_override dac_read_search fsetid setgid setpcap setuid
sys_admin sys_boot };

gen_require(

```

```

type devpts_t;
type polaris_iox_container_t;
type container_runtime_t;
class fifo_file { getattr ioctl read write };
class chr_file { getattr ioctl open read setattr write };
)

#===== polaris_iox_container_t =====
allow polaris_iox_container_t container_runtime_t:fifo_file { getattr setattr ioctl open read write };
allow polaris_iox_container_t devpts_t:chr_file { getattr ioctl open read setattr write };

# Normally lipc denials are addressed by code that is generated from TDL.
# I.e if process need to access lipc service it just need to be listed as 'client' of proper TDL service.
# If in this case iox_container process does not have its own TDL proc_def entry,
# therefore we use autogenerated polaris_lipc_iosd_portal_app_write macro/interface.
# Marking this policy optional, so that if platform TDL does not have proper service defined
# then polaris_lipc_iosd_portal_app_write won't be generated, but container policy still would compile.
optional_policy(
    gen_require(
        type polaris_iosd_t;
    )
    polaris_lipc_iosd_portal_app_write(polaris_iox_container_t, polaris_iosd_t)
)

docker_exec_lib(polaris_iox_container_t)
fs_exec_hugetlbfs_files(polaris_iox_container_t)
kernel_read_ring_buffer(polaris_iox_container_t)
dev_read_sysfs(polaris_iox_container_t)
polaris_iox_container_watch(polaris_iox_container_t)

# polaris_sdavc_container_t type for SDAVC container, that has
# legacy configuration, need more permissions

polaris_container_domain_template(sdavc)
polaris_utd_container(polaris_sdavc_container_t)

# manage /tmp/xml/{SDAVC*} dirs
polaris_vman_log_files_manage(polaris_sdavc_container_t)

# legacy SDAVC container in /etc/init.d/rc.local does unconditional
# mount of tmpfs on /dev/shm
fs_mount_tmpfs(polaris_sdavc_container_t)

# container systemd mounton tmpfs_t & tmpfs management
fs_mounton_tmpfs(polaris_sdavc_container_t)
fs_manage_tmpfs_dirs(polaris_sdavc_container_t)
fs_manage_tmpfs_files(polaris_sdavc_container_t)
fs_manage_tmpfs_symlinks(polaris_sdavc_container_t)

```

```

fs_manage_tmpfs_sockets(polaris_sdavc_container_t)
manage_fifo_files_pattern(polaris_sdavc_container_t, tmpfs_t, tmpfs_t)
# container systemd file mmmaps tmpfs_t, i.e /usr/lib/systemd/systemd-journald
allow polaris_sdavc_container_t tmpfs_t:file map;
# Add watch on tmpfs_t/container_t dir/files
polaris_iox_container_watch(polaris_sdavc_container_t)

# map/mount/write hugetlbf files
gen_require(
    type hugetlbf_t;
)
allow polaris_sdavc_container_t hugetlbf_t:filesystem mount;
allow polaris_sdavc_container_t hugetlbf_t:file map;
fs_manage_hugetlbf_dirs(polaris_sdavc_container_t)

# Allow syslog_mod operation on kernel_t
kernel_clear_ring_buffer(polaris_sdavc_container_t)

# Allow tcpdump
allow polaris_sdavc_container_t self:packet_socket map;
allow polaris_utdl_container_t self:packet_socket map;

# add in the docker files labels to polaris_disk_type
gen_require(
    type container_var_lib_t;
    type container_share_t;
    type container_log_t;
)
polaris_disk_type(container_var_lib_t)
polaris_disk_type(container_share_t)
polaris_disk_type(container_log_t)

# polaris_waas_container_t type for WAAS KVM
polaris_kvm_domain_template(waas)

#Allow rw block files access to /dev/lvm_raid
storage_dontaudit_write_fixed_disk(polaris_waas_container_t)
storage_dontaudit_read_fixed_disk(polaris_waas_container_t)
#Manage hugetlbf files/dirs
fs_manage_hugetlbf_dirs(polaris_waas_container_t)
manage_files_pattern(polaris_waas_container_t, hugetlbf_t, hugetlbf_t)
fs_exec_hugetlbf_files(polaris_waas_container_t)

#allow access of /dev/kvm device
dev_rw_kvm(polaris_waas_container_t)

```

```
#allow domain to search/write to virlogd_t
polaris_vman_virtlog_allow(polaris_waas_container_t)

# Allow for guest-share
gen_require(
    type polaris_iox_shared_files_t;
)
manage_files_pattern(polaris_iox_container_t, polaris_iox_shared_files_t, polaris_iox_shared_files_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscontainer.te

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```
#
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#

## <summary>Polaris polarispvp Policy Rules.</summary>
```

```
#####
## <summary>
##   Execute a domain transition to run pvp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed to transition.
##   </summary>
## </param>
#
interface(`polaris_pvp_domtrans`,
    gen_require(
        type polaris_pvp_t, polaris_pvp_exec_t;
    )

    domtrans_pattern($1, polaris_pvp_exec_t, polaris_pvp_t)
)
```

```
#####
## <summary>
##   Manage pvp temporary files and directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
```

```

## </param>
#
interface(`polaris_pvp_manage_tmp_files`,`
    gen_require(`
        type polaris_pvp_tmp_t;
    `)

    manage_files_pattern($1, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
    manage_dirs_pattern($1, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
    manage_fifo_files_pattern($1, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
)

#####
## <summary>
##   Manage pvp process_state files and directories in
## /tmp/[rp|fp|cc]/pvp/process_state.
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pvp_manage_process_state_files`,`
    gen_require(`
        type polaris_process_state_t;
    `)

    manage_files_pattern($1, polaris_process_state_t, polaris_process_state_t)
)

#####
## <summary>
##   Getattr dirs pvp temporary files and directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_pvp_getattrs_tmp_dirs`,`
    gen_require(`
        type tmp_t;
        type polaris_pvp_tmp_t;
    `)

    getattr_dirs_pattern($1, tmp_t, polaris_pvp_tmp_t)
)

```

```

)

#####
## <summary>
##   Read from pvp stdin. Should be granted to scripts spawned
## from pvp with domain transition. pvp stdin (0) points to fifo
## file like /tmp/rp/pvp/work/inot_fifo
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_pvp_stdin_read',`
    gen_require(`
        type polaris_pvp_tmp_t;
    `)

    read_fifo_files_pattern($1, polaris_pvp_tmp_t, polaris_pvp_tmp_t)
`)

#####
## <summary>
##   Read pvp temporary files and directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface('polaris_pvp_read_tmp_files',`
    gen_require(`
        type tmp_t;
        type polaris_pvp_tmp_t;
    `)

    rw_files_pattern($1, { tmp_t polaris_pvp_tmp_t }, polaris_pvp_tmp_t)
`)

#####
## <summary>
##   Read pvp SAI files under
## /tmp/[rp|fp|cc|*]/pvp/sai_process.
## </summary>
## <param name="domain">
##   <summary>

```

```

## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pvp_read_sai_files`,`
  gen_require(`
    type polaris_pvp_sai_t;
  `)
  read_files_pattern($1, polaris_pvp_sai_t, polaris_pvp_sai_t)
  list_dirs_pattern($1, polaris_pvp_sai_t, polaris_pvp_sai_t)
  allow $1 polaris_pvp_sai_t:dir watch;
`)

#####
## <summary>
## Delete pvp SAI dirs and files under
## /tmp/[rp|fp|cc/*]/pvp/sai_process.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pvp_delete_sai_files`,`
  gen_require(`
    type polaris_pvp_sai_t;
  `)
  allow $1 polaris_pvp_sai_t:dir { remove_name rmdir write };
  allow $1 polaris_pvp_sai_t:file unlink;
`)

#####
## <summary>
## Watch pvp process_state directories
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <rolebase/>
#
interface(`polaris_process_state_watch`,`
  gen_require(`
    type polaris_process_state_t;
  `)
  allow $1 polaris_process_state_t:dir watch;
`)

```

)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarispvp.if

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#

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#

policy\_module(polarisrmonbifo, 1.0);

#####

# Polaris Rmonbifo Driver policy

#####

# note polaris\_proc\_rmonbifo\_t is defined in kernel/kernel.te, since genfscon

# statements could be only in base policy

type polaris\_rmonbifo\_tmp\_t;

files\_type(polaris\_rmonbifo\_tmp\_t)

polaris\_systemd\_tmpfiles\_tmp\_filetrans(polaris\_rmonbifo\_tmp\_t, dir, "rmonbifo")

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisrmonbifo.te

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#

/bootflash/sdavic(/.\*)? gen\_context(system\_u:object\_r:polaris\_sdavic\_proxy\_files\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisssdavicproxy.fc

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#

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#

# polarisodm file contexts place holder

Found in path(s):

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#

/usr/binos/conf/auto\_upgrade\_client.sh -- gen\_context(system\_u:object\_r:polaris\_autoupgrade\_exec\_t,s0)

/usr/binos/conf/auto\_upgrade\_helper.sh -- gen\_context(system\_u:object\_r:polaris\_autoupgrade\_exec\_t,s0)

/usr/binos/conf/auto\_upgrade\_trigger.sh -- gen\_context(system\_u:object\_r:polaris\_autoupgrade\_exec\_t,s0)

/usr/binos/conf/auto\_upgrade\_client\_helper.sh -- gen\_context(system\_u:object\_r:polaris\_autoupgrade\_exec\_t,s0)

/tmp/etc/installer gen\_context(system\_u:object\_r:polaris\_autoupgrade\_tmp\_t,s0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisautoupgrade.fc

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#

# polariswstatsd file contexts place holder

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswstatsd.fc

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#

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#

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#

/usr/binos/conf/bexecute.sh -- gen\_context(system\_u:object\_r:polaris\_bexecute\_exec\_t,s0)

```

/usr/binos/bin/bexecute -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
# still exists for backward compatibility
/tmp/etc/bexecute -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
/usr/binos/conf/bexec.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
/usr/binos/conf/brelay.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
/usr/binos/bin/brelay -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
/usr/binos/conf/ioucon.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
/usr/binos/conf/runin.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
/usr/binos/conf/runin_exec_proc.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
/usr/binos/conf/runon.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)
/usr/binos/conf/in.telnetd.sh -- gen_context(system_u:object_r:polaris_bexecute_exec_t,s0)

/usr/binos/conf/brelay_console.sh -- gen_context(system_u:object_r:polaris_bconsole_exec_t,s0)

# mcp_chvrf.sh used by some systemd units to switch vrf (ip namespace)
# of xinetd that drives brelay service
/usr/binos/conf/mcp_chvrf.sh -- gen_context(system_u:object_r:polaris_chvrf_exec_t,s0)

# used by "request platform software system shell" CLI
/usr/binos/conf/mcp_record_shell.sh -- gen_context(system_u:object_r:polaris_platform_shell_exec_t,s0)
/usr/binos/conf/mcp_shell.sh -- gen_context(system_u:object_r:polaris_shell_exec_t,s0)

# used by "sh pla so process memory r0 name iosd maps" CLI
/usr/binos/conf/mcp_process_maps.sh -- gen_context(system_u:object_r:polaris_process_maps_exec_t,s0)

# used by "req platform software console attach switch standby R0" CLI
/usr/binos/conf/mcp_console_attach.sh -- gen_context(system_u:object_r:polaris_mcp_console_attach_exec_t,s0)
/usr/binos/bin/ioucon -- gen_context(system_u:object_r:polaris_ioucon_exec_t,s0)

# ngio_module_session.sh used by "hw-module session" CLI
/usr/binos/conf/ngio_module_session.sh -- gen_context(system_u:object_r:polaris_ngio_module_session_exec_t,s0)

#used by "upgrade rom-monitor capsule primary switch 1 R0" CLI
/usr/binos/conf/cat9k-primary-capsule-upgrade.sh --
gen_context(system_u:object_r:polaris_capsule_upgrade_exec_t,s0)

/usr/binos/conf/cat9k-capsule-upgrade.sh -- gen_context(system_u:object_r:polaris_capsule_upgrade_exec_t,s0)

/mnt/sd3/user/capsule-upgrade.log -- gen_context(system_u:object_r:polaris_capsule_upgrade_log_t,s0)
/usr/binos/conf/mcp_dmesg_service.sh -- gen_context(system_u:object_r:polaris_mcp_dmesg_exec_t,s0)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbexecute.fc
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#
# August 2017, Shawn Lu
#

```

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#

## <summary>Polaris wncd Policy Rules.</summary>

#####

## <summary>

## Read files under /mnt/images/...these are related to AccessPoint images

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_wlc\_ap\_images\_read`,`

```
gen_require(  
    type polaris_wlc_ap_images_t;  
)
```

```
read_files_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)  
read_lnk_files_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)  
list_dirs_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)  
allow $1 polaris_wlc_ap_images_t:file map;  
)
```

## <summary>

## Manage files under /mnt/images/...these are related to AccessPoint images

## </summary>

## <param name="domain">

## <summary>

## Domain allowed access.

## </summary>

## </param>

#

interface(`polaris\_wlc\_ap\_images\_manage`,`

```
gen_require(  
    type polaris_wlc_ap_images_t;  
    type mnt_t;  
)
```

```
manage_files_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)  
manage_lnk_files_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)  
manage_dirs_pattern($1, polaris_wlc_ap_images_t, polaris_wlc_ap_images_t)
```

# transition when /mnt/images is created

```
filetrans_pattern($1, mnt_t, polaris_wlc_ap_images_t, dir, "images")
```

)

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\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariswncd.if

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```
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#

## <summary>Polaris esg_tam_cfg Policy Rules.</summary>
```

```
#####
## <summary>
##   Getattr dirs pvp temporary directories in /tmp.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_tam_getattrs_tmp_dirs`,`
    gen_require(`
        type tmp_t;
        type polaris_tam_tmp_t;
    `)

    setattr_dirs_pattern($1, tmp_t, polaris_tam_tmp_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisesgтамcfg.if

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```
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#

## <summary>Polaris MQIPC Policy Rules.</summary>
```

```
#####
```

```

# Polaris mqipc (infra/mqipc)
#####

#####

## <summary>
##   Make specified domain as one of mqipc types.
## </summary>
## <param name="domain">
##   <summary>
##     The domain serving as polaris_mqipc type
##   </summary>
## </param>
#
interface(`polaris_mqipc_type',`
    gen_require(`
        attribute polaris_mqipc;
    `)
    typeattribute $1 polaris_mqipc;
    files_type($1)
`)

#####

## <summary>
##   Manage mqipc shared memory file in /dev/shm directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="mqipc_label">
##   <summary>
##     Mqipc file label.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     Mqipc channel file name stem. It is used to derive set of file names
##     used by MQIPC.
##   </summary>
## </param>
#
interface(`polaris_mqipc_create_name',`
    gen_require(`
        type tmpfs_t;
        type tmp_t;
    `)
    manage_files_pattern($1, tmpfs_t, $2)
`)

```

```

allow $1 $2:file map;
type_transition $1 tmpfs_t : file $2 "mq.-$3";
manage_fifo_files_pattern($1, tmp_t, $2)
type_transition $1 tmp_t : fifo_file $2 "mq_ene_fifo.-$3";
type_transition $1 tmp_t : fifo_file $2 "mq_fnf_fifo.-$3";
fs_getattr_tmpfs($1)
')

#####
## <summary>
##   Manage mqipc shared memory file in /dev/shm/dir directory
## where dir is also derived from object parameter used as stem. It
## should be used only in cases where mqipc server operates with
## chanell under subdirectory. TDL autogeneration does not pick up
## this so interface call should be added explicitly.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="mqipc_label">
##   <summary>
##     Database file label.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     Mqipc file name stem. It is used to derive set of file names
##     used by MQIPC.
##   </summary>
## </param>
#
interface(`polaris_mqipc_create_name_dir`,
gen_require(`
type tmpfs_t;
    type tmp_t;
`)
manage_files_pattern($1, { tmpfs_t $2 }, $2)
allow $1 $2:file map;
manage_dirs_pattern($1, tmpfs_t, $2)
type_transition $1 tmpfs_t : { file dir } $2 "mq.-$3";
manage_fifo_files_pattern($1, { tmp_t $2 }, $2)
type_transition $1 tmp_t : fifo_file $2 "mq_ene_fifo.-$3";
type_transition $1 tmp_t : fifo_file $2 "mq_fnf_fifo.-$3";
fs_getattr_tmpfs($1)
')

```

```
#####
## <summary>
##   Manage mqipc shared memory file in /dev/shm directory
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="mqipc_label">
##   <summary>
##     Mqipc channel file label.
##   </summary>
## </param>
#
interface(`polaris_mqipc_use`,`
gen_require(`
type tmpfs_t;
`)
    read_files_pattern($1, { tmpfs_t $2 }, $2)
    write_files_pattern($1, { tmpfs_t $2 }, $2)
    read_fifo_files_pattern($1, { tmp_t $2 }, $2)
    write_fifo_files_pattern($1, { tmp_t $2 }, $2)
    fs_getattr_tmpfs($1)
    allow $1 $2:file map;
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarismqipc.if

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#

```

```
## <summary>Polaris issu_stack Policy Rules.</summary>
```

```
#####
## <summary>
##   Manage tmp files created by issu_stack.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>

```

```

## </param>
## <rolecap/>
#
interface(`polaris_issu_stack_tmp_manage`,`
    gen_require(`
        type polaris_issu_stack_tmp_t;
    `)

    manage_files_pattern($1, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)
    manage_lnk_files_pattern($1, polaris_issu_stack_tmp_t, polaris_issu_stack_tmp_t)
)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisissustack.if

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```

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#

```

## <summary>Polaris Tmp Boot Policy Rules.</summary>

```

#####
# /tmp/sw/boot policy
#####

```

```

#####

```

```

## <summary>
##   Read /tmp/sw/boot files. Does not cover rmonbifo file under
## /tmp/sw/boot/rmonbifo. For those use polaris_rmonbifo_tmp_read interface
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_boot_tmp_read`,`
    gen_require(`
        type polaris_boot_tmp_t;
    `)

    read_files_pattern($1, polaris_boot_tmp_t, polaris_boot_tmp_t)
)

```

```

#####

```



```

## <summary>
##   Write /tmp/sw/boot files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_boot_tmp_write`,`
gen_require(`
  type polaris_boot_tmp_t;
`)
  write_files_pattern($1, polaris_boot_tmp_t, polaris_boot_tmp_t)
`)

```

```

#####
## <summary>
##   Map any polaris_boot_tmp_t file, needed during install.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_boot_tmp_map`,`
  gen_require(`
    type polaris_boot_tmp_t;
  `)
  allow $1 polaris_boot_tmp_t:file map;
`)

```

```

#####
## <summary>
##   Manage /tmp/sw/boot files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_boot_tmp_manage`,`
gen_require(`
  type polaris_boot_tmp_t;
`)

```

```

    manage_files_pattern($1, polaris_boot_tmp_t, polaris_boot_tmp_t)
)

#####
## <summary>
## Create an polaris_boot_tmp_t object
## in tmpfs_t, tmp_t directories.
##
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_boot_tmp_filetrans`,`
gen_require(`
type polaris_boot_tmp_t;
)
fs_tmpfs_filetrans($1, polaris_boot_tmp_t, $2, $3)
files_tmp_filetrans($1, polaris_boot_tmp_t, $2, $3)
)

```

```

#####
## <summary>
## Manage partition disk device that contains rommon image.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_rommon_device_manage`,`
gen_require(`
type device_t;
type polaris_rommon_device_t;
)

```

```
)  
manage_blk_files_pattern($1, device_t, polaris_rommon_device_t)  
manage_chr_files_pattern($1, device_t, polaris_rommon_device_t)  
)
```

```
#####
```

```
## <summary>  
## Read partition disk device that contains rommon image.  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>  
## </param>
```

```
#  
interface(`polaris_rommon_device_read`,`  
gen_require(`  
type device_t;  
type polaris_rommon_device_t;  
)  
read_blk_files_pattern($1, device_t, polaris_rommon_device_t)  
read_chr_files_pattern($1, device_t, polaris_rommon_device_t)  
)
```

```
#####
```

```
## <summary>  
## Manage /bootflash/.prst_sync/reload_info  
## </summary>  
## <param name="domain">  
## <summary>  
## Domain allowed access.  
## </summary>  
## </param>
```

```
#  
interface(`polaris_boot_file_manage`,`  
gen_require(`  
type polaris_boot_file_t;  
)  
manage_files_pattern($1, polaris_boot_file_t, polaris_boot_file_t)  
)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisboot.if

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```
#  
# February 2020, Victor Kamensky  
#
```

```

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#

policy_module(polariscedge_tanman, 1.0);

# why /usr/bin/os/conf/cedge-tanman.sh is not described in TDL?
polaris_process_domain_template(cedge_tanman)

polaris_boot_tmp_read(polaris_cedge_tanman_t)
polaris_chasfs_read(polaris_cedge_tanman_t)
polaris_cpld_read(polaris_cedge_tanman_t)
polaris_read_debug_conf(polaris_cedge_tanman_t)
polaris_use_btrace_fifo(polaris_cedge_tanman_t)

corecmd_exec_bin(polaris_cedge_tanman_t)
corecmd_exec_shell(polaris_cedge_tanman_t)
auth_use_nsswitch(polaris_cedge_tanman_t)

# /tmp/tan handling
type polaris_cedge_tanman_tmp_t;
files_tmp_file(polaris_cedge_tanman_tmp_t)
gen_require(
    type tmp_t;
)
manage_dirs_pattern(polaris_cedge_tanman_t, tmp_t, polaris_cedge_tanman_tmp_t)
manage_fifo_files_pattern(polaris_cedge_tanman_t, polaris_cedge_tanman_tmp_t, polaris_cedge_tanman_tmp_t)
files_tmp_filetrans(polaris_cedge_tanman_t, polaris_cedge_tanman_tmp_t, dir, "tan")

# calls du -sk /tmp/xml/System
fs_getattr_tmpfs(polaris_cedge_tanman_t)

# work with /tmp/xml
polaris_cedge_xml_tmp_manage(polaris_cedge_tanman_t)

# work with /tmp/tmp
polaris_cedge_tmp_manage(polaris_cedge_tanman_t)

polaris_btrace_tmppub_read(polaris_cedge_tanman_t)

allow polaris_cedge_tanman_t self:capability sys_resource;

# calls nice
allow polaris_cedge_tanman_t self:process setsched;

# runs inotifywait -mrq --format %f: -e moved_to /bootflash/tracelogs
# and removes files in /bootflash/tracelogs
polaris_btrace_persistent_data_manage(polaris_cedge_tanman_t)

```

```

# runs ps -eaf
# ps needs access to proc_t
kernel_read_system_state(polaris_cedge_tanman_t)
# ps needs access to state of all domains
domain_read_all_domains_state(polaris_cedge_tanman_t)
# "ps" needs read access to /sys/devices/system/cpu/online
# "ps" needs read access to /proc/uptime
dev_read_sysfs(polaris_cedge_tanman_t)

# watch over /bootflash/tracelogs
polaris_btrace_data_watch(polaris_cedge_tanman_t)

# watches over /tmp for /tmp/booted appearance
gen_require(
    type tmp_t;
)
allow polaris_cedge_tanman_t tmp_t:dir watch;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscedgetanman.te
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#
# Aug 2020, Sridhar
#
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#

## <summary>Polaris tlscd process Policy Rules.</summary>

## <summary>
##   Allow the specified domain to manage UDS socket
## files. I.e /tmp/tlscd/
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_tlscd_uds_manage',`
    gen_require(
        type polaris_tlscd_uds_t;
    )

    manage_sock_files_pattern($1, polaris_tlscd_uds_t, polaris_tlscd_uds_t)

```

)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polaristlsd.if

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dnl

dnl Same as Nyquist

dnl

dnl Nyquist Platform Max Bay Limits

max\_bay\_map\_set(rp, `per\_bay', 0)

max\_bay\_map\_set(cc, `per\_bay', 0)

max\_bay\_map\_set(fp, `per\_bay', 0)

dnl in elastic scope each process has its own value

max\_elastic\_map\_set(rp, `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(cc, `elastic', BPROC\_ODM, 0)

max\_elastic\_map\_set(fp, `elasitc', BPROC\_ODM, 0)

max\_elastic\_map\_set(rp, `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(cc, `elastic', BPROC\_WNCD, 0)

max\_elastic\_map\_set(fp, `elastic', BPROC\_WNCD, 0)

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/m4/msmaps.m4

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#

# September 2017, Victor Kamensky

#

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#

## <summary>Polaris polarisunconfined Policy Rules.</summary>

#####

## <summary>

## Make the specified type usable

## to be conditionally unconfined.

## </summary>

## <param name="domain">

## <summary>

## Type to be used for conditionally unconfined.

```

## </summary>
## </param>
#
interface(`polaris_domain_storage_unconfined_type`,`
    gen_require(`
        attribute polaris_storage_unconfined_type;
    `)
    typeattribute $1 polaris_storage_unconfined_type;
`)

```

```

#####
## <summary>
## Mark domain unconfined, if polaris_unconfined build
## macro is defined. Or if polaris_unconfined_conditional
## macro is defined make domain unconfined only if
## polaris_unconfined_all SELinux boolean is set on.
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#

```

```

interface(`polaris_domain_maybe_unconfined`,`
    ifdef(`polaris_unconfined`,`
        unconfined_domain($1)
    `)

    ifdef(`polaris_unconfined_conditional`,`
        polaris_domain_storage_unconfined_type($1)

        tunable_policy(`polaris_unconfined_all`,`
            polaris_unconfined_domain($1)
        `)
    `)
)
#implicitly confined domain being made permissive
permissive $1;
)

```

```

#####
## <summary>
## Mark iosd domain unconfined, if polaris_iosd_unconfined
## build macro is defined. Or if polaris_iosd_unconfined_conditional
## macro is defined make domain unconfined only if
## polaris_unconfined_iosd SELinux boolean is set on.
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_iosd_maybe_unconfined`,`
    ifdef(`polaris_iosd_unconfined`,`
        unconfined_domain($1)
    `)

    ifdef(`polaris_iosd_unconfined_conditional`,`
        polaris_domain_storage_unconfined_type($1)

        tunable_policy(`polaris_unconfined_iosd`,`
            polaris_unconfined_domain($1)
        `)
    `)
)

#####
## <summary>
## Unconfined access to kernel module resources.
## Like kernel_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_kernel_unconfined`,`
    gen_require(`
        attribute proc_type;
        attribute sysctl_type;
        type kernel_t;
        type unlabeled_t;
        type proc_kcore_t;
        type proc_kmsg_t;
    `)

    allow $1 { proc_type - proc_kcore_t - proc_kmsg_t } :{ file } ~entrypoint;
    allow $1 { proc_type - proc_kcore_t - proc_kmsg_t } :{ dir lnk_file } *;

    allow $1 sysctl_type:{ file } ~entrypoint;
    allow $1 sysctl_type:{ dir lnk_file } *;

```



```

allow $1 kernel_t:system *;

allow $1 unlabeled_t:{ dir lnk_file sock_file fifo_file chr_file blk_file } *;
allow $1 unlabeled_t:file ~entrypoint;
allow $1 unlabeled_t:filesystem *;
allow $1 unlabeled_t:association *;
allow $1 unlabeled_t:packet *;
allow $1 unlabeled_t:process ~{ ptrace transition dyntransition execmem execstack execheap };

# LOOK AT ME
# kernel_load_module($1)
')

#####
## <summary>
## Unconfined access to network objects.
## Like corenet_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## The domain allowed access.
## </summary>
## </param>
#
interface(`polaris_corenet_unconfined',`
gen_require(`
    attribute node_type;
    attribute netif_type;
    attribute packet_type;
    attribute port_type;
)

allow $1 node_type:node *;
allow $1 netif_type:netif *;
allow $1 packet_type:packet *;
allow $1 port_type:dccp_socket { send_msg rcv_msg name_connect };
allow $1 port_type:tcp_socket { send_msg rcv_msg name_connect };
allow $1 port_type:udp_socket { send_msg rcv_msg };

# Bind to any network address.
allow $1 port_type:{ dccp_socket tcp_socket udp_socket rawip_socket } name_bind;
allow $1 node_type:{ dccp_socket tcp_socket udp_socket rawip_socket } node_bind;

)

#####
## <summary>
## Unconfined access to devices.

```

```

## Like dev_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_dev_unconfined`,`
gen_require(`
attribute device_node;
        type memory_device_t;
        type mtrr_device_t;
)

allow $1 self:capability sys_rawio;
allow $1 { device_node - memory_device_t } :{ blk_file lnk_file } *;
allow $1 { device_node - memory_device_t } :{ file chr_file } ~{ execmod entrypoint };
allow $1 mtrr_device_t:file ~{ execmod entrypoint };
dev_getattr_all($1

)

#####
## <summary>
## Unconfined access to domains.
## Like domain_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_domain_unconfined`,`
gen_require(`
attribute domain;
)

# Use/sendto/connectto sockets created by any domain.
allow $1 domain: { socket_class_set socket key_socket } *;

allow $1 domain:system all_system_perms;
# Use descriptors and pipes created by any domain.
allow $1 domain:fd use;
allow $1 domain:fifo_file rw_file_perms;

```

```

allow $1 $1:dbus send_msg;

# Act upon any other process.
allow $1 domain:process ~{ ptrace transition dyntransition execmem execstack execheap setcurrent };
allow $1 domain:process ptrace;

# Create/access any System V IPC objects.
allow $1 domain:{ sem msgq shm } *;
allow $1 domain:msg { send receive };

# For /proc/pid
allow $1 domain:dir list_dir_perms;
allow $1 domain:file rw_file_perms;
allow $1 domain:lnk_file { read_lnk_file_perms ioctl lock };

# act on all domains keys
allow $1 domain:key *;

# pass constraints
# typeattribute $1 can_change_object_identity;
# typeattribute $1 set_curr_context;
# typeattribute $1 process_uncond_exempt;

# mcs_process_set_categories($1)

# userdom_filetrans_home_content($1)
')

#####
## <summary>
## Unconfined access to files.
## Like files_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_files_unconfined',`
gen_require(`
    attribute file_type;
type shadow_t;
)

# Create/access any file in a labeled filesystem;
allow $1 { file_type - shadow_t }:{ file chr_file } ~{ execmod entrypoint relabelto };

```

```

allow $1 file_type:{ dir lnk_file sock_file fifo_file blk_file } *;
allow $1 file_type:service *;

# Mount/unmount any filesystem with the context= option.
allow $1 file_type:filesystem all_filesystem_perms;
)

#####
## <summary>
## Unconfined access to filesystems
## Like fs_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_fs_unconfined`,`
gen_require(`
    attribute filesystem_type;
)

allow $1 filesystem_type:filesystem all_filesystem_perms;

# Create/access other files. fs_type is to pick up various
# pseudo filesystem types that are applied to both the filesystem
# and its files.
allow $1 filesystem_type:{ file } ~entrypoint;
allow $1 filesystem_type:{ dir lnk_file sock_file fifo_file chr_file blk_file } *;
)

#####
## <summary>
## Unconfined access to the SELinux kernel security server.
## Like selinux_unconfined but without typeattribute use.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_selinux_unconfined`,`
gen_require(`
    attribute boolean_type;
    type security_t;

```

```

        type secure_mode_policyload_t;
    ')

    # use SELinuxfs
    allow $1 security_t:dir list_dir_perms;
    allow $1 security_t:file rw_file_perms;
    allow $1 boolean_type:file read_file_perms;
    allow $1 { boolean_type -secure_mode_policyload_t }:file write_file_perms;

    # Access the security API.
    allow $1 security_t:security ~{ load_policy setenforce setbool setseccommand };

    ifdef(`distro_rhel4',`
        # needed for systems without audit support
        auditallow $1 security_t:security setbool;
    ')

# selinux_set_all_booleans($1)
# selinux_load_policy($1)
# selinux_set_parameters($1)
# selinux_set_enforce_mode($1)
')

#####
## <summary>
## Make the specified domain unconfined.
## </summary>
## <param name="domain">
## <summary>
## Domain to make unconfined.
## </summary>
## </param>
#
interface(`polaris_unconfined_domain',`
    gen_require(`
        class dbus all_dbus_perms;
        class nscd all_nscd_perms;
        class passwd all_passwd_perms;
    ')

    # Use any Linux capability.

    allow $1 self:capability ~{ sys_module };
    allow $1 self:capability2 ~{ mac_admin mac_override };
    allow $1 self:fifo_file { manage_fifo_file_perms relabelfrom relabelto };

```

```

# Transition to myself, to make get_ordered_context_list happy.
allow $1 self:process { dyntransition transition };

# Write access is for setting attributes under /proc/self/attr.
allow $1 self:file rw_file_perms;
allow $1 self:dir rw_dir_perms;

# Userland object managers
allow $1 self:nscd all_nscd_perms;
allow $1 self:dbus all_dbus_perms;
allow $1 self:passwd all_passwd_perms;
allow $1 self:association all_association_perms;
allow $1 self:socket_class_set create_socket_perms;

polaris_kernel_unconfined($1)
polaris_corenet_unconfined($1)
polaris_dev_unconfined($1)
polaris_domain_unconfined($1)
polaris_files_unconfined($1)
polaris_fs_unconfined($1)
polaris_selinux_unconfined($1)

systemd_config_all_services($1)

# in unconfined_domain_noaudit its under not deny_execmem
allow $1 self:process execmem;

# domain_mmap_low($1)
#
# ubac_process_exempt($1)
#
# optional_policy(`
# auth_unconfined($1)
# ')
#
# optional_policy(`
# # Communicate via dbusd.
# dbus_system_bus_unconfined($1)
# dbus_unconfined($1)
# ')
#
# optional_policy(`
# ipsec_setcontext_default_spd($1)
# ipsec_match_default_spd($1)
# ')
#
# optional_policy(`
# nscd_unconfined($1)

```

```

# ')
#
# optional_policy(`
# seutil_create_bin_policy($1)
# seutil_relabelto_bin_policy($1)
# ')
#
# optional_policy(`
# storage_unconfined($1)
# ')
#
# optional_policy(`
# xserver_unconfined($1)
# ')
')

#####
## <summary>
##   Make the specified domain able to work with cpp /tmp/cpp_ifdev_rep and
## /tmp/cpp_ifdev_req pipe files.
## </summary>
## <param name="type">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_unconfined_service_fifo_file_manage',`
    gen_require(`
        type unconfined_service_t;
    `)

    manage_fifo_files_pattern($1, unconfined_service_t, unconfined_service_t)
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisunconfined.if

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```

#
# March 2019, Shikhar Dogra
#
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#

```

```

policy_module(polarisfmancc, 1.0);

```

```

gen_require(
    type polaris_fman_cc_t;
)

polaris_btrace_data_manage(polaris_fman_cc_t)
polaris_crft_data_manage(polaris_fman_cc_t)
polaris_chasfs_manage(polaris_fman_cc_t)
polaris_tdlresolve_read(polaris_fman_cc_t)
polaris_tdlldb_list_dirs(polaris_fman_cc_t)
polaris_cpld_read(polaris_fman_cc_t)
polaris_lua_read(polaris_fman_cc_t)
polaris_flashlib_read(polaris_fman_cc_t)
polaris_cpld_dev_use(polaris_fman_cc_t)

# allow to send message to /dev/log
logging_send_syslog_msg(polaris_fman_cc_t)

# ISR Nightwatch module accesses libraries compiled with icc
polaris_icc_broken_relocations(polaris_fman_cc_t)

# cpp bleeds into switching platforms through fman_fp and fed
# apparently even on nyquist fed creates /tmp/cpp_anon_db
polaris_cpp_process(polaris_fman_cc_t)
polaris_cpp_tmp_files_use(polaris_fman_cc_t)

type polaris_iosd_fmanrp_mqipc_t;
polaris_mqipc_type(polaris_iosd_fmanrp_mqipc_t)

polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc0)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc1)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc2)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc3)
polaris_mqipc_create_name(polaris_fman_cc_t, polaris_iosd_fmanrp_mqipc_t, iosd-thr-fmanrp-R0:0-cc4)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfmancc.te

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dnl

dnl May 2020, Swati Kumari

dnl

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dnl

dnl rpx86 Platform Max Bay Limits

max\_bay\_map\_set(rp', `per\_bay', 0)

max\_bay\_map\_set(cc', `per\_bay', 5)



```
max_bay_map_set(^fp', `per_bay', 2)
```

```
min_bay_ripc_map_set(^rp', `per_bay', 0)
```

```
min_bay_ripc_map_set(^cc', `per_bay', 1)
```

```
min_bay_ripc_map_set(^fp', `per_bay', 0)
```

```
max_bay_ripc_map_set(^rp', `per_bay', 2)
```

```
max_bay_ripc_map_set(^cc', `per_bay', 6)
```

```
max_bay_ripc_map_set(^fp', `per_bay', 2)
```

```
min_bay_ripc_map_set(^rp', `global', 0)
```

```
min_bay_ripc_map_set(^cc', `global', 1)
```

```
min_bay_ripc_map_set(^fp', `global', 0)
```

```
max_bay_ripc_map_set(^rp', `global', 2)
```

```
max_bay_ripc_map_set(^cc', `global', 6)
```

```
max_bay_ripc_map_set(^fp', `global', 2)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/m4/rpx86maps.m4
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# March 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
## <summary>Polaris polarispsvp Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispsvp.if
```

No license file was found, but licenses were detected in source scan.

```
#
```

```
# September 2017, Victor Kamensky
```

```
#
```

```
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```

```
# All rights reserved
```

```
#
```

```
/tmp/tmppub(/.*)? gen_context(system_u:object_r:polaris_btrace_tmppub_t,s0)
```

```
# btrace utility to rotate logs
```

```
/usr/binos/bin/btman_rotate_immediate -- gen_context(system_u:object_r:polaris_btman_exec_t,s0)
```

```
# btrace utility to dump meta data
```

```
/usr/binos/bin/dump_btrace_meta -- gen_context(system_u:object_r:polaris_btman_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisbtman.fc
```

No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
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#
```

```
policy_module(polarisnvram, 1.0);
```

```
#####  
# NVRAM  
#####
```

```
ifdef(^ngwc_family',`  
# suppose that in edison case nvram is not in partition  
type polaris_nvram_file_t;  
files_type(polaris_nvram_file_t)  
# allow nvram file reside on persistent storage  
polaris_pfile_type(polaris_nvram_file_t)  
)
```

```
ifdef(^blackheart_platform',`  
gen_require(`  
    type polaris_nvram_file_t;  
    type polaris_iods_t;  
)  
files_type(polaris_nvram_file_t)  
# allow nvram file reside on persistent storage  
polaris_pfile_type(polaris_nvram_file_t)  
allow polaris_iods_t polaris_nvram_file_t:filesystem getattr;  
)
```

```
ifdef(^sparrow_platform',`  
gen_require(`  
    type polaris_nvram_file_t;  
    type polaris_iods_t;  
)  
files_type(polaris_nvram_file_t)  
# allow nvram file reside on persistent storage  
polaris_pfile_type(polaris_nvram_file_t)  
allow polaris_iods_t polaris_nvram_file_t:filesystem getattr;  
)
```

```

ifdef(`aventus_platform',`
gen_require(`
    type polaris_nvram_file_t;
    type polaris_iosd_t;
`)
files_type(polaris_nvram_file_t)
# allow nvram file reside on persistent storage
polaris_pfile_type(polaris_nvram_file_t)
allow polaris_iosd_t polaris_nvram_file_t:filesystem getattr;
`)

ifdef(`cabo_platform',`
gen_require(`
    type polaris_nvram_file_t;
    type polaris_iosd_t;
`)
files_type(polaris_nvram_file_t)
# allow nvram file reside on persistent storage
polaris_pfile_type(polaris_nvram_file_t)
allow polaris_iosd_t polaris_nvram_file_t:filesystem getattr;
`)

ifdef(`petra_platform',`
type polaris_nvram_file_t;
files_type(polaris_nvram_file_t)
# suppose that in edison case nvram is not in partition
gen_require(`
    type polaris_iosd_t;
`)
# allow nvram file reside on persistent storage
polaris_pfile_type(polaris_nvram_file_t)
allow polaris_iosd_t polaris_nvram_file_t:filesystem getattr;
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisnvram.te

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```

#
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#

```

```

## <summary>Polaris cxp Policy Rules.</summary>

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscxp.if

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```
#
# March 2017, Victor Kamensky
#
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#

policy_module(polarischasfs, 1.0);

#####
# Chasfs policy
#####
gen_require(
    attribute domain;
)

type polaris_chasfs_t;
files_type(polaris_chasfs_t)

files_tmp_filetrans(domain, polaris_chasfs_t, dir, "chassis")
files_tmp_filetrans(domain, polaris_chasfs_t, lnk_file, "chasfs")
# LOOK AT ME: on ultra /tmp/cc/chasfs is created as directory, but
# on other platforms it is symbolic to /tmp/chassis/local/cc/chasfs
# as it happens for rp and fp. Would it be better to fix ultra
# script(s)?
files_tmp_filetrans(domain, polaris_chasfs_t, dir, "chasfs")

# cpld-symlink.service, creates /tmp/chassis while /tmp is
# still tmpfs_t, ie before systemd-tmpfiles runs and had a
# chance to set tmp_t label on /tmp
gen_require(
    type initrc_t;
)
fs_tmpfs_filetrans(initrc_t, polaris_chasfs_t, dir, "chassis")

init_script_tmp_filetrans(domain, polaris_chasfs_t, dir, "chasfs")

#####
# chasync
#####

polaris_process_domain_template(chasync)

corecmd_exec_bin(polaris_chasync_t)
```

```

# allow read of /etc/group and /etc/passwd
auth_use_nsswitch(polaris_chasync_t)

polaris_btrace_data_manage(polaris_chasync_t)
polaris_chasfs_manage(polaris_chasync_t)
polaris_cpld_read(polaris_chasync_t)
polaris_boot_tmp_read(polaris_chasync_t)
polaris_read_debug_conf(polaris_chasync_t)
polaris_rmonbifo_tmp_read(polaris_chasync_t)
polaris_proc_rmonbifo_read(polaris_chasync_t)

polaris_disk_bootflash_read_Ink(polaris_chasync_t)
polaris_disk_harddisk_read_Ink(polaris_chasync_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_chasync_t)

allow polaris_chasync_t self:capability sys_resource;
allow polaris_chasync_t self:process setpgid;

# access of crashinfo dir for the domain
polaris_disk_crashinfo_getattr(polaris_chasync_t)

# allow access of /tmp/rp/chasync for the polaris chasync_t domain to
# create/write/read dirs/files with domain specific context
type polaris_chasync_tmp_t;
files_type(polaris_chasync_tmp_t)
files_tmp_file(polaris_chasync_tmp_t)
files_tmp_filetrans(polaris_chasync_t, polaris_chasync_tmp_t, dir, "chasync")
manage_files_pattern(polaris_chasync_t, polaris_chasync_tmp_t, polaris_chasync_tmp_t)
manage_dirs_pattern(polaris_chasync_t, polaris_chasync_tmp_t, polaris_chasync_tmp_t)
manage_fifo_files_pattern(polaris_chasync_t, polaris_chasync_tmp_t, polaris_chasync_tmp_t)

# allow creation/access of temporary files created by chasync.sh like
# /tmp/sh-thd-1499428203 etc
files_tmp_filetrans(polaris_chasync_t, polaris_chasync_tmp_t, file)
manage_files_pattern(polaris_chasync_t, polaris_chasync_tmp_t, polaris_chasync_tmp_t)

fs_getattr_tmpfs(polaris_chasync_t)

# access of flash util for the domain
polaris_flashlib_read(polaris_chasync_t)

# read /proc/cmdline
kernel_read_system_state(polaris_chasync_t)

gen_require(

```

```

    type rsync_t;
    type init_t;
    type rsync_tmp_t;
)
rsync_entry_domtrans(polaris_chasync_t, rsync_t)
allow rsync_t polaris_chasync_t:process sigchld;
# file descriptor leak when rsync is called
allow rsync_t init_t:unix_stream_socket ioctl;

# upon exec rsync inherits chasync's stdout/stderr fifo files
allow rsync_t polaris_chasync_t:fifo_file { getattr write };
# in chasync_prepost_rsync.sh, CHASYNC_PID_DIR (rsync pid files) is deleted by rsync
fs_getattr_tmpfs(rsync_t)

# allow file:map for rsync_tmp_t
allow rsync_t rsync_tmp_t:file map;
dev_getattr_generic_blk_files(rsync_t)
dev_getattr_loop_control(rsync_t)
# need access to /usr/bin/mount
mount_entry_type(rsync_t)
# need access to dev/sda1
storage_getattr_fixed_disk_dev(rsync_t)
ifdef(`ngwc_family',`

#Read and write RPC sysctls
kernel_rw_rpc_sysctls(rsync_t)
mount_domtrans(rsync_t)
fstools_domtrans(rsync_t)
#Create/read/write on fixed device disk nodes
storage_manage_fixed_disk(rsync_t)
#stat -f -L -c %T /mnt/usb0
polaris_getattr_removable(rsync_t)
storage_filetrans_all_named_dev(rsync_t)
)
#===== polaris_dyncfg =====
polaris_dyncfg_tmp_read(rsync_t)

#===== polaris_chasync_t =====
polaris_btrace_persistent_data_search(polaris_chasync_t)
#chasync.sh code executes mv command
allow polaris_chasync_t self:process { setfscreate };
#chasync.sh code executes ping command to check if ping works before trying rsync for the first time
netutils_domtrans_ping(polaris_chasync_t)

#chasync.sh code in wlc saves logs during cleanup to /var/log/chasync
type polaris_chasync_log_t;
logging_log_file(polaris_chasync_log_t)
manage_files_pattern(polaris_chasync_t, polaris_chasync_log_t, polaris_chasync_log_t)

```

```
manage_dirs_pattern(polaris_chasync_t, polaris_chasync_log_t, polaris_chasync_log_t)
logging_log_filetrans(polaris_chasync_t, polaris_chasync_log_t, dir, "chasync")
```

```
#####
# chasfs_boottime script
#####
```

```
polaris_process_domain_template(chasfs_boottime)
```

```
unconfined_domain(polaris_chasfs_boottime_t)
```

```
# chasfs_boottime.sh starts cman_fp or cmand with -C option; allow its
```

```
# transition to fman_fp_t type
```

```
optional_policy(`
```

```
polaris_cm_rp_domtrans(polaris_chasfs_boottime_t)
```

```
')
```

```
optional_policy(`
```

```
polaris_cm_fp_domtrans(polaris_chasfs_boottime_t)
```

```
')
```

```
optional_policy(`
```

```
polaris_cm_cc_domtrans(polaris_chasfs_boottime_t)
```

```
')
```

```
ifdef(`ngwc_family',`
```

```
# Allow iox_polaris.conf read
```

```
polaris_caf_files_read(polaris_chasync_t)
```

```
# Allow losetup in helper script
```

```
fstoools_domtrans(polaris_chasync_t)
```

```
# Manage alternate hdd files
```

```
polaris_iox_alt_hdd_manage(polaris_chasync_t)
```

```
#Allow console logging
```

```
term_open_unallocated_ttys(polaris_chasync_t)
```

```
# Allow logger which is used for syslog message
```

```
allow polaris_chasync_t self:unix_dgram_socket { connect create };
```

```
logging_send_syslog_msg(polaris_chasync_t)
```

```
# logger needs to run pidof
```

```
dev_read_sysfs(polaris_chasync_t)
```

```
domain_read_all_domains_state(polaris_chasync_t)
```

```
')
```

```

type polaris_chasync_files_t;
files_type(polaris_chasync_files_t)
polaris_pfile_type(polaris_chasync_files_t)

optional_policy(
gen_require(
    type polaris_disk_harddisk_t;
    type polaris_disk_bootflash_t;
)
filetrans_pattern(polaris_chasync_t, {polaris_disk_bootflash_t polaris_disk_harddisk_t}, polaris_chasync_files_t,
dir, "sys_report")
filetrans_pattern(polaris_chasync_t, {polaris_disk_bootflash_t polaris_disk_harddisk_t}, polaris_chasync_files_t,
dir, "fp_cc_crash")
filetrans_pattern(polaris_chasync_t, polaris_disk_bootflash_t, polaris_chasync_files_t, file,
"user_input_custom.xml")

# chasync can manage files inside of its own polaris_disk_chasync_t directories
manage_dirs_pattern(polaris_chasync_t, polaris_chasync_files_t, polaris_chasync_files_t)
manage_files_pattern(polaris_chasync_t, polaris_chasync_files_t, polaris_chasync_files_t)
allow polaris_chasync_t polaris_chasync_files_t:dir watch;
polaris_install_disk_read(polaris_chasync_t)
)

optional_policy(
# chansync invoked sys_report does ls /tmp/ufs/crashinfo
polaris_ncd_tmp_read(polaris_chasync_t)
)

# chasync moves inv files from /tftp/inv to chasfs directory
allow polaris_chasync_t self:capability { chown fowner fsetid };
gen_require(
type brctl_t;
)
# pd_iox.sh invokes brctl which needs access to chasfs
polaris_chasfs_read(brctl_t)

#allow chasync to unmount flash partition
mount_domtrans(polaris_chasync_t)

sysnet_domtrans_ifconfig(polaris_chasync_t)

# chasync.sh needs read access to /bootflash/.installer/install_issu_state
polaris_disk_install_read(polaris_chasync_t)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarischasfs.te

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```

#
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#
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#

policy_module(polariscpp, 1.0);

#####
# Polaris cpp (ultra)
#####

type polaris_cpp_device_t;
dev_node(polaris_cpp_device_t)

# deals with /dev/shm files semaphors, etc
type polaris_cpp_tmpfs_t;
files_tmpfs_file(polaris_cpp_tmpfs_t)
attribute polaris_cpp_domain;
fs_tmpfs_filetrans(polaris_cpp_domain, polaris_cpp_tmpfs_t, file)
manage_files_pattern(polaris_cpp_domain, tmpfs_t, polaris_cpp_tmpfs_t)
allow polaris_cpp_domain polaris_cpp_tmpfs_t:file map;
polaris_cpp_tmpfs_manage(polaris_cpp_domain)
polaris_cerr_shm_manage(polaris_cpp_domain)

# on TSN ucode_dram lives in hugetlbfs
fs_hugetlbfs_filetrans(polaris_cpp_domain, polaris_cpp_tmpfs_t, file)
gen_require(
    type hugetlbfs_t;
)
manage_files_pattern(polaris_cpp_domain, hugetlbfs_t, polaris_cpp_tmpfs_t)

# deals with cpp /tmp files
type polaris_cpp_tmp_t;
files_tmp_file(polaris_cpp_tmp_t)
files_tmp_filetrans(polaris_cpp_domain, polaris_cpp_tmp_t, file, "cpp_anon_db")
files_tmp_filetrans(polaris_cpp_domain, polaris_cpp_tmp_t, file, "qm_rt_dbg")
files_tmp_filetrans(polaris_cpp_domain, polaris_cpp_tmp_t, fifo_file, "cpp_ifdev_rep")
files_tmp_filetrans(polaris_cpp_domain, polaris_cpp_tmp_t, fifo_file, "cpp_ifdev_req")
manage_files_pattern(polaris_cpp_domain, tmp_t, polaris_cpp_tmp_t)
manage_fifo_files_pattern(polaris_cpp_domain, tmp_t, polaris_cpp_tmp_t)
allow polaris_cpp_domain polaris_cpp_tmp_t:file map;

fs_getattr_tmpfs(polaris_cpp_domain)

# overlord/neptune access /sys/bus/pci/devices/0000:01:00.0/resource0
# when initializing the CPP DMAP library

```

```
optional_policy(
polaris_cpp_cavium_dma_map(polaris_cpp_domain)
')
```

```
type polaris_i95_device_t;
dev_node(polaris_i95_device_t)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polariscpp.te

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```
#
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#
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#
```

```
# some platforms have /usr/binos/bin/fman_fp as hardlink to
# /usr/binos/bin/fman_fp_image
/usr/binos/bin/fman_fp -- gen_context(system_u:object_r:polaris_fman_fp_exec_t,s0)
/usr/binos/bin/fman_fp_ledp -- gen_context(system_u:object_r:polaris_fman_fp_exec_t,s0)
/usr/binos/bin/fman_fp_vwlc_ledp -- gen_context(system_u:object_r:polaris_fman_fp_exec_t,s0)
/usr/binos/bin/fman_fp_us_ledp -- gen_context(system_u:object_r:polaris_fman_fp_exec_t,s0)
```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisfmanfp.fc

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```
#
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#
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#
```

```
## <summary>Polaris ngiolite Policy Rules.</summary>
```

```
#####
```

```
## <summary>
```

```
## Execute mcp_smartctl_cmds.sh in the polaris_smartctl domain.
```

```
## </summary>
```

```
## <param name="domain">
```

```
## <summary>
```

```
## Domain allowed to transition.
```

```
## </summary>
```

```
## </param>
```

```
#
interface(`polaris_smartctl_domtrans`,`
    gen_require(`
        type polaris_smartctl_t, polaris_smartctl_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_smartctl_exec_t, polaris_smartctl_t)
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisngiolite.if
No license file was found, but licenses were detected in source scan.
```

```
#
# February 2018, Manohar Hungund
#
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#
```

```
/dev/act2      -c gen_context(system_u:object_r:polaris_act2_device_t,s0)
/tmp/hw_entropy -- gen_context(system_u:object_r:polaris_hw_entropy_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisact2.fc
No license file was found, but licenses were detected in source scan.
```

```
#
# July 2017, Victor Kamensky
#
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#
```

```
policy_module(polariscmcc, 1.0);
```

```
gen_require(`
    type polaris_cm_cc_t;
`)
```

```
polaris_btrace_data_manage(polaris_cm_cc_t)
polaris_crft_data_manage(polaris_cm_cc_t)
polaris_chasfs_manage(polaris_cm_cc_t)
polaris_tdlresolve_read(polaris_cm_cc_t)
polaris_tdlldb_list_dirs(polaris_cm_cc_t)
polaris_cpld_read(polaris_cm_cc_t)
polaris_lua_read(polaris_cm_cc_t)
```

```

polaris_flashlib_read(polaris_cm_cc_t)

polaris_cpld_dev_use(polaris_cm_cc_t)
polaris_proc_rmonbifo_read(polaris_cm_cc_t)

polaris_ripc_sman_ui_serv_connect(polaris_cm_cc_t)

optional_policy(`
    # access to /dev/iocp0
    polaris_spa_dev_use(polaris_cm_cc_t)
`)
optional_policy(`
    # access to /dev/htdb[0-9]*
    polaris_htdp_dev_use(polaris_cm_cc_t)
`)
# read /proc/cmdline
kernel_read_system_state(polaris_cm_cc_t)
# work with /dev/i2c devices
polaris_i2c_use(polaris_cm_cc_t)

polaris_obfl_data_read(polaris_cm_cc_t)
# cmcc module as part of init calls cmem_obfl_write_voltage_log(),
# which writes to obfl device.
polaris_obfl_data_manage(polaris_cm_cc_t)
# on vxe platform /obfl is symlink to /varied
ifdef(`vxe_family',`
polaris_disk_varied_list(polaris_cm_cc_t)
`)

# on 1ng works with /dev/cpld-virtual-cc
polaris_cpp_dev_use(polaris_cm_cc_t)

polaris_i2c_use(polaris_cm_cc_t)
dev_rw_sysfs(polaris_cm_cc_t)

ifdef(`crankshaft_family',`
# read,getattr, map access to /firmware/ files for Switzer-CC
polaris_firmware_read(polaris_cm_cc_t)
polaris_firmware_getattr(polaris_cm_cc_t)
polaris_firmware_map(polaris_cm_cc_t)
`)

# allow objstore access
polaris_disk_objstore_read(polaris_cm_cc_t)

# get interface address cmlib_if_config_addr at cman/lib/cmlib_msgs/src/cmlib_eobc.c
allow polaris_cm_cc_t self:udp_socket { create ioctl };

```

```

# on utah need to get model info
optional_policy(`
    polaris_dash_dev_use(polaris_cm_cc_t)
`)

#access to /dev/dash_fpga device on fugazi platform
ifdef(`fugazi_platform',`
    polaris_dash_dev_mcp_use(polaris_cm_cc_t)
`)

#access to /dev/nutella_fpga device on nutella platform
optional_policy(`
polaris_nutella_fpga_dev_use(polaris_cm_cc_t)
`)

# handle /tmp/pci files on utah
type polaris_pci_tmp_t;
files_tmp_file(polaris_pci_tmp_t)
# /tmp/pci/bus, /tmp/pci/vendor, /tmp/pic/device created by systemd unit
gen_require(`
    type initrc_t;
    type unconfined_service_t;
    type tmp_t;
`)
files_tmp_filetrans({ unconfined_service_t initrc_t }, polaris_pci_tmp_t, dir, "pci")
manage_dirs_pattern(initrc_t, tmp_t, polaris_pci_tmp_t)
manage_files_pattern(initrc_t, polaris_pci_tmp_t, polaris_pci_tmp_t)
manage_files_pattern(polaris_cm_cc_t, polaris_pci_tmp_t, polaris_pci_tmp_t)

logging_send_syslog_msg(polaris_cm_cc_t)

# cmcc module creates the PCI rescan shm mutex.
# /dev/shm/rescan_shm file.
type polaris_cm_cc_tmpfs_t;
files_tmpfs_file(polaris_cm_cc_tmpfs_t)
fs_tmpfs_filetrans(polaris_cm_cc_t, polaris_cm_cc_tmpfs_t, file)
manage_files_pattern(polaris_cm_cc_t, tmpfs_t, polaris_cm_cc_tmpfs_t)
mmap_files_pattern(polaris_cm_cc_t, tmpfs_t, polaris_cm_cc_tmpfs_t)
dev_read_sysfs(polaris_cm_cc_t)
dev_getattr_sysfs_fs(polaris_cm_cc_t)
fs_getattr_tmpfs(polaris_cm_cc_t)

# /tmp/udev-cc should it not be polaris_udev_tmp_t
type polaris_cm_cc_tmp_t;
files_tmp_file(polaris_cm_cc_tmp_t)
files_tmp_filetrans(polaris_cm_cc_t, polaris_cm_cc_tmp_t, dir, "udev-cc")
manage_files_pattern(polaris_cm_cc_t, polaris_cm_cc_tmp_t, polaris_cm_cc_tmp_t)
gen_require(`

```

```

    type tmp_t;
  )
manage_dirs_pattern(polaris_cm_cc_t, { tmp_t polaris_cm_cc_tmp_t }, polaris_cm_cc_tmp_t)

# on tsn need access to /dev/moka_fpga
optional_policy(
polaris_mokafpga_dev_use(polaris_cm_cc_t)
)

optional_policy(
# betelgeuse need access to /dev/sirius_fpga
polaris_sirius_fpga_dev_use(polaris_cm_cc_t)
)

# on macallan need access to /dev/quack
optional_policy(
polaris_quack_dev_use(polaris_cm_cc_t)
)

polaris_cpld_write(polaris_cm_cc_t)

optional_policy(
# on starfleet access gettysburg_fpga
polaris_gettysburg_fpga_dev_use(polaris_cm_cc_t)
)

# /dev/epactrlN on qwlc
optional_policy(
polaris_epa_dev_use(polaris_cm_cc_t)
)

# /dev/luna_fpga on qwlc
optional_policy(
polaris_luna_mbfpga_dev_use(polaris_cm_cc_t)
)

# /dev/astro on qwlc
optional_policy(
polaris_astro_dev_use(polaris_cm_cc_t)
)

# /dev/huron_fpga on Sumatra
optional_policy(
polaris_huron_dev_use(polaris_cm_cc_t)
)

type polaris_nim_xxd_tmp_t;
files_tmp_file(polaris_nim_xxd_tmp_t)

```

```

files_tmp_filetrans(polaris_cm_cc_t, polaris_nim_xxd_tmp_t, file, "nim_xxd_present")
manage_files_pattern(polaris_cm_cc_t, polaris_nim_xxd_tmp_t, polaris_nim_xxd_tmp_t)
ifdef(`starfleet_platform',`
    # In cman_cc
    # cmcc_starfleet_act2_authentication_udi in cman/cc/src/cmcc_starfleet.c
    #   cmcc_starfleet_cpupboard_act2_authentication_udi cman/cc/src/cmcc_starfleet.c
    #     tam_lib_device_open infra/act2/tam_act2/tam_lib/src/tam_lib_device.c:
    polaris_act2_dev_use(polaris_cm_cc_t)
')

ifdef(`crankshaft_family',`
    # modprobe sm_nim_adpt.ko for Switzer-CC
    modutils_domtrans_insmod(polaris_cm_cc_t)
    # /dev/sm_nim_adpt device files for Switzer-CC
    polaris_sm_nim_adpt_dev_use(polaris_cm_cc_t)
')

# Mapping permission for /dev/shm/<name>
ifdef(`crankshaft_family',`
    gen_require(`
        type systemd_tmpfiles_t;
    ')
    mmap_files_pattern(systemd_tmpfiles_t, polaris_cm_cc_tmpfs_t, polaris_cm_cc_tmpfs_t)
')

# on ngwc cmcc needs to access /dev/chdrvmmap for asic memory mapping
optional_policy(`
    polaris_chdrvmmap_dev_use(polaris_cm_cc_t)
')

ifdef(`vxe_family',`
    # bind to BMC_AGENT_CLIENT_PORT port from cman_tlv_init
    corenet_tcp_bind_polaris_bmc_agent_client_port(polaris_cm_cc_t)
')

# allow /usr/binos/bin/cmcc to access /tmp/hd_sz
gen_require(`
    type udev_tmp_t;
')
read_files_pattern(polaris_cm_cc_t, udev_tmp_t, udev_tmp_t)

# allow /usr/sbin/smartctl to be operated on fsadm_exec_t
fstools_exec(polaris_cm_cc_t)

# using existing interface "polaris_cm_rp_tmp_manage" for polaris_cm_cc_t
# to acces /tmp/cmlib_eeeprom_sim_smartctl.out
polaris_cm_rp_tmp_manage(polaris_cm_cc_t)

```

```
files_tmp_filetrans(polaris_cm_cc_t, polaris_cm_rp_tmp_t, file, "cmlib_eeprom_sim_smartctl.out")
```

```
# allow access to /dev/nvme*  
dev_nvme_chr_files_manage(polaris_cm_cc_t)  
dev_nvme_blk_files_manage(polaris_cm_cc_t)
```

```
# access to /dev/ttyS0  
term_use_unallocated_ttys(polaris_cm_cc_t)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarismcc.te
```

No license file was found, but licenses were detected in source scan.

```
#  
# June 2017, Victor Kamensky  
#  
# Copyright (c) 2017-2019 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
## <summary>Polaris tservice Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristSERVICE.if
```

No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
# Copyright (c) 2016-2019 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
## <summary>Polaris polarissortfiles Policy Rules.</summary>
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissortfiles.if
```

No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
# Copyright (c) 2016-2021 by Cisco Systems, Inc.  
# All rights reserved  
#
```

```
## <summary>Polaris Storage Policy Rules.</summary>
```



```

#####
# Persistent storage policy
#####

#####
## <summary>
## Make the specified type usable as default type for files
## in a Polaris persistent (bootflash, harddisk, etc) filesystem.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.
## </summary>
## </param>
#
interface(`polaris_disk_type`,`
    files_type($1)
    gen_require(`
        attribute polaris_disk;
    `)
    typeattribute $1 polaris_disk;
`)

#####
## <summary>
## Make the specified type usable for files
## in a Polaris persistent (bootflash, harddisk, etc)
## filesystem.
## </summary>
## <param name="type">
## <summary>
## Type to be used for files.
## </summary>
## </param>
#
interface(`polaris_pfile_type`,`
    files_type($1)
    gen_require(`
        attribute polaris_disk;
    `)
    typeattribute $1 polaris_disk;
`)

#####
## <summary>
## Read any regular file/directory from persistent storage.
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_persistent_read`,`
    gen_require(`
        attribute polaris_disk;
    `)
    read_files_pattern($1, polaris_disk, polaris_disk)
    read_lnk_files_pattern($1, polaris_disk, polaris_disk)
    list_dirs_pattern($1, polaris_disk, polaris_disk)
`)

#####
## <summary>
## Getattr of any regular file/directory from persistent storage.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_persistent_getattr`,`
    gen_require(`
        attribute polaris_disk;
    `)
    list_dirs_pattern($1, polaris_disk, polaris_disk)
    getattr_files_pattern($1, polaris_disk, polaris_disk)
    getattr_lnk_files_pattern($1, polaris_disk, polaris_disk)
`)

#####
## <summary>
## Listdir of any regular directory from persistent storage.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_persistent_list_dirs`,`
    gen_require(`
        attribute polaris_disk;
    `)
    list_dirs_pattern($1, polaris_disk, polaris_disk)

```

)

```
#####  
## <summary>  
## Write/read any regular file/directory from persistent storage.  
## </summary>  
## <param name="domain">  
##   <summary>  
##     Domain allowed access.  
##   </summary>  
## </param>  
#  
interface(`polaris_persistent_manage`,`  
  gen_require(`  
    attribute polaris_disk;  
  `)  
  manage_files_pattern($1, polaris_disk, polaris_disk)  
  manage_dirs_pattern($1, polaris_disk, polaris_disk)  
  manage_lnk_files_pattern($1, polaris_disk, polaris_disk)  
`)  
)
```

```
#####  
## <summary>  
## Map any regular file/directory from persistent storage.  
## </summary>  
## <param name="domain">  
##   <summary>  
##     Domain allowed access.  
##   </summary>  
## </param>  
#  
interface(`polaris_persistent_map`,`  
  gen_require(`  
    attribute polaris_disk;  
  `)  
  allow $1 polaris_disk:file map;  
`)  
)
```

```
#####  
# debug.conf  
#####
```

```
#####  
## <summary>  
## Read debug.conf from persistent storage.  
## </summary>  
## <param name="domain">
```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_read_debug_conf`,`
    gen_require(`
        type polaris_debug_conf_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
        type tmp_t;
    `)
    read_files_pattern($1, polaris_disk_bootflash_t, polaris_debug_conf_t)
    read_files_pattern($1, polaris_disk_harddisk_t, polaris_debug_conf_t)
    read_files_pattern($1, tmp_t, polaris_debug_conf_t)
    read_lnk_files_pattern($1, tmp_t, polaris_debug_conf_t)
    polaris_disk_bootflash_read_lnk($1)
)

#####
# packages.conf
#####

#####
## <summary>
## Read packages.conf from persistent storage.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_read_packages_conf`,`
    gen_require(`
        type polaris_packages_conf_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
    `)
    read_files_pattern($1, polaris_disk_bootflash_t, polaris_packages_conf_t)
    read_files_pattern($1, polaris_disk_harddisk_t, polaris_packages_conf_t)
)

#####
## <summary>
## Manage packages.conf in persistent storage.
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_manage_packages_conf`,`
    gen_require(`
        type polaris_packages_conf_t;
        type polaris_disk_bootflash_t;
        type polaris_disk_harddisk_t;
    `)
    manage_files_pattern($1, polaris_disk_bootflash_t, polaris_packages_conf_t)
    manage_files_pattern($1, polaris_disk_harddisk_t, polaris_packages_conf_t)
`)

```

```
#####
```

```

## <summary>
## Write/read any regular file/directory from /varied
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_varied_manage`,`
    gen_require(`
        type polaris_disk_varied_t;
    `)
    manage_files_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
`)

```

```
#####
```

```

## <summary>
## read any regular file/directory from /varied
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_varied_read`,`
    gen_require(`
        type polaris_disk_varied_t;
    `)
    read_files_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
    list_dirs_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
`)

```

```

')

#####
#####
## <summary>
## Search /varied directory
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_varied_search`,`
    gen_require(`
        type polaris_disk_varied_t;
    `)
    search_dirs_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
`)

```

```

#####
#####
## <summary>
## List/read /varied directory
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_varied_list`,`
    gen_require(`
        type polaris_disk_varied_t;
    `)
    list_dirs_pattern($1, polaris_disk_varied_t, polaris_disk_varied_t)
`)

```

```

#####
## <summary>
## Write/read/remove polaris_core_file_t file/directory from
## persistent storage.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>

```

```

#
interface(`polaris_core_file_manage',`
    gen_require(`
        type polaris_core_file_t;
    ')
    allow $1 polaris_core_file_t:dir rmdir;
    manage_files_pattern($1, polaris_core_file_t, polaris_core_file_t)

    allow $1 polaris_core_file_t:dir watch;
')

```

```
#####
```

```

## <summary>
## Search polaris_core_file_t dir
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_core_file_search',`
    gen_require(`
        type polaris_core_file_t;
    ')
    search_dirs_pattern($1, polaris_core_file_t, polaris_core_file_t)
')

```

```
#####
```

```

## <summary>
## Read/Open/Search polaris_core_file_t dir
## </summary>
## <param name="domain">
##   <summary>
##   Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_core_file_read',`
    gen_require(`
        type polaris_core_file_t;
    ')
    allow $1 polaris_core_file_t:dir read;
    getattr_files_pattern($1, polaris_core_file_t, polaris_core_file_t)
')

```

```
#####
```

```
## <summary>
```

```

## Get attrib of bootflash fifo file.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_bootflash_fifo_file_getattr`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    getattr_fifo_files_pattern($1, polaris_disk_bootflash_t,
        polaris_disk_bootflash_t)
`)

```

```

#####
## <summary>
## Get attrib of bootflash sock file.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_bootflash_sock_file_getattr`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    getattr_sock_files_pattern($1, polaris_disk_bootflash_t,
        polaris_disk_bootflash_t)
`)

```

```

#####
## <summary>
## Read links of polaris_disk_bootflash_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_bootflash_read_lnk`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)

```



```

    read_lnk_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
)

#####
## <summary>
## Search polaris_disk_bootflash_t dir
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_bootflash_search`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    search_dirs_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
)

```

```

#####
## <summary>
## Write/read any regular file/directory under /csl_p_0/, /csl_p_1,
## /csl_s_0, and /csl_s_1
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_disk_csl_manage`,`
    gen_require(`
        type polaris_disk_csl_p_t;
        type polaris_disk_csl_s_t;
    `)
    manage_files_pattern($1, polaris_disk_csl_p_t, polaris_disk_csl_p_t)
    manage_files_pattern($1, polaris_disk_csl_s_t, polaris_disk_csl_s_t)
    read_lnk_files_pattern($1, polaris_disk_csl_p_t, polaris_disk_csl_p_t)
    read_lnk_files_pattern($1, polaris_disk_csl_s_t, polaris_disk_csl_s_t)
)

```

```

#####
## <summary>
## Write/read any regular file/directory under /csl_p_0/, /csl_p_1,
## /csl_s_0, and /csl_s_1
## </summary>

```

```

## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_csl_read`,`
    gen_require(`
        type polaris_disk_csl_p_t;
        type polaris_disk_csl_s_t;
    `)
    read_files_pattern($1, polaris_disk_csl_p_t, polaris_disk_csl_p_t)
    read_files_pattern($1, polaris_disk_csl_s_t, polaris_disk_csl_s_t)
    read_lnk_files_pattern($1, polaris_disk_csl_p_t, polaris_disk_csl_p_t)
    read_lnk_files_pattern($1, polaris_disk_csl_s_t, polaris_disk_csl_s_t)
)

#####
## <summary>
## Write/read any regular file/directory under /objstore,
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_objstore_manage`,`
    gen_require(`
        type polaris_disk_objstore_t;
    `)
    manage_files_pattern($1, polaris_disk_objstore_t, polaris_disk_objstore_t)
    read_lnk_files_pattern($1, polaris_disk_objstore_t, polaris_disk_objstore_t)
)

interface(`polaris_disk_objstore_read`,`
    gen_require(`
        type polaris_disk_objstore_t;
    `)
    read_files_pattern($1, polaris_disk_objstore_t, polaris_disk_objstore_t)
    list_dirs_pattern($1, polaris_disk_objstore_t, polaris_disk_objstore_t)
)

#####
## <summary>
## Read links of polaris_disk_harddisk_t
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_harddisk_read_lnk`,`
    gen_require(`
        type polaris_disk_harddisk_t;
    `)
    read_lnk_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
`)

```

```
#####
```

```

## <summary>
## Read harddisk files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_harddisk_read`,`
    gen_require(`
        type polaris_disk_harddisk_t;
    `)
    read_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
    list_dirs_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
`)

```

```
#####
```

```

## <summary>
## Read bootflash files
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_bootflash_read`,`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    read_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
    read_lnk_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
    list_dirs_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
`)

```

```

')

#####
## <summary>
##   Manage bootflash files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_bootflash_manage',`
    gen_require(`
        type polaris_disk_bootflash_t;
    `)
    manage_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
    manage_lnk_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
    manage_dirs_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
)

```

```

#####
## <summary>
## Create an object in the polaris_disk_bootflash_t directories,
## with a private type using a type transition.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="private type">
## <summary>
## The type of the object to be created.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_bootflash_filetrans',`

```

```

gen_require(
    type polaris_disk_bootflash_t;
)

filetrans_pattern($1, polaris_disk_bootflash_t, $2, $3, $4)
)

#####
## <summary>
##   Manage bootflash files
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface( polaris_harddisk_manage',
    gen_require(
        type polaris_disk_harddisk_t;
    )
    manage_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
    manage_lnk_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
    manage_dirs_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)
)

#####
## <summary>
## Create an object in the polaris_disk_harddisk_t directories,
## with a private type using a type transition.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="private type">
##   <summary>
##     The type of the object to be created.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     The object class of the object being created.
##   </summary>
## </param>
## <param name="name" optional="true">

```

```

## <summary>
## The name of the object being created.
## </summary>
## </param>
#
interface(`polaris_harddisk_filetrans`,`
gen_require(`
type polaris_disk_harddisk_t;
`)

filetrans_pattern($1, polaris_disk_harddisk_t, $2, $3, $4)
`)

#####
## <summary>
## Getattr of polaris_disk_crashinfo_t (typically /crashinfo
## symbolic link and real disk it points to)
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_crashinfo_getattr`,`
gen_require(`
type polaris_disk_crashinfo_t;
`)
read_lnk_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
getattr_lnk_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
getattr_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
getattr_dirs_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
`)

#####
## <summary>
## Manage polaris_disk_crashinfo_t (typically /crashinfo
## symbolic link and real disk it points to)
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_crashinfo_manage`,`
gen_require(`

```

```

    type polaris_disk_crashinfo_t;
)
manage_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
manage_lnk_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
manage_dirs_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
)

```

```
#####
```

```

## <summary>
## Read links of polaris_disk_crashinfo_t
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_disk_crashinfo_read_lnk`,
  gen_require(`
    type polaris_disk_crashinfo_t;
  `)
  read_lnk_files_pattern($1, polaris_disk_crashinfo_t, polaris_disk_crashinfo_t)
)

```

```
#####
```

```

## <summary>
## Write/read polaris_disk_license_t files/directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#

```

```

interface(`polaris_disk_license_manage`,
  gen_require(`
    type polaris_disk_license_t;
  `)
  manage_files_pattern($1, polaris_disk_license_t, polaris_disk_license_t)
  manage_lnk_files_pattern($1, polaris_disk_license_t, polaris_disk_license_t)
  allow $1 polaris_disk_license_t:file map;
)

```

```
#####
```

```

## <summary>
## Fead polaris_disk_license_t files/directories
## </summary>
## <param name="domain">

```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_disk_license_read`,`
    gen_require(`
        type polaris_disk_license_t;
    `)
    read_files_pattern($1, polaris_disk_license_t, polaris_disk_license_t)
    read_lnk_files_pattern($1, polaris_disk_license_t, polaris_disk_license_t)
)

```

```
#####
```

```

## <summary>
## Get the attributes of an removable
## filesystem.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_getattr_removable`,`
    gen_require(`
        type removable_t;
    `)

    allow $1 removable_t:filesystem getattr;
    allow $1 removable_t:dir getattr;
)

```

```
#####
```

```

## <summary>
## Create, read, write, and delete all removable files.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_removable_manage`,`
    gen_require(`
        type removable_t;
    `)

```



```
manage_files_pattern($1, removable_t, removable_t)
manage_dirs_pattern($1, removable_t, removable_t)
')
```

```
#####
## <summary>
##   read all removable files.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_removable_read`,`
  gen_require(`
    type removable_t;
  `)
  read_files_pattern($1, removable_t, removable_t)
  list_dirs_pattern($1, removable_t, removable_t)
  read_lnk_files_pattern($1, removable_t, removable_t)
')
```

```
#####
## <summary>
##   Get the attributes of silent roll partition
##   filesystem.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_getattr_filesystem_disk_ucose`,`
  gen_require(`
    type polaris_disk_ucose_t;
  `)

  allow $1 polaris_disk_ucose_t:filesystem getattr;
')
```

```
#####
## <summary>
##   Get the attributes of an bootflash
##   filesystem.
## </summary>
## <param name="domain">
```

```

## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_getattr_bootflash`,`
gen_require(`
type polaris_disk_bootflash_t;
`)

allow $1 polaris_disk_bootflash_t:filesystem getattr;
`)

#####
## <summary>
## Get the attributes of an harddisk
## filesystem.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_getattr_harddisk`,`
gen_require(`
type polaris_disk_harddisk_t;
`)

allow $1 polaris_disk_harddisk_t:filesystem getattr;
`)

#####
## <summary>
## Get the attributes of an harddisk
## file.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_getattr_file_harddisk`,`
gen_require(`
type polaris_disk_harddisk_t;
`)
getattr_files_pattern($1, polaris_disk_harddisk_t, polaris_disk_harddisk_t)

```

)

#####

```
## <summary>
##   Watch persistent file or directories
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolebase/>
#
interface(`polaris_persistent_watch',`
  gen_require(`
    attribute polaris_disk;
  `)
  allow $1 polaris_disk: { dir file } watch;
`)
```

#####

```
## <summary>
##   Create an object in the polaris_disk_crashinfo_t directories,
##   with a private type using a type transition.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <param name="private type">
##   <summary>
##     The type of the object to be created.
##   </summary>
## </param>
## <param name="object">
##   <summary>
##     The object class of the object being created.
##   </summary>
## </param>
## <param name="name" optional="true">
##   <summary>
##     The name of the object being created.
##   </summary>
## </param>
#
interface(`polaris_crashinfo_filetrans',`
  gen_require(`
```

```

        type polaris_disk_crashinfo_t;
    ')

    filetrans_pattern($1, polaris_disk_crashinfo_t, $2, $3, $4)
)

#####
## <summary>
##   Get the attributes of an polaris_disk_config_t
##   file or directory.
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_getattr_disk_config`,`
gen_require(
    type polaris_disk_config_t;
)
    getattr_files_pattern($1, polaris_disk_config_t, polaris_disk_config_t)
    getattr_dirs_pattern($1, polaris_disk_config_t, polaris_disk_config_t)
)

#####
## <summary>
## Create an object in the polaris_disk_config_t directories,
## with a private type using a type transition.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
## <param name="private type">
## <summary>
## The type of the object to be created.
## </summary>
## </param>
## <param name="object">
## <summary>
## The object class of the object being created.
## </summary>
## </param>
## <param name="name" optional="true">
## <summary>
## The name of the object being created.

```

```

## </summary>
## </param>
#
interface(`polaris_disk_config_filetrans`,`
gen_require(`
type polaris_disk_config_t;
`)

filetrans_pattern($1, polaris_disk_config_t, $2, $3, $4)
`)

#####
## <summary>
##   Manage bootflash files mmap
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_bootflash_files_mmap`,`
gen_require(`
type polaris_disk_bootflash_t;
`)
mmap_files_pattern($1, polaris_disk_bootflash_t, polaris_disk_bootflash_t)
`)

```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisstorage.if
```

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```

#
# March 2020, Victor Kamensky
#
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# All rights reserved
#

```

```
policy_module(polarisjvm, 1.0);
```

```

gen_require(`
type polaris_jvm_t;
`)

```

```

# access /etc/passwd
auth_use_nsswitch(polaris_jvm_t)

```

```

# java through posix_sysconf accesses /sys/devices/system/cpu
# to get number of CPUs
dev_read_sysfs(polaris_jvm_t)

# checks whether IPV6 is configured accessing /proc/pid/net/if_inet6
kernel_read_network_state(polaris_jvm_t)

# handling ~/.oracle_jre_usage
type polaris_jvm_home_t;
files_type(polaris_jvm_home_t)
gen_require(
    type user_home_dir_t;
)
filetrans_pattern(polaris_jvm_t, user_home_dir_t, polaris_jvm_home_t, dir, ".oracle_jre_usage")
manage_dirs_pattern(polaris_jvm_t, user_home_dir_t, polaris_jvm_home_t)
manage_files_pattern(polaris_jvm_t, polaris_jvm_home_t, polaris_jvm_home_t)

# handling /tmp/hsperfdata_root
type polaris_jvm_tmp_t;
files_type(polaris_jvm_tmp_t)
gen_require(
    type tmp_t;
)
files_tmp_filetrans(polaris_jvm_t, polaris_jvm_tmp_t, dir, "hsperfdata_root")
manage_dirs_pattern(polaris_jvm_t, tmp_t, polaris_jvm_tmp_t)
manage_files_pattern(polaris_jvm_t, polaris_jvm_tmp_t, polaris_jvm_tmp_t)
mmap_files_pattern(polaris_jvm_t, polaris_jvm_tmp_t, polaris_jvm_tmp_t)

# listen on 9093 websocket tcp port
corenet_tcp_bind_polaris_poljvm_websocket_port(polaris_jvm_t)
corenet_tcp_bind_generic_node(polaris_jvm_t)
allow polaris_jvm_t self:tcp_socket create_stream_socket_perms;

# java uses jit and needs executable anonymous mapping
allow polaris_jvm_t self:process execmem;

# Allow JDK access to read cpu and memory utilization data on start up
gen_require(
    type proc_t;
)

allow polaris_jvm_t proc_t:file { getattr open read };
fs_read_cgroup_files(polaris_jvm_t)
fs_search_cgroup_dirs(polaris_jvm_t)

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarisjvm.te

```

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```
#  
# March 2017, Victor Kamensky  
#  
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# All rights reserved  
#  
  
## <summary>Polaris plogd Policy Rules.</summary>
```

Found in path(s):  
\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarisplogd.if  
No license file was found, but licenses were detected in source scan.

```
#  
# March 2017, Victor Kamensky  
#  
# Copyright (c) 2016-2020 by Cisco Systems, Inc.  
# All rights reserved  
#  
  
## <summary>Polaris hm Policy Rules.</summary>
```

```
#####  
## <summary>  
##   Write into fifo file created by hman, typical case when  
##   hman starts script under popen.  
## </summary>  
## <param name="domain">  
##   <summary>  
##     Domain allowed access.  
##   </summary>  
## </param>  
## <rolecap/>  
#  
interface(`polaris_hman_use_fifo`,`  
    gen_require(  
        type polaris_hm_t;  
    )  
  
    write_fifo_files_pattern($1, polaris_hm_t, polaris_hm_t)  
)
```

```
#####  
## <summary>  
##   Read tmp files created by hman. I.e /tmp/myhostname.  
## </summary>
```

```

## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_hm_tmp_read`,`
    gen_require(`
        type polaris_hm_tmp_t;
    `)

    read_files_pattern($1, polaris_hm_tmp_t, polaris_hm_tmp_t)
`)

#####
## <summary>
##   Execute pkg_summary.sh in its own domain
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_pkg_summary_domtrans`,`
    gen_require(`
        type polaris_pkg_summary_t;
        type polaris_pkg_summary_exec_t;
    `)

    corecmd_search_bin($1)
    domtrans_pattern($1, polaris_pkg_summary_exec_t, polaris_pkg_summary_t)
`)

#####
## <summary>
##   Execute pkg_to_tree.sh in its own domain
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
## <rolecap/>
#
interface(`polaris_pkg_to_tree_domtrans`,`

```



```

gen_require(
    type polaris_pkg_to_tree_t;
    type polaris_pkg_to_tree_exec_t;
)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_pkg_to_tree_exec_t, polaris_pkg_to_tree_t)
)

#####
## <summary>
## Execute hman in the polaris_cli_fs_cmds domain.
## </summary>
## <param name="domain">
## <summary>
## Domain allowed to transition.
## </summary>
## </param>
#
interface(`polaris_cli_fs_cmds_domtrans`,`
gen_require(
    type polaris_cli_fs_cmds_t, polaris_cli_fs_cmds_exec_t;
)

corecmd_search_bin($1)
domtrans_pattern($1, polaris_cli_fs_cmds_exec_t, polaris_cli_fs_cmds_t)
)

#####
## <summary>
## Read file /tmp/pkg_summary.txt file
## </summary>
## <param name="domain">
## <summary>
## Domain allowed access.
## </summary>
## </param>
#
interface(`polaris_pkg_summary_tmp_read`,`
gen_require(
    type polaris_pkg_summary_tmp_t;
)
read_files_pattern($1, polaris_pkg_summary_tmp_t, polaris_pkg_summary_tmp_t)
)

#####
## <summary>
## read the contents of /tmp/show_provision_temp

```

```

## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_show_provision_temp_read`,`
    gen_require(`
        type polaris_show_provision_tmp_t;
    `)
    read_files_pattern($1, polaris_show_provision_tmp_t, polaris_show_provision_tmp_t)
`)

#####
## <summary>
##   manage the contents of /tmp/show_provision_temp
## </summary>
## <param name="domain">
##   <summary>
##     Domain allowed access.
##   </summary>
## </param>
#
interface(`polaris_show_provision_temp_manage`,`
    gen_require(`
        type polaris_show_provision_tmp_t;
    `)
    manage_files_pattern($1, polaris_show_provision_tmp_t, polaris_show_provision_tmp_t)
    manage_lnk_files_pattern($1, polaris_show_provision_tmp_t, polaris_show_provision_tmp_t)
    manage_dirs_pattern($1, polaris_show_provision_tmp_t, polaris_show_provision_tmp_t)
    files_tmp_filetrans($1, polaris_show_provision_tmp_t, { file dir })
`)

```

Found in path(s):

\* /opt/cola/permits/1103963160\_1615183271.1/0/selinux-tar/selinux/polarishm.if

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```

#
# March 2017, Victor Kamensky
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#

```

```

policy_module(polarispsvp, 1.0);

```

```

polaris_process_domain_template(psvp)

# transition to pman domain, once pman is invoked by psvp
polaris_pman_domtrans(polaris_psvp_t)
# transition to pvp domain, once pvp is invoked by psvp
polaris_pvp_domtrans(polaris_psvp_t)

corecmd_exec_bin(polaris_psvp_t)
corecmd_exec_shell(polaris_psvp_t)

# can execute process in polaris domain
polaris_exec(polaris_psvp_t)

# LOOK AT ME start-stop-daemon from busy box iterates all
# /proc/<pid> directories and reads /proc/<pid>/cmdline
# /proc/<pid>/exe. I.e it need quite a bit of priviledges
domain_read_all_domains_state(polaris_psvp_t)

# another issue of running busybox start-stop-daemon under
# psvp_t label
# type=AVC msg=audit(1480527500.482:46): avc: denied { sys_ptrace } for pid=14853 comm="start-stop-daem"
# capability=19 scontext=system_u:system_r:polaris_psvp_t:s0 tcontext=system_u:system_r:polaris_psvp_t:s0
# tclass=capability
allow polaris_psvp_t self:capability sys_ptrace;

# allow to read /proc/meminfo
kernel_read_system_state(polaris_psvp_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_psvp_t)

# run ldd, which in turns execve "ld.so --verify"
libs_exec_ld_so(polaris_psvp_t)

# work with /tmp files
type polaris_psvp_tmp_t;
files_tmp_file(polaris_psvp_tmp_t)
manage_dirs_pattern(polaris_psvp_t, tmp_t, polaris_psvp_tmp_t)
manage_files_pattern(polaris_psvp_t, polaris_psvp_tmp_t, polaris_psvp_tmp_t)
manage_fifo_files_pattern(polaris_psvp_t, polaris_psvp_tmp_t, polaris_psvp_tmp_t)
files_tmp_filetrans(polaris_psvp_t, polaris_psvp_tmp_t, { file dir })
filetrans_pattern(domain, tmp_t, polaris_psvp_tmp_t, dir, "psvp")

ifdef(`ngwc_family',`
# also need to be able to ls /tmp/ufs/ on ngwc
optional_policy(`
polaris_ncd_tmp_read(polaris_psvp_t)
')

```

```

')

# note split entry another psvp capability listed above
allow polaris_psvp_t self:capability sys_resource;

polaris_pvp_getattr_tmp_dirs(polaris_psvp_t)

dmidecode_domtrans(polaris_psvp_t)

polaris_btrace_data_manage(polaris_psvp_t)
polaris_chasfs_manage(polaris_psvp_t)
polaris_cpld_read(polaris_psvp_t)
polaris_cpld_write(polaris_psvp_t)
polaris_rmonbifo_tmp_read(polaris_psvp_t)
polaris_tdldb_list_dirs(polaris_psvp_t)
polaris_boot_tmp_read(polaris_psvp_t)
polaris_disk_crashinfo_getattr(polaris_psvp_t)
polaris_flashlib_read(polaris_psvp_t)
polaris_read_debug_conf(polaris_psvp_t)

allow polaris_psvp_t self:capability dac_override;

# watch /tmp/sai/psvp
allow polaris_psvp_t polaris_psvp_tmp_t:dir watch;

# creates /tmp/sai/pvp/rp/run_stg2
polaris_pvp_manage_tmp_files(polaris_psvp_t)

# Allow /tmp/ufs/bootflash & /tmp/ufs/harddisk read access
ifdef(`vwlc_platform',`
optional_policy(`
polaris_ncd_tmp_read(polaris_psvp_t)
')
')

# permissions during shutdown
polaris_pvp_manage_tmp_files(polaris_psvp_t);

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarispsvp.te
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#
# October 2019, Patrick O'Halloran
#
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#

```

```

policy_module(polariscrft, 1.0);

#####
# CRFT policy
#####
gen_require(
    attribute domain;
    attribute polaris_extended_domain;
)

# persistent CRFT files stored under crft_data
type polaris_crft_data_t;
files_type(polaris_crft_data_t)

# allow crft data file reside on persistent storage
polaris_pfile_type(polaris_crft_data_t)

attribute polaris_crft_data_domain;

typeattribute polaris_crft_data_t polaris_crft_data_domain;

# Start of mcp_crft_request context elements
polaris_utility_domain_template(crft_request)

# smand calls the mcp_crft_request.sh in bexec context
polaris_bexecute_domtrans(polaris_crft_request_t)
polaris_bexecute_domain(polaris_crft_request_t, polaris_crft_request_exec_t)

# read the cpld information
polaris_cpld_read(polaris_crft_request_t)

# dev/pty access as part of bexec operations
telnet_use_ptys(polaris_crft_request_t)

# filesystem attributes for df /
fs_getattr_xattr_fs(polaris_crft_request_t)

# btrace used in script uses these
polaris_btrace_tmppub_manage(polaris_crft_request_t)
polaris_use_btrace_fifo(polaris_crft_request_t)

# read /proc/rmonbifo files such as env_var.sh
polaris_rmonbifo_tmp_read(polaris_crft_request_t)

# read /tmp/sw/boot/base_pkg
polaris_boot_tmp_manage(polaris_crft_request_t)

```

```

# ufs information captured by the chasfs utils
ifdef(^ngwc_family';`
optional_policy(`
polaris_ncd_tmp_manage(polaris_crft_request_t)
')
')
# scripts read /proc/cmdline
kernel_read_system_state(polaris_crft_request_t)

# ping the vrf
netutils_domtrans_ping(polaris_crft_request_t)
sysnet_domtrans_ifconfig(polaris_crft_request_t)

# rsync operations for members and standby rps
gen_require(`
    type rsync_exec_t;
    type rsync_port_t;
')
allow polaris_crft_request_t rsync_exec_t:file { execute execute_no_trans getattr map open read };
allow polaris_crft_request_t rsync_port_t:tcp_socket name_connect;

# access to /etc/hosts for rp/members information
gen_require(`
    type net_conf_t;
')
files_etc_filetrans(polaris_crft_request_t, net_conf_t, file, "hosts")
auth_use_nsswitch(polaris_crft_request_t)

# execute the bash script
corecmd_exec_bin(polaris_crft_request_t)

# net namespace filesystem
fs_read_nsfs_files(polaris_crft_request_t)
polaris_chasfs_manage(polaris_crft_request_t)

# script also accesses the persistent files from crft
polaris_persistent_manage(polaris_crft_request_t)
polaris_crft_data_manage_all(polaris_crft_request_t)

# ping operations via ip netns
gen_require(`
    type ifconfig_t;
')
netutils_domtrans_ping(ifconfig_t)

# Curl accesses from IoT boxes like petra/sparrow
gen_require(`
    type polaris_curl_t;

```

```

    type polaris_iosd_t;
)
allow polaris_curl_t polaris_crft_request_t:process sigchld;

# handle mktemp creation and cleanup
files_manage_generic_tmp_dirs(polaris_crft_request_t)
allow polaris_crft_request_t self:capability sys_resource;

Found in path(s):
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polariscrft.te
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#
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#

policy_module(polaristamdrp, 1.0);

gen_require(^
    type polaris_tamd_rp_t;
)

polaris_btrace_data_manage(polaris_tamd_rp_t)
polaris_crft_data_manage(polaris_tamd_rp_t)
polaris_chasfs_manage(polaris_tamd_rp_t)
polaris_tdlresolve_read(polaris_tamd_rp_t)
polaris_tdlldb_list_dirs(polaris_tamd_rp_t)
polaris_flashlib_read(polaris_tamd_rp_t)
logging_send_syslog_msg(polaris_tamd_rp_t)

# allow read of /etc/passwd
auth_use_nsswitch(polaris_tamd_rp_t)

polaris_cpld_read(polaris_tamd_rp_t)
polaris_cpld_write(polaris_tamd_rp_t)

polaris_quack_dev_use(polaris_tamd_rp_t)

# tmp file for udi authentication
type polaris_tamd_rp_tmp_t;
files_tmp_file(polaris_tamd_rp_tmp_t);
files_tmp_filetrans(polaris_tamd_rp_t, polaris_tamd_rp_tmp_t, file, "tam_uid_validation")
manage_files_pattern(polaris_tamd_rp_t, polaris_tamd_rp_tmp_t, polaris_tamd_rp_tmp_t)
polaris_cm_rp_tmp_manage(polaris_tamd_rp_t)

```

```

# hybrid tam needs access to /objstore/.swtam
gen_require(
    type polaris_disk_objstore_t;
    type root_t;
)
filetrans_pattern(polaris_tamd_rp_t, root_t, polaris_disk_objstore_t, dir, "objstore")
manage_dirs_pattern(polaris_tamd_rp_t, polaris_disk_objstore_t, polaris_disk_objstore_t)
polaris_disk_objstore_manage(polaris_tamd_rp_t)

# need access to dash fpga to read/write TAM
optional_policy(
    polaris_dash_dev_use(polaris_tamd_rp_t)
)

#access to /dev/dash_fpga device on fugazi platform
ifdef(^fugazi_platform',`
    polaris_dash_dev_mcp_use(polaris_tamd_rp_t)
)

allow polaris_tamd_rp_t self:capability net_admin;

# LOOK AT ME tamd_rp needs shell access to do something like this
# sh -c "echo 0x04 > /sys/devices/platform/cpld/reg_rp_reset_control"
# need to rework into simple open,write,close
corecmd_exec_shell(polaris_tamd_rp_t)

# LOOK AT ME access should be restricted after /flash/dummy_check is removed,
# which is tracked under CSCvh68866. Allow access to bootflash till then.
polaris_bootflash_read(polaris_tamd_rp_t)

optional_policy(
# Allow /dev/dmammmap access
polaris_dmammmap_dev_use(polaris_tamd_rp_t)
)

# LOOK AT ME: /dev/mem access restriction
polaris_dev_mem_use(polaris_tamd_rp_t)

optional_policy(
polaris_ngwc_shm_manage(polaris_tamd_rp_t)
)

optional_policy(
polaris_remap_mem_dev_use(polaris_tamd_rp_t)
)

polaris_cpld_dev_use(polaris_tamd_rp_t)

```



```
optional_policy(`
# allow access to /sys/devices/virtual/misc/ggpio/gpio_out_assert
polaris_ggpio_dev_read_write(polaris_tamd_rp_t)
`)
```

```
optional_policy(`
    polaris_quake_i2c_manage(polaris_tamd_rp_t)
`)
```

```
# /dev/aikido access
polaris_aikido_dev_use(polaris_tamd_rp_t)
```

```
# tamlib debug file access
polaris_tamlib_dbg_file_manage(polaris_tamd_rp_t)
```

```
# tam gpio sysfs access
optional_policy(`
dev_rw_sysfs(polaris_tamd_rp_t)
`)
```

```
ifdef(`petra_platform',`
#allow access to /dev/i2c-0 for hash value
polaris_i2c_use(polaris_tamd_rp_t)
`)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polaristamdrp.te
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```

```
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#
```

```
/usr/binos/conf/sort_files_by_inode.sh -- gen_context(system_u:object_r:polaris_sort_files_exec_t,s0)
```

Found in path(s):

```
* /opt/cola/permits/1103963160_1615183271.1/0/selinux-tar/selinux/polarissortfiles.fc
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```

```
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```

```

policy_module(polariscedgestart, 1.0);

gen_require(
    type polaris_cedge_start_t;
)

polaris_chasfs_manage(polaris_cedge_start_t)
polaris_boot_tmp_read(polaris_cedge_start_t)
polaris_bootflash_manage(polaris_cedge_start_t)
polaris_cpld_read(polaris_cedge_start_t)
polaris_flashlib_read(polaris_cedge_start_t)
polaris_rmonbifo_tmp_read(polaris_cedge_start_t)
polaris_btrace_tmppub_read(polaris_cedge_start_t)

# needed by install_util.sh
polaris_read_packages_conf(polaris_cedge_start_t)

corecmd_exec_bin(polaris_cedge_start_t)
corecmd_exec_shell(polaris_cedge_start_t)
auth_use_nsswitch(polaris_cedge_start_t)

polaris_dmi_ports_fetch_domtrans(polaris_cedge_start_t)

# runs ps -C cfgmgr -o pid=
# ps needs access to proc_t
kernel_read_system_state(polaris_cedge_start_t)
# ps needs access to state of all domains
domain_read_all_domains_state(polaris_cedge_start_t)
# "ps" needs read access to /sys/devices/system/cpu/online
# "ps" needs read access to /proc/uptime
dev_read_sysfs(polaris_cedge_start_t)

# runs vip-confd-startup.sh needs transition into polaris_conf_d_t domain
polaris_conf_d_domtrans(polaris_cedge_start_t)

# runs systemctl start logrotate.service
systemd_exec_systemctl(polaris_cedge_start_t)

# manage /etc/viptela
polaris_cedge_etc_manage(polaris_cedge_start_t)

# runs install_assist.sh
polaris_install_engine_domtrans(polaris_cedge_start_t)

# write /bootflash/.installer/images/pkg_boot_17.3.01/version
polaris_disk_install_manage(polaris_cedge_start_t)
gen_require(

```

```

    type polaris_disk_install_t;
)
# du -s /bootflash/.installer/images/pkg_boot_17.3.01/confd0/cdb
allow polaris_cedge_start_t polaris_disk_install_t:filesystem getattr;

# chown -R binos /bootflash/sdwan
fs_getattr_xattr_fs(polaris_cedge_start_t)

allow polaris_cedge_start_t self:capability { chown fowner net_admin };

# PLEASE LOOK AT ME cedge_start.sh modifies set of directories that
# are supposed to be read only, like usr_t, etc_t, root_t
files_rw_usr_dirs(polaris_cedge_start_t)
gen_require(
    type usr_t;
)
manage_lnk_files_pattern(polaris_cedge_start_t, usr_t, usr_t)
libs_manage_lib_dirs(polaris_cedge_start_t)
gen_require(
    type lib_t;
)
manage_lnk_files_pattern(polaris_cedge_start_t, lib_t, lib_t)
files_manage_etc_symlinks(polaris_cedge_start_t)
files_manage_var_symlinks(polaris_cedge_start_t)
# creates /home directory in root
gen_require(
    type root_t;
)
manage_dirs_pattern(polaris_cedge_start_t, root_t, root_t)
manage_lnk_files_pattern(polaris_cedge_start_t, root_t, root_t)
# creates /var/log/sdwan
gen_require(
    type var_log_t;
)
manage_dirs_pattern(polaris_cedge_start_t, var_log_t, var_log_t)
manage_lnk_files_pattern(polaris_cedge_start_t, var_log_t, var_log_t)
corecmd_manage_bin_files(polaris_cedge_start_t)

# PLEASE LOOK AT ME copy unit files into /lib/systemd/system
# cp /tmp/sw/rp/0/0/rp_daemons/mount/lib/systemd/system/logrotate.service /lib/systemd/system
gen_require(
    type systemd_unit_file_t;
)
read_lnk_files_pattern(polaris_cedge_start_t, systemd_unit_file_t, systemd_unit_file_t)

# PLEASE LOOK AT ME need to have separate label for logrotate.service
# allow only to start if, do it once copy of logrotate.service is fixed
systemd_config_generic_services(polaris_cedge_start_t)

```

```

init_start(polaris_cedge_start_t)

# creates /var/log/confd
polaris_conf_d_var_log_manage(polaris_cedge_start_t)

# executes touch /etc/resolv.conf for case when it is missing
# check create_etc_resolv_conf make sure that it becomes net_conf_t
gen_require(
    type net_conf_t;
)
files_etc_filetrans(polaris_cedge_start_t, net_conf_t, file, "resolv.conf")
sysnet_create_config(polaris_cedge_start_t)
sysnet_write_config(polaris_cedge_start_t)

# creates /var/confd0 when box boots with startup config disabled
polaris_conf_d_var_filetrans(polaris_cedge_start_t, dir, "confd0")

polaris_conf_d_var_dir_manage(polaris_cedge_start_t)

#####
# During controller-mode enablement/bringup,
# viptela scripts are not loaded as part of the base packages.
# viptela-start.sh script takes care of creating these references.
# It creates softlink copies them as below to desired location depending on the packaging (mono vs subpackage).
# "cp $PKG_PATH/lib/systemd/system/logrotate.service /lib/systemd/system"
# Below policy statement allow copy access needed for viptela-logrotate.sh
# for updating /lib/systemd/system and /usr/binos/conf path
write_files_pattern(polaris_cedge_start_t, systemd_unit_file_t, systemd_unit_file_t)

# While creating softlink as below
# "ln -sf $PKG_PATH/usr/binos/conf/viptela-logrotate.sh /usr/binos/conf/viptela-logrotate.sh"
# As the ln command tries to create the new link, it removes the already existing link.
# ln deletes the file associated with the path name if this path name is the last link to the file.
# If ln can't get rid of the conflicting path name, it does not attempt to establish the new link.
# If ln successfully removes the conflicting path name, it then establishes the link.
# delete file permissions are hence needed for ln command to perform unlinking previous link
files_delete_etc_files(polaris_cedge_start_t)
#####

# During cEdge upgrade, viptela-start.sh needs permissions to maintain the
# state of roll back timer in /bootflash/.rollback_timer/*
polaris_rbtimer_bootflash_manage(polaris_cedge_start_t)

#Nutella-XE - Vedge image install
#/bin/bash /tmp/sw/rp/0/0/rp_security/mount/usr/binos/conf/viptela-start.sh
mount_domtrans(polaris_cedge_start_t)

```

Found in path(s):

# 1.501 flask-script 2.0.5

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# 1.502 libcomps 0.1.18-1.el8

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Version 2, June 1991

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## 1.511 pcre 10.32 2.el8

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## THE BASIC LIBRARY FUNCTIONS

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## PCRE2 JUST-IN-TIME COMPILATION SUPPORT

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## STACK-LESS JUST-IN-TIME COMPILER

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## 1.512 snake-yaml 1.12

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