Open Source Used In Cisco Secure Endpoint Connector (Linux) 1.20.4

Cisco Systems, Inc.
www.cisco.com

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco website at www.cisco.com/go/offices.

Text Part Number: 78EE117C99-1591775582

This document contains licenses and notices for open source software used in this product. With respect to the free/open source software listed in this document, if you have any questions or wish to receive a copy of any source code to which you may be entitled under the applicable free/open source license(s) (such as the GNU Lesser/General Public License), please submit this form.

In your requests please include the following reference number 78EE117C99-1591775582

Contents

1.1 asn1c 0.9.24

1.1.1 Available under license :

* OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
* SUCH DAMAGE.
*
* Id
*/

1.2 re2 20160201

1.2.1 Available under license :

This is the official list of people who can contribute
(and typically have contributed) code to the RE2 repository.
The AUTHORS file lists the copyright holders; this file
lists people. For example, Google employees are listed here
but not in AUTHORS, because Google holds the copyright.
#
The submission process automatically checks to make sure
that people submitting code are listed in this file (by email address).
#
Names should be added to this file only after verifying that

the individual or the individual's organization has agreed to
the appropriate Contributor License Agreement, found here:
#
http://code.google.com/legal/individual-cla-v1.0.html
http://code.google.com/legal/corporate-cla-v1.0.html
#
The agreement for individuals can be filled out on the web.
#
When adding J Random Contributor's name to this file,
either J's name or J's organization's name should be
added to the AUTHORS file, depending on whether the
individual or corporate
CLA was used.

Names should be added to this file like so:
Name <email address>

Please keep the list sorted.

Dominic Battr <battre@chromium.org>
Doug Kwan <dougkwan@google.com>
Dmitriy Vyukov <dvyukov@google.com>
John Millikin <jmillikin@gmail.com>
Mike Nazarewicz <mpn@google.com>
Nico Weber <thakis@chromium.org>
Pawel Hajdan <phajdan.jr@gmail.com>
Rob Pike <r@google.com>
Russ Cox <rsc@swtch.com>
Sanjay Ghemawat <sanjay@google.com>
Stefano Rivera <stefano.rivera@gmail.com>
Srinivasan Venkatachary <vsri@google.com>
Viatcheslav Ostapenko <sl.ostapenko@samsung.com>

1.3 libmnl 1.0.4

1.3.1 Available under license :

GNU LESSER GENERAL PUBLIC LICENSE
Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

[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.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation
and other authors who decide to use it. You
can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

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 for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

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.

GNU LESSER GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

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.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

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.

b) You must cause the files modified to carry prominent notices

stating that you changed the files and the date of any change.

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.

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.

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 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.

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.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein.
You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or

otherwise) that contradict the conditions of this License, they do not
excuse you from the conditions of this License. If you cannot
distribute so as to satisfy simultaneously your obligations under this
License and any other pertinent obligations, then as a consequence you
may not distribute the Library at all. For example, if a patent
license would not permit royalty-free redistribution of the Library by
all those who receive copies directly or indirectly through you, then
the only way you could satisfy both it and this License would be to
refrain entirely from distribution of the Library.

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.

It is not the purpose of this section to induce you to infringe any
patents or other property right claims or to contest validity of any
such claims; this section has the sole purpose of protecting the
integrity of the free software distribution system which is
implemented by public license practices. Many people have made
generous contributions to the wide range of software distributed
through that system in reliance on consistent application of that
system; it is up to the author/donor to decide if he or she is willing
to distribute software through any other system and a licensee cannot
impose that choice.

This section is intended to make thoroughly clear what is believed to
be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in
certain countries either by patents
or by copyrighted interfaces, the
original copyright holder who places the Library under this License may add
an explicit geographical distribution limitation excluding those countries,
so that distribution is permitted only in or among countries not thus
excluded. In such case, this License incorporates the limitation as if
written in the body of this License.

13. The Free Software Foundation may publish revised and/or new
versions of the Lesser General Public License from time to time.
Such new versions will be similar in spirit to the present version,
but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library
specifies a version number of this License which applies to it and
"any later version", you have the option of following the terms and
conditions either of that version or of any later version published by
the Free Software Foundation. If the Library does not specify a

license version
number, you may choose any version ever published by
the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED
WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

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.>
Copyright (C) <year> <name of author>

This library 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.

This library 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 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!

1.4 xmlsec 1.2.27

1.4.1 Available under license :

See Copyright file for information about the copyright
xmlsec, xmlsec-openssl, xmlsec-gnutls, xmlsec-gcrypt libraries
----

Copyright (C) 2002-2016 Aleksey Sanin <aleksey@aleksey.com>. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy

of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO
EVENT SHALL THE
ALEKSEY SANIN 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.

Except as contained in this notice, the name of Aleksey Sanin shall not
be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from him.

xmlsec-nss library

Copyright (C) 2002-2016 Aleksey Sanin <aleksey@aleksey.com>. All Rights Reserved.
Copyright (c) 2003 America Online, Inc. All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy
of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or
sell
copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

Portions of the Software were created using source code and/or APIs
governed by the Mozilla Public License (MPL). The MPL is available
at http://www.mozilla.org/MPL/MPL-1.1.html. The MPL permits such
portions to be distributed with code not governed by MPL, as long
as the requirements of MPL are fulfilled for such portions.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
ALEKSEY SANIN 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.

Except as contained in this notice, the name of Aleksey Sanin shall not
be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from him.

xmlsec-mscrypto library

Permission is hereby granted, free of charge, to any person obtaining a copy
of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom the Software is furnished to do
so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE ALEKSEY SANIN 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.

Except as contained in this notice, the name of Aleksey Sanin shall not
be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from him.

References
----

* AOL
http://www.aleksey.com/pipermail/xmlsec/2003/005488.html
http://www.aleksey.com/pipermail/xmlsec/attachments/20030729/0e25648e/attachment.htm

*
 Cordys R&D BV
http://www.aleksey.com/pipermail/xmlsec/2003/005581.html

* Cryptocom LTD
http://www.aleksey.com/pipermail/xmlsec/2006/007410.html

1.5 jansson 2.11

1.5.1 Available under license :

1.6 pcre 10.34

1.6.1 Available under license :

PCRE2 LICENCE

Please see the file LICENCE in the PCRE2 distribution for licensing details.

End
PCRE2 LICENCE

PCRE2 is a library of functions to support regular expressions whose syntax
and semantics are as close as possible to those of the Perl 5 language.

Releases 10.00 and above of PCRE2 are distributed under the terms of the "BSD" licence, as specified below, with one exemption for certain binary redistributions. The documentation for PCRE2, supplied in the "doc" directory, is distributed under the same terms as the software itself. The data in the testdata directory is not copyrighted and is in the public domain.

The basic library functions are written in C and are freestanding. Also included in the distribution is a just-in-time compiler that can be used to optimize pattern matching. This is an optional feature that can be omitted when the library is built.

THE BASIC LIBRARY FUNCTIONS

Written by: Philip Hazel
Email local part: ph10
Email domain: cam.ac.uk

University of Cambridge Computing Service,
Cambridge, England.

PCRE2 JUST-IN-TIME COMPILATION SUPPORT

Written by: Zoltan Herczeg
Email local part: hzmester
Email domain: freemail.hu

STACK-LESS JUST-IN-TIME COMPILER

Written by: Zoltan Herczeg
Email local part: hzmester
Email domain: freemail.hu

THE "BSD" LICENCE

Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notices,
  this list of conditions and the following disclaimer.

* Redistributions in binary form must reproduce the above copyright
  notices, this list of conditions and the following disclaimer in the
  documentation
 and/or other materials provided with the distribution.

* Neither the name of the University of Cambridge nor the names of any
  contributors may be used to endorse or promote products derived from this
  software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED
 OF THE
POSSIBILITY OF SUCH DAMAGE.

EXEMPTION FOR BINARY LIBRARY-LIKE PACKAGES

The second condition in the BSD licence (covering binary redistributions) does not apply all the way down a chain of software. If binary package A includes PCRE2, it must respect the condition, but if package B is software that includes package A, the condition is not imposed on package B unless it uses PCRE2 independently.

End
Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the copyright

notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the copyright
notice, this list of conditions and the following disclaimer in the
documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products
derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT
OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

1.7 cre2 0.3.1

1.7.1 Available under license :

// Copyright (c) 2009 The RE2 Authors. All rights reserved.
//
// Redistribution and use in source and binary forms, with or without
// modification, are permitted provided that the following conditions are
// met:
//
//   * Redistributions of source code must retain the above copyright
// notice, this list of conditions and the following disclaimer.
//   * Redistributions in binary form must reproduce the above
// copyright notice, this list of conditions and the following disclaimer
// in the documentation and/or other materials provided with the
// distribution.
//   * Neither the name of Google Inc. nor the names of its
// contributors may be used to endorse or promote products derived from
// this software without specific prior written permission.
//
// THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
// "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
// LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
// A PARTICULAR PURPOSE
ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
// OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
// SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
// LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
// DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY

1.8 libedit 20180525-3.1

1.8.1 Available under license :

Christos Zoulas of Cornell University.

Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions
are met:
1. Redistributions of source code must retain the above copyright
 notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright
 notice, this list of conditions and the following disclaimer in the
 documentation and/or other materials provided with the distribution.
3. Neither the name of the University nor the names of its contributors
 may be used to endorse or promote products derived from this software
 without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS ``AS IS'' AND
ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED
TO, THE
IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE
FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL
DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT
LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY
OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
SUCH DAMAGE.

1.9 klib 70c0e397 + P

1.9.1 Available under license :

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

/* The MIT License

 Copyright (c) 2008, 2009, 2011 Attractive Chaos <attractor@live.co.uk>

 Permission is hereby granted, free of charge, to any person obtaining
 a copy of this software and associated documentation files (the
 "Software"), to deal in the Software without restriction, including
 without limitation the rights to use, copy, modify, merge, publish,
 distribute, sublicense, and/or sell copies of the Software, and to
 permit persons to whom the Software is furnished to do so, subject to
 the following conditions:

 The above copyright notice and this permission notice shall be
 included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR
COPYRIGHT HOLDERS
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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/kseq.h
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) by Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining
a copy of this software and associated documentation files (the
"Software"), to deal in the Software without restriction, including
without limitation the rights to use, copy, modify, merge, publish,
distribute, sublicense, and/or sell copies of the Software, and to
permit persons to whom the Software is furnished to do so, subject to
the following conditions:

The above copyright notice and this permission notice shall be
included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS
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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/kstring.h
No license file was found, but licenses were detected in source scan.

/* This code is public-domain - it is based on libcrypt placed in the public domain by Wei Dai and other contributors. */

Found in path(s):

* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/kurl.c
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) 2018 by Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/kavl.h
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) 2011 by Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT
HOLDERS
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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/ksw.c
No license file was found, but licenses were detected in source scan.

/*-
* Copyright 1997-1999, 2001, John-Mark Gurney.
*   2008-2009, Attractive Chaos <attractor@live.co.uk>
*
* Redistribution and use in source and binary forms, with or without
* modification, are permitted provided that the following conditions
* are met:
*
* 1. Redistributions of source code must retain the above copyright
*   notice, this list of conditions and the following disclaimer.
* 2. Redistributions in binary form must reproduce the above copyright
*   notice, this list of conditions and the following disclaimer in the
*   documentation and/or other materials provided with the distribution.
*
* THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS'' AND
* ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
* IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
* ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE
* FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL
* DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
* OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
* HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT
* LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY
* OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
* SUCH DAMAGE.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/kbtree.h
No license file was found, but licenses were detected in source scan.

Klib: a Generic Library in C

Overview

Klib is a standalone and lightweight C library distributed under [MIT/X11
license][1]. Most components are independent of external libraries, except the
standard C library, and independent of each other. To use a component of this
library, you only need to copy a couple of files to your source code tree
without worrying about library dependencies.

Klib strives for efficiency and a small memory footprint. Some components, such
as khash.h, kbtree.h, ksort.h and kvec.h, are among the most efficient
implementations of similar algorithms or data structures in all programming
languages, in terms of both speed and memory use.

A new documentation is available [here](http://attractivechaos.github.io/klib/)
which includes most information in this README file.

Common components

* [khash.h][khash]: generic [hash table][2] with open addressing.
* [kbtree.h][kbtree]:
 generic search tree based on [B-tree][3].
* [kavl.h][kavl]: generic intrusive [AVL tree][wiki-avl].
* [ksort.h][ksort]: generic sort, including [introsort][4], [merge sort][5], [heap sort][6], [comb sort][7], [Knuth shuffle][8] and the [k-small][9] algorithm.
* [kseq.h][kseq]: generic stream buffer and a [FASTA][10]/[FASTQ][11] format parser.
* kvec.h: generic dynamic array.
* klist.h: generic single-linked list and [memory pool][12].
* kstring.{h,c}: basic string library.
* kmath.{h,c}: numerical routines including [MT19937-64][13] [pseudorandom generator][14], basic [nonlinear programming][15] and a few special math functions.
* [ketopt.h][ketopt]: portable command-line argument parser with getopt_long-like API.

Components for more specific use cases

* ksa.c: constructing [suffix arrays][16] for strings with multiple sentinels, based on a revised [SAIS algorithm][17].
* knetfile.{h,c}: random access to remote files on HTTP or FTP.
* kopen.c: smart stream opening.
*
 khmm.{h,c}: basic [HMM][18] library.
* ksw.(h,c}: Striped [Smith-Waterman algorithm][19].
* knhx.{h,c}: [Newick tree format][20] parser.

Methodology

For the implementation of generic [containers][21], klib extensively uses C
macros. To use these data structures, we usually need to instantiate methods by
expanding a long macro. This makes the source code look unusual or even ugly

and adds difficulty to debugging. Unfortunately, for efficient generic programming in C that lacks [template][22], using macros is the only solution. Only with macros, we can write a generic container which, once instantiated, compete with a type-specific container in efficiency. Some generic libraries in C, such as [Glib][23], use the `void*` type to implement containers. These implementations are usually slower and use more memory than klib (see [this benchmark][31]).

To effectively use klib, it is important to understand how it achieves generic programming. We will use the
hash table library as an example:

```
#include "khash.h"
KHASH_MAP_INIT_INT(m32, char)        // instantiate structs and methods
int main() {
    int ret, is_missing;
    khint_t k;
    khash_t(m32) *h = kh_init(m32);  // allocate a hash table
    k = kh_put(m32, h, 5, &ret);     // insert a key to the hash table
    if (!ret) kh_del(m32, h, k);
    kh_value(h, k) = 10;             // set the value
    k = kh_get(m32, h, 10);          // query the hash table
    is_missing = (k == kh_end(h));   // test if the key is present
    k = kh_get(m32, h, 5);
    kh_del(m32, h, k);               // remove a key-value pair
    for (k = kh_begin(h); k != kh_end(h); ++k)  // traverse
        if (kh_exist(h, k))          // test if a bucket contains data
   kh_value(h, k) = 1;
    kh_destroy(m32, h);              // deallocate the hash table
    return 0;
}
```

In this example, the second line instantiates a hash table with `unsigned`
as
the key type and `char` as the value type. `m32` names such a type of hash table. All types and functions associated with this name are macros, which will be explained later. Macro `kh_init()` initiates a hash table and `kh_destroy()` frees it. `kh_put()` inserts a key and returns the iterator (or the position) in the hash table. `kh_get()` and `kh_del()` get a key and delete an element, respectively. Macro `kh_exist()` tests if an iterator (or a position) is filled with data.

An immediate question is this piece of code does not look like a valid C program (e.g. lacking semicolon, assignment to an _apparent_ function call and _apparent_ undefined `m32` 'variable'). To understand why the code is correct, let's go a bit further into the source code of `khash.h`, whose skeleton looks like:

```
#define KHASH_INIT(name, SCOPE, key_t, val_t, is_map, _hashf, _hasheq) \
  typedef struct { \
    int n_buckets, size, n_occupied, upper_bound; \
    unsigned *flags; \

 key_t *keys; \
    val_t *vals; \
  } kh_##name##_t; \
  SCOPE inline kh_##name##_t *init_##name() { \
    return (kh_##name##_t*)calloc(1, sizeof(kh_##name##_t)); \
  } \
  SCOPE inline int get_##name(kh_##name##_t *h, key_t k) \
  ... \
  SCOPE inline void destroy_##name(kh_##name##_t *h) { \
    if (h) { \
      free(h->keys); free(h->flags); free(h->vals); free(h); \
    } \
  }

#define _int_hf(key) (unsigned)(key)
#define _int_heq(a, b) (a == b)
#define khash_t(name) kh_##name##_t
#define kh_value(h, k) ((h)->vals[k])
#define kh_begin(h, k) 0
#define kh_end(h) ((h)->n_buckets)
#define kh_init(name) init_##name()
#define kh_get(name, h, k) get_##name(h, k)
#define kh_destroy(name, h) destroy_##name(h)
...
#define KHASH_MAP_INIT_INT(name, val_t) \
 KHASH_INIT(name, static, unsigned, val_t, is_map, _int_hf, _int_heq)
```

`KHASH_INIT()` is a huge macro defining all the structs and methods.
 When this
macro is called, all the code inside it will be inserted by the [C
preprocess][37] to the place where it is called. If the macro is called
multiple times, multiple copies of the code will be inserted. To avoid naming
conflict of hash tables with different key-value types, the library uses [token
concatenation][36], which is a preprocessor feature whereby we can substitute
part of a symbol based on the parameter of the macro. In the end, the C
preprocessor will generate the following code and feed it to the compiler
(macro `kh_exist(h,k)` is a little complex and not expanded for simplicity):

```
typedef struct {
  int n_buckets, size, n_occupied, upper_bound;
  unsigned *flags;
  unsigned *keys;
  char *vals;
```

```
  } kh_m32_t;
  static inline kh_m32_t *init_m32() {
    return (kh_m32_t*)calloc(1, sizeof(kh_m32_t));
  }
  static inline int get_m32(kh_m32_t *h, unsigned k)
  ...
  static inline void destroy_m32(kh_m32_t *h) {
    if (h) {

  free(h->keys); free(h->flags); free(h->vals); free(h);
    }
  }

int main() {
 int ret, is_missing;
 khint_t k;
 kh_m32_t *h = init_m32();
 k = put_m32(h, 5, &ret);
 if (!ret) del_m32(h, k);
 h->vals[k] = 10;
 k = get_m32(h, 10);
 is_missing = (k == h->n_buckets);
 k = get_m32(h, 5);
 del_m32(h, k);
 for (k = 0; k != h->n_buckets; ++k)
  if (kh_exist(h, k)) h->vals[k] = 1;
 destroy_m32(h);
 return 0;
}
```

This is the C program we know.

From this example, we can see that macros and the C preprocessor plays a key role in klib. Klib is fast partly because the compiler knows the key-value type at the compile time and is able to optimize the code to the same level as type-specific code. A generic library written with `void*` will not get such performance boost.

Massively inserting code upon instantiation may remind us of C++'s slow compiling speed and huge binary size when STL/boost is in use. Klib is much better in this respect due to its small code size and component independency.
Inserting several hundreds lines of code won't make compiling obviously slower.

Resources

* Library documentation, if present, is available in the header files. Examples can be found in the [test/][24] directory.

* **Obsolete** documentation of the hash table library can be found at
[SourceForge][25]. This README is partly adapted from the old documentation.
* [Blog post][26] describing the hash table library.
* [Blog post][27] on why using `void*` for generic programming may be inefficient.
* [Blog post][28] on the generic stream buffer.
* [Blog post][29] evaluating the performance of `kvec.h`.
* [Blog post][30] arguing B-tree may be a better data structure than a binary search tree.
* [Blog post][31] evaluating the performance of `khash.h` and `kbtree.h` among many other implementations.
[An older version][33] of the benchmark is also available.
* [Blog post][34] benchmarking internal sorting algorithms and implementations.
* [Blog post][32]
on the k-small algorithm.
* [Blog post][35] on the Hooke-Jeeve's algorithm for nonlinear programming.

[1]: http://en.wikipedia.org/wiki/MIT_License
[2]: https://en.wikipedia.org/wiki/Hash_table
[3]: http://en.wikipedia.org/wiki/B-tree
[4]: http://en.wikipedia.org/wiki/Introsort
[5]: http://en.wikipedia.org/wiki/Merge_sort
[6]: http://en.wikipedia.org/wiki/Heapsort
[7]: http://en.wikipedia.org/wiki/Comb_sort
[8]: http://en.wikipedia.org/wiki/Fisher-Yates_shuffle
[9]: http://en.wikipedia.org/wiki/Selection_algorithm
[10]: http://en.wikipedia.org/wiki/FASTA_format
[11]: http://en.wikipedia.org/wiki/FASTQ_format
[12]: http://en.wikipedia.org/wiki/Memory_pool
[13]: http://en.wikipedia.org/wiki/Mersenne_twister
[14]: http://en.wikipedia.org/wiki/Pseudorandom_generator
[15]: http://en.wikipedia.org/wiki/Nonlinear_programming
[16]: http://en.wikipedia.org/wiki/Suffix_array
[17]: https://sites.google.com/site/yuta256/sais
[18]: http://en.wikipedia.org/wiki/Hidden_Markov_model
[19]: http://en.wikipedia.org/wiki/Smith-Waterman_algorithm
[20]:
http://en.wikipedia.org/wiki/Newick_format
[21]: http://en.wikipedia.org/wiki/Container_(abstract_data_type)
[22]: http://en.wikipedia.org/wiki/Template_(C%2B%2B)
[23]: http://en.wikipedia.org/wiki/GLib
[24]: https://github.com/attractivechaos/klib/tree/master/test
[25]: http://klib.sourceforge.net/
[26]: http://attractivechaos.wordpress.com/2008/09/02/implementing-generic-hash-library-in-c/
[27]: http://attractivechaos.wordpress.com/2008/10/02/using-void-in-generic-c-programming-may-be-inefficient/
[28]: http://attractivechaos.wordpress.com/2008/10/11/a-generic-buffered-stream-wrapper/
[29]: http://attractivechaos.wordpress.com/2008/09/19/c-array-vs-c-vector/
[30]: http://attractivechaos.wordpress.com/2008/09/24/b-tree-vs-binary-search-tree/
[31]: http://attractivechaos.wordpress.com/2008/10/07/another-look-at-my-old-benchmark/
[32]: http://attractivechaos.wordpress.com/2008/09/13/calculating-median/
[33]: http://attractivechaos.wordpress.com/2008/08/28/comparison-of-hash-table-libraries/

[34]:
 http://attractivechaos.wordpress.com/2008/08/28/comparison-of-internal-sorting-algorithms/
[35]: http://attractivechaos.wordpress.com/2008/08/24/derivative-free-optimization-dfo/
[36]: http://en.wikipedia.org/wiki/C_preprocessor#Token_concatenation
[37]: http://en.wikipedia.org/wiki/C_preprocessor

[wiki-avl]: https://en.wikipedia.org/wiki/AVL_tree

[kbtree]:
http://attractivechaos.github.io/klib/#KBtree%3A%20generic%20ordered%20map:%5B%5BKBtree%3A%20generic%20ordered%20map%5D%5D
[khash]:
http://attractivechaos.github.io/klib/#Khash%3A%20generic%20hash%20table:%5B%5BKhash%3A%20generic%20hash%20table%5D%5D
[kseq]:
http://attractivechaos.github.io/klib/#Kseq%3A%20stream%20buffer%20and%20FASTA%2FQ%20parser:%5B%5BKseq%3A%20stream%20buffer%20and%20FASTA%2FQ%20parser%5D%5D
[ksort]: http://attractivechaos.github.io/klib/#Ksort%3A%20sorting%2C%20shuffling%2C%20heap%20and%20k-small:%5B%5BKsort%3A%20sorting%2C%20shuffling%2C%20heap%20and%20k-small%5D%5D
[kavl]:
 http://attractivechaos.github.io/klib/#KAVL%3A%20generic%20intrusive%20AVL%20tree
[ketopt]: http://attractivechaos.github.io/klib/#Ketopt%3A%20parsing%20command-line%20arguments

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/README.md
No license file was found, but licenses were detected in source scan.

/*
* Copyright (c) 2008 Yuta Mori   All Rights Reserved.
*   2011 Attractive Chaos <attractor@live.co.uk>
*
* Permission is hereby granted, free of charge, to any person
* obtaining a copy of this software and associated documentation
* files (the "Software"), to deal in the Software without
* restriction, including without limitation the rights to use,
* copy, modify, merge, publish, distribute, sublicense, and/or sell
* copies of the Software, and to permit persons to whom the
* Software is furnished to do so, subject to the following
* conditions:
*
* The above copyright notice and this permission notice shall be
* included in all copies or substantial portions of the Software.
*
* THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
* EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES
* OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
* NONINFRINGEMENT.

IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT
* HOLDERS 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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/ksa.c
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) 2008 by Genome Research Ltd (GRL).
2010 by Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining
a copy of this software and associated documentation files (the
"Software"), to deal in the Software without restriction, including
without limitation the rights to use, copy, modify, merge, publish,
distribute, sublicense, and/or sell copies of the Software, and to
permit persons to whom the Software is furnished to do so, subject to
the following conditions:

The above copyright notice and this permission notice shall be
included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT.
IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS
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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/knetfile.c
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) 2008 Broad Institute / Massachusetts Institute of Technology
2011 Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining a copy

of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom the Software is
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE
AND NONINFRINGEMENT. IN NO EVENT SHALL THE
AUTHORS OR COPYRIGHT HOLDERS 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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/bgzf.h
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/bgzf.c
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) 2008, 2011 Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining
a copy of this software and associated documentation files (the
"Software"), to deal in the Software without restriction, including
without limitation the rights to use, copy, modify, merge, publish,
distribute, sublicense, and/or sell copies of the Software, and to
permit persons to whom the Software is furnished to do so, subject to
the following conditions:

The above copyright notice and this permission notice shall be
included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT
HOLDERS
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.

*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/ksort.h
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) 2008, 2009, 2011 by Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining
a copy of this software and associated documentation files (the
"Software"), to deal in the Software without restriction, including
without limitation the rights to use, copy, modify, merge, publish,
distribute, sublicense, and/or sell copies of the Software, and to
permit persons to whom the Software is furnished to do so, subject to
the following conditions:

The above copyright notice and this permission notice shall be
included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS
OR COPYRIGHT HOLDERS
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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/khash.h
No license file was found, but licenses were detected in source scan.

--[[
The MIT License

Copyright (c) 2011, Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining a copy
of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom the Software is
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS
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.
]]

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/lua/klib.lua
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) 2008-2009, by Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT
HOLDERS
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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/klist.h
No license file was found, but licenses were detected in source scan.

/*

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/test/ksort_test.cc
No license file was found, but licenses were detected in source scan.

included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT
HOLDERS
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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/kvec.h
No license file was found, but licenses were detected in source scan.

/* The MIT License

Copyright (c) 2019 by Attractive Chaos <attractor@live.co.uk>

Permission is hereby granted, free of charge, to any person obtaining
a copy of this software and associated documentation files (the
"Software"), to deal in the Software without restriction, including
without limitation the rights to use, copy, modify, merge, publish,
distribute, sublicense, and/or sell copies of the Software, and to
permit persons to whom the Software is furnished to do so, subject to
the following conditions:

The above copyright notice and this permission notice shall be
included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT
HOLDERS
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.
*/

Found in path(s):
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/krmq.h
* /opt/cola/permits/1140903019_1614894938.43/0/klib-master-zip/klib-master/khashl.h

1.10 tail 068b729 + P

1.10.1 Available under license :

The MIT License (MIT)

Copyright 2015 Hewlett Packard Enterprise Development LP
Copyright (c) 2014 ActiveState

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:
The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.
tomb - support for clean goroutine termination in Go.

Copyright (c) 2010-2011 - Gustavo Niemeyer <gustavo@niemeyer.net>

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
* Neither the name of the copyright holder nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.

1.11 x-net 747e238

1.11.1 Available under license :

This source code was written by the Go contributors.
The master list of contributors is in the main Go distribution,
visible at http://tip.golang.org/CONTRIBUTORS.
Copyright (c) 2009 The Go Authors. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
* Neither the name of Google Inc. nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER
OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

1.12 gosigar 3ed7c74 + P

1.12.1 Available under license :

Copyright (c) [2009-2011] VMware, Inc. All Rights Reserved.

This product is licensed to you under the Apache License, Version 2.0 (the "License"). You may not use this product except in compliance with the License.

This product includes a number of subcomponents with separate copyright notices and license terms. Your use of these subcomponents is subject to the terms and conditions of the subcomponent's license, as noted in the LICENSE file.

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a

cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

1.13 redirfs 1.0.5

1.13.1 Available under license :

GNU GENERAL PUBLIC LICENSE
Version 3, 29 June 2007

Copyright (C) 2007 Free Software Foundation, Inc. <http://fsf.org/>
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

Preamble

The GNU General Public License is a free, copyleft license for software and other kinds of works.

The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program--to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for them if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs, and that you know you can do these things.

To protect your rights, we need to prevent others from denying you these rights or asking you to surrender the rights. Therefore, you have certain responsibilities if you distribute copies of the software, or if you modify it: responsibilities to respect the freedom of others.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must pass on to the recipients the same freedoms that you received. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

Developers that use the GNU GPL protect your rights with two steps: (1) assert copyright on the software, and (2) offer you this License giving you legal permission to copy, distribute and/or modify it.

For the developers' and authors' protection, the GPL clearly explains that there is no warranty for this free software. For both users' and authors' sake, the GPL requires that modified versions be marked as changed, so that their problems will not be attributed erroneously to authors of previous versions.

Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

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.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS

0. Definitions.

"This License" refers to version 3 of the GNU General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this License. Each licensee is addressed as "you". "Licensees"
and
"recipients" may be individuals or organizations.

To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

A "covered work" means either the unmodified Program or a work based on the Program.

To "propagate" a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is
not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

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.

The "Corresponding Source" for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work's System Libraries, or general-purpose tools or generally
available free
programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require, such as by intimate data communication or control flow between those subprograms and other parts of the work.

The Corresponding Source need not include anything that users can regenerate automatically from other parts of the Corresponding Source.

The Corresponding Source for a work in source code form is that same work.

2. Basic Permissions.

All rights granted under this License are granted for the term of copyright on the Program, and are irrevocable provided the stated conditions are met. This License explicitly affirms your unlimited permission to run the unmodified Program. The output from running a covered work is covered
by this License only if the output, given its
content, constitutes a covered work. This License acknowledges your rights of fair use or other equivalent, as provided by copyright law.

You may make, run and propagate covered works that you do not convey, without conditions so long as your license otherwise remains in force. You may convey covered works to others for the sole purpose of having them make modifications exclusively for you, or provide you with facilities for running those works, provided that you comply with the terms of this License in conveying all material for which you do not control copyright. Those thus making or running the covered works for you must do so exclusively on your behalf, under your direction and control, on terms that prohibit them from making any copies of your copyrighted material outside their relationship with you.

Conveying under any other circumstances is permitted solely under the conditions stated below. Sublicensing is not allowed;
section 10
makes it unnecessary.

3. Protecting Users' Legal Rights From Anti-Circumvention Law.

No covered work shall be deemed part of an effective technological measure under any applicable law fulfilling obligations under article 11 of the WIPO copyright treaty adopted on 20 December 1996, or similar laws prohibiting or restricting circumvention of such measures.

When you convey a covered work, you waive any legal power to forbid circumvention of technological measures to the extent such circumvention is effected by exercising rights under this License with respect to the covered work, and you disclaim any intention to limit operation or modification of the work as a means of enforcing, against the work's users, your or third parties' legal rights to forbid circumvention of technological measures.

4. Conveying Verbatim Copies.

You may convey verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately

publish on each copy an appropriate copyright notice;
keep intact all notices stating that this License and any
non-permissive terms added in accord with section 7 apply to the code;
keep intact all notices of the absence of any warranty; and give all
recipients a copy of this License along with the Program.

You may charge any price or no price for each copy that you convey,
and you may offer support or warranty protection for a fee.

5. Conveying Modified Source Versions.

You may convey a work based on the Program, or the modifications to
produce it from the Program, in the form of source code under the
terms of section 4, provided that you also meet all of these conditions:

a) The work must carry prominent notices stating that you modified
it, and giving a relevant date.

b) The work must carry prominent notices stating that it is
released under this License and any conditions added under section
7. This requirement modifies the requirement in section
4 to
"keep intact all notices".

c) You must license the entire work, as a whole, under this
License to anyone who comes into possession of a copy. This
License will therefore apply, along with any applicable section 7
additional terms, to the whole of the work, and all its parts,
regardless of how they are packaged. This License gives no
permission to license the work in any other way, but it does not
invalidate such permission if you have separately received it.

d) If the work has interactive user interfaces, each must display
Appropriate Legal Notices; however, if the Program has interactive
interfaces that do not display Appropriate Legal Notices, your
work need not make them do so.

A compilation of a covered work with other separate and independent
works, which are not by their nature extensions of the covered work,
and which are not combined with it such as to form a larger program,
in or on a volume of a storage or distribution
medium, is called an
"aggregate" if the compilation and its resulting copyright are not
used to limit the access or legal rights of the compilation's users
beyond what the individual works permit. Inclusion of a covered work
in an aggregate does not cause this License to apply to the other
parts of the aggregate.

6. Conveying Non-Source Forms.

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

a) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.

b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.

c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.

d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.

e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source
as a System Library, need not be
included in conveying the object code work.

A "User Product" is either (1) a "consumer product", which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, "normally used" refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.

"Installation Information" for a User Product means any methods, procedures, authorization
keys, or other information required to install
and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.

If you convey an object code work under this section in, or with, or specifically for use in, a User Product, and the conveying occurs as part of a transaction in which the right of possession and use of the User Product is transferred to the recipient in perpetuity or for a fixed term (regardless of how the transaction is characterized), the Corresponding Source conveyed under this section must be accompanied by the Installation Information. But this requirement does not apply if neither you nor any third party retains the ability to install modified object code on the User Product (for example, the work has been installed in
ROM).

The requirement to provide Installation Information does not include a requirement to continue to provide support service, warranty, or updates for a work that has been modified or installed by the recipient, or for the User Product in which it has been modified or installed. Access to a network may be denied when the modification itself materially and adversely affects the operation of the network or violates the rules and protocols for communication across the network.

Corresponding Source conveyed, and Installation Information provided, in accord with this section must be in a format that is publicly documented (and with an implementation available to the public in source code form), and must require no special password or key for unpacking, reading or copying.

7. Additional Terms.

"Additional permissions" are terms that supplement the terms of this License by making exceptions from one or more of its conditions. Additional permissions that are applicable to the entire Program shall be treated as though they were included in this License, to the extent that they are valid under applicable law. If additional permissions apply only to part of the Program, that part may be used separately under those permissions, but the entire Program remains governed by this License without regard to the additional permissions.

When you convey a copy of a covered work, you may at your option remove any additional permissions from that copy, or from any part of it. (Additional permissions may be written to require their own removal in certain cases when you modify the work.) You may place additional permissions on material, added by you to a covered work, for which you have or can give appropriate copyright permission.

Notwithstanding any other provision of this License, for material you add to a covered work, you may (if authorized by the copyright holders of that material) supplement the terms of this License with terms:

a) Disclaiming warranty or limiting liability differently from the terms of sections 15 and 16 of this License; or

b) Requiring preservation of specified reasonable legal notices or author attributions in that material or in the Appropriate Legal Notices displayed by works containing it; or

c) Prohibiting misrepresentation of the origin of that material, or requiring that modified versions of such material be marked in reasonable ways as different from the original version; or

d) Limiting the use for publicity purposes of names of licensors or authors of the material; or

e) Declining to grant rights under trademark law for use of some trade names, trademarks, or service marks; or

f) Requiring indemnification of licensors and authors of that material by anyone who conveys the material (or modified versions of it) with contractual assumptions of liability to the recipient, for any liability that these contractual assumptions directly impose on

those licensors and authors.

All other non-permissive additional terms are considered "further restrictions" within the meaning of section 10. If the Program as you received it, or any part of it, contains a notice stating that it is governed by this License along with a term that is a further restriction, you may remove that term. If a license document contains a further restriction but permits relicensing or conveying under this License, you may add to a covered work material governed by the terms of that license document, provided that the further restriction does not survive such relicensing or conveying.

If you add terms to a covered work in accord with this section, you must place, in the relevant source files, a statement of the additional terms that apply to those files, or a notice indicating where to find the applicable terms.

Additional terms, permissive or non-permissive, may be stated in the form of a separately written license, or stated as exceptions; the above
requirements apply either way.

8. Termination.

You may not propagate or modify a covered work except as expressly provided under this License. Any attempt otherwise to propagate or modify it is void, and will automatically terminate your rights under this License (including any patent licenses granted under the third paragraph of section 11).

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright

holder, and you cure the violation prior to 30 days after
your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, you do not qualify to receive new licenses for the same material under section 10.

9. Acceptance Not Required for Having Copies.

You are not required to accept this License in order to receive or run a copy of the Program. Ancillary propagation of a covered work occurring solely as a consequence of using peer-to-peer transmission to receive a copy likewise does not require acceptance. However, nothing other than this License grants you permission to propagate or modify any covered work. These actions infringe copyright if you do not accept this License. Therefore, by modifying or propagating a covered work, you indicate your acceptance of this License to do so.

10. Automatic Licensing of Downstream Recipients.

Each time you convey a covered work, the recipient automatically receives a license from the original licensors, to run, modify and propagate that work, subject to this License. You are not responsible for enforcing compliance by third parties with this License.

An "entity transaction" is a transaction transferring control of an organization, or substantially all assets of one, or subdividing an organization, or merging organizations. If propagation of a covered work results from an entity transaction, each party to that transaction who receives a copy of the work also receives whatever licenses to the work the party's predecessor in interest had or could give under the previous paragraph, plus a right to possession of the Corresponding Source of the work from the predecessor in interest, if the predecessor has it or can get it with reasonable efforts.

You may not impose any further restrictions on the exercise of the rights
granted or affirmed under this License. For example, you may not impose a license fee, royalty, or other charge for exercise of rights granted under this License, and you may not initiate litigation (including a cross-claim or counterclaim in a lawsuit) alleging that any patent claim is infringed by making, using, selling, offering for sale, or importing the Program or any portion of it.

11. Patents.

A "contributor" is a copyright holder who authorizes use under this License of the Program or a work on which the Program is based. The work thus licensed is called the contributor's "contributor version".

A contributor's "essential patent claims" are all patent claims owned or controlled by the contributor, whether already acquired or hereafter acquired, that would be infringed by some manner, permitted by this License, of making, using, or selling its contributor version, but do not include claims that would be infringed only as a consequence of further modification of the contributor version. For purposes of this definition, "control" includes the right to grant patent sublicenses in a manner consistent with the requirements of this License.

Each contributor grants you a non-exclusive, worldwide, royalty-free patent license under the contributor's essential patent claims, to make, use, sell, offer for sale, import and otherwise run, modify and propagate the contents of its contributor version.

In the following three paragraphs, a "patent license" is any express agreement or commitment, however denominated, not to enforce a patent (such as an express permission to practice a patent or covenant not to sue for patent infringement). To "grant" such a patent license to a party means to make such an agreement or commitment not to enforce a patent against the party.

If you convey a covered work, knowingly relying on a patent license, and the Corresponding Source of the work is not available for anyone to copy, free of charge and under the terms of this License, through a publicly available network server or other readily accessible means, then you must either (1) cause the Corresponding Source to be so available, or (2) arrange to deprive yourself of the benefit of the patent license for this particular work, or (3) arrange, in a manner consistent with the requirements of this License, to extend the patent license to downstream recipients. "Knowingly relying" means you have actual knowledge that, but for the patent license, your conveying the covered work in a country, or your recipient's use of the covered work in a country, would infringe one or more identifiable patents in that country that you have reason to believe are valid.

If, pursuant to or in connection with a single transaction or arrangement, you convey, or propagate by procuring conveyance of, a covered work, and grant a patent license to some of the parties receiving the covered work authorizing them to use, propagate, modify or convey a specific copy of the covered

work, then the patent license
you grant is automatically extended to all recipients of the covered
work and works based on it.

A patent license is "discriminatory" if it does not include within
the scope of its coverage, prohibits the exercise of, or is
conditioned on the non-exercise of one or more of the rights that are
specifically granted under this License. You may not convey a covered
work if you are a party to an arrangement with a third party that is
in the business of distributing software, under which you make payment
to the third party based on the extent of your activity of conveying
the work, and under which the third party grants, to any of the
parties who would receive the covered work from you, a discriminatory
patent license (a) in connection with copies of the covered work
conveyed by you (or copies made from those copies), or (b) primarily
for and in connection with specific products or compilations that
contain the covered work, unless you entered into that arrangement,
or
that patent license was granted, prior to 28 March 2007.

Nothing in this License shall be construed as excluding or limiting
any implied license or other defenses to infringement that may
otherwise be available to you under applicable patent law.

12. No Surrender of Others' Freedom.

If conditions are imposed on you (whether by court order, agreement or
otherwise) that contradict the conditions of this License, they do not
excuse you from the conditions of this License. If you cannot convey a
covered work so as to satisfy simultaneously your obligations under this
License and any other pertinent obligations, then as a consequence you may
not convey it at all. For example, if you agree to terms that obligate you
to collect a royalty for further conveying from those to whom you convey
the Program, the only way you could satisfy both those terms and this
License would be to refrain entirely from conveying the Program.

13. Use with the GNU Affero General Public License.

Notwithstanding any other provision of this License, you have
permission to link or combine any covered work with a work licensed
under version 3 of the GNU Affero General Public License into a single
combined work, and to convey the resulting work. The terms of this
License will continue to apply to the part which is the covered work,
but the special requirements of the GNU Affero General Public License,
section 13, concerning interaction through a network will apply to the
combination as such.

14. Revised Versions of this License.

The Free Software Foundation may publish revised and/or new versions of the GNU General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies that a certain numbered version of the GNU General Public License "or any later version" applies to it, you have the option of following the terms and conditions either of that numbered version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of the GNU General Public License, you may choose any version ever published by the Free Software Foundation.

If the Program specifies that a proxy can decide which future versions of the GNU General Public License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Program.

Later license versions may give you additional or different permissions. However, no additional obligations are imposed on any author or copyright holder as a result of your choosing to follow a later version.

15. Disclaimer of Warranty.

THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. Limitation of Liability.

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MODIFIES AND/OR CONVEYS THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF

SUCH DAMAGES.

17.
Interpretation of Sections 15 and 16.

If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

END OF TERMS AND CONDITIONS

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 state 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) <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.

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, see <http://www.gnu.org/licenses/>.

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
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, your program's commands might be different; for a GUI interface, you would use an "about box".

You should also get your employer (if you work as a programmer) or school, if any, to sign a "copyright disclaimer" for the program, if necessary. For more information on this, and how to apply and follow the GNU GPL, see <http://www.gnu.org/licenses/>.

The GNU 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 Lesser General Public License instead of this License. But first, please read <http://www.gnu.org/philosophy/why-not-lgpl.html>.
Copyright (c) 2007 Jan Podrouzek <podrouzek at gmail dot com>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.
Boost Software License - Version 1.0 - August 17th, 2003

Permission is hereby granted, free of charge, to any person or organization obtaining a copy of the software and accompanying documentation covered by this license (the "Software") to use, reproduce, display, distribute, execute, and transmit the Software, and to prepare derivative works of the Software, and to permit third-parties to whom the Software is furnished to do so, all subject to the following:

The copyright notices in the Software and this entire statement, including the above license grant, this restriction and the following disclaimer, must be included in all copies of the Software, in whole or in part, and all derivative works of the Software, unless such copies or derivative works are solely in the form of machine-executable object code generated by a source language processor.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT. IN NO EVENT SHALL THE COPYRIGHT HOLDERS OR ANYONE DISTRIBUTING THE SOFTWARE BE LIABLE FOR ANY DAMAGES OR OTHER LIABILITY, WHETHER IN CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

1.14 avflt 1.5

1.14.1 Available under license :

Copyright (c) 2007 Jan Podrouzek <podrouzek at gmail dot com>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.

GNU GENERAL PUBLIC LICENSE

Version 3, 29 June 2007

Copyright (C) 2007 Free Software Foundation, Inc. <http://fsf.org/>
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

Preamble

The GNU General Public License is a free, copyleft license for software and other kinds of works.

The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program--to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. You can apply it to your programs, too.

When we speak of free software, we are referring to
freedom, not
price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for them if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs, and that you know you can do these things.

To protect your rights, we need to prevent others from denying you these rights or asking you to surrender the rights. Therefore, you have certain responsibilities if you distribute copies of the software, or if you modify it: responsibilities to respect the freedom of others.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must pass on to the recipients the same freedoms that you received. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

Developers that use the GNU GPL protect your rights with two steps:
(1)
assert copyright on the software, and (2) offer you this License giving you legal permission to copy, distribute and/or modify it.

For the developers' and authors' protection, the GPL clearly explains that there is no warranty for this free software. For both users' and authors' sake, the GPL requires that modified versions be marked as changed, so that their problems will not be attributed erroneously to authors of previous versions.

Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of

protecting users' freedom to change the software. The systematic
pattern of such abuse occurs in the area of products for individuals to
use, which is precisely where it is most unacceptable. Therefore, we
have designed this version of the GPL to prohibit the practice for those
products. If such problems arise substantially in other domains, we
stand
ready to extend this provision to those domains in future versions
of the GPL, as needed to protect the freedom of users.

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.

The precise terms and conditions for copying, distribution and
modification follow.

TERMS AND CONDITIONS

0. Definitions.

"This License" refers to version 3 of the GNU General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of
works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this
License. Each licensee is addressed as "you". "Licensees"
and
"recipients" may be individuals or organizations.

To "modify" a work means to copy from or adapt all or part of the work
in a fashion requiring copyright permission, other than the making of an
exact copy. The resulting work is called a "modified version" of the
earlier work or a work "based on" the earlier work.

A "covered work" means either the unmodified Program or a work based
on the Program.

To "propagate" a work means to do anything with it that, without
permission, would make you directly or secondarily liable for
infringement under applicable copyright law, except executing it on a
computer or modifying a private copy. Propagation includes copying,
distribution (with or without modification), making available to the
public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

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.

The "Corresponding Source" for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work's System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require,

such as by intimate data communication or control flow between those
subprograms and other parts of the work.

The Corresponding Source need not include anything that users
can regenerate automatically from other parts of the Corresponding
Source.

The Corresponding Source for a work in source code form is that
same work.

2. Basic Permissions.

All rights granted under this License are granted for the term of
copyright on the Program, and are irrevocable provided the stated
conditions are met. This License explicitly affirms your unlimited
permission to run the unmodified Program. The output from running a
covered work is covered
by this License only if the output, given its
content, constitutes a covered work. This License acknowledges your
rights of fair use or other equivalent, as provided by copyright law.

You may make, run and propagate covered works that you do not
convey, without conditions so long as your license otherwise remains
in force. You may convey covered works to others for the sole purpose
of having them make modifications exclusively for you, or provide you
with facilities for running those works, provided that you comply with
the terms of this License in conveying all material for which you do
not control copyright. Those thus making or running the covered works
for you must do so exclusively on your behalf, under your direction
and control, on terms that prohibit them from making any copies of
your copyrighted material outside their relationship with you.

Conveying under any other circumstances is permitted solely under
the conditions stated below. Sublicensing is not allowed;
section 10
makes it unnecessary.

3. Protecting Users' Legal Rights From Anti-Circumvention Law.

No covered work shall be deemed part of an effective technological
measure under any applicable law fulfilling obligations under article
11 of the WIPO copyright treaty adopted on 20 December 1996, or
similar laws prohibiting or restricting circumvention of such
measures.

When you convey a covered work, you waive any legal power to forbid
circumvention of technological measures to the extent such circumvention
is effected by exercising rights under this License with respect to

the covered work, and you disclaim any intention to limit operation or
modification of the work as a means of enforcing, against the work's
users, your or third parties' legal rights to forbid circumvention of
technological measures.

4. Conveying Verbatim Copies.

You may convey verbatim copies of the Program's source code as you
receive it, in any medium, provided that you conspicuously and
appropriately
publish on each copy an appropriate copyright notice;
keep intact all notices stating that this License and any
non-permissive terms added in accord with section 7 apply to the code;
keep intact all notices of the absence of any warranty; and give all
recipients a copy of this License along with the Program.

You may charge any price or no price for each copy that you convey,
and you may offer support or warranty protection for a fee.

5. Conveying Modified Source Versions.

You may convey a work based on the Program, or the modifications to
produce it from the Program, in the form of source code under the
terms of section 4, provided that you also meet all of these conditions:

a) The work must carry prominent notices stating that you modified
it, and giving a relevant date.

b) The work must carry prominent notices stating that it is
released under this License and any conditions added under section
7. This requirement modifies the requirement in section
4 to
"keep intact all notices".

c) You must license the entire work, as a whole, under this
License to anyone who comes into possession of a copy. This
License will therefore apply, along with any applicable section 7
additional terms, to the whole of the work, and all its parts,
regardless of how they are packaged. This License gives no
permission to license the work in any other way, but it does not
invalidate such permission if you have separately received it.

d) If the work has interactive user interfaces, each must display
Appropriate Legal Notices; however, if the Program has interactive
interfaces that do not display Appropriate Legal Notices, your
work need not make them do so.

A compilation of a covered work with other separate and independent

works, which are not by their nature extensions of the covered work,
and which are not combined with it such as to form a larger program,
in or on a volume of a storage or distribution
medium, is called an
"aggregate" if the compilation and its resulting copyright are not
used to limit the access or legal rights of the compilation's users
beyond what the individual works permit. Inclusion of a covered work
in an aggregate does not cause this License to apply to the other
parts of the aggregate.

6. Conveying Non-Source Forms.

You may convey a covered work in object code form under the terms
of sections 4 and 5, provided that you also convey the
machine-readable Corresponding Source under the terms of this License,
in one of these ways:

a) Convey the object code in, or embodied in, a physical product
(including a physical distribution medium), accompanied by the
Corresponding Source fixed on a durable physical medium
customarily used for software interchange.

b) Convey the object code in, or embodied in, a physical product
(including a physical distribution medium), accompanied by a
written offer, valid for at least three years
and valid for as
long as you offer spare parts or customer support for that product
model, to give anyone who possesses the object code either (1) a
copy of the Corresponding Source for all the software in the
product that is covered by this License, on a durable physical
medium customarily used for software interchange, for a price no
more than your reasonable cost of physically performing this
conveying of source, or (2) access to copy the
Corresponding Source from a network server at no charge.

c) Convey individual copies of the object code with a copy of the
written offer to provide the Corresponding Source. This
alternative is allowed only occasionally and noncommercially, and
only if you received the object code with such an offer, in accord
with subsection 6b.

d) Convey the object code by offering access from a designated
place (gratis or for a charge), and offer equivalent access to the
Corresponding Source in
the same way through the same place at no
further charge. You need not require recipients to copy the
Corresponding Source along with the object code. If the place to
copy the object code is a network server, the Corresponding Source

may be on a different server (operated by you or a third party)
that supports equivalent copying facilities, provided you maintain
clear directions next to the object code saying where to find the
Corresponding Source. Regardless of what server hosts the
Corresponding Source, you remain obligated to ensure that it is
available for as long as needed to satisfy these requirements.

e) Convey the object code using peer-to-peer transmission, provided
you inform other peers where the object code and Corresponding
Source of the work are being offered to the general public at no
charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

A "User Product" is either (1) a "consumer product", which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, "normally used" refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.

"Installation Information" for a User Product means any methods, procedures, authorization keys, or other information required to install and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.

If you convey an object code work under this section in, or with, or specifically for use in, a User Product, and the conveying occurs as part of a transaction in which the right of possession and use of the User Product is transferred to the recipient in perpetuity or for a fixed term (regardless of how the transaction is characterized), the Corresponding Source conveyed under this section must be accompanied by the Installation Information. But this requirement does not apply if neither you nor any third party retains the ability to install modified object code on the User Product (for example, the work has

been installed in
ROM).

The requirement to provide Installation Information does not include a requirement to continue to provide support service, warranty, or updates for a work that has been modified or installed by the recipient, or for the User Product in which it has been modified or installed. Access to a network may be denied when the modification itself materially and adversely affects the operation of the network or violates the rules and protocols for communication across the network.

Corresponding Source conveyed, and Installation Information provided, in accord with this section must be in a format that is publicly documented (and with an implementation available to the public in source code form), and must require no special password or key for unpacking, reading or copying.

7. Additional Terms.

"Additional permissions" are terms that supplement the terms of this License by making exceptions from one or more of its conditions. Additional permissions that are applicable to the
entire Program shall
be treated as though they were included in this License, to the extent that they are valid under applicable law. If additional permissions apply only to part of the Program, that part may be used separately under those permissions, but the entire Program remains governed by this License without regard to the additional permissions.

When you convey a copy of a covered work, you may at your option remove any additional permissions from that copy, or from any part of it. (Additional permissions may be written to require their own removal in certain cases when you modify the work.) You may place additional permissions on material, added by you to a covered work, for which you have or can give appropriate copyright permission.

Notwithstanding any other provision of this License, for material you add to a covered work, you may (if authorized by the copyright holders of that material) supplement the terms of this License with terms:

a) Disclaiming warranty or
limiting liability differently from the
terms of sections 15 and 16 of this License; or

b) Requiring preservation of specified reasonable legal notices or author attributions in that material or in the Appropriate Legal Notices displayed by works containing it; or

c) Prohibiting misrepresentation of the origin of that material, or
requiring that modified versions of such material be marked in
reasonable ways as different from the original version; or

d) Limiting the use for publicity purposes of names of licensors or
authors of the material; or

e) Declining to grant rights under trademark law for use of some
trade names, trademarks, or service marks; or

f) Requiring indemnification of licensors and authors of that
material by anyone who conveys the material (or modified versions of
it) with contractual assumptions of liability to the recipient, for
any liability that these contractual assumptions directly impose on

those licensors and authors.

All other non-permissive additional terms are considered "further restrictions" within the meaning of section 10. If the Program as you received it, or any part of it, contains a notice stating that it is governed by this License along with a term that is a further restriction, you may remove that term. If a license document contains a further restriction but permits relicensing or conveying under this License, you may add to a covered work material governed by the terms of that license document, provided that the further restriction does not survive such relicensing or conveying.

If you add terms to a covered work in accord with this section, you must place, in the relevant source files, a statement of the additional terms that apply to those files, or a notice indicating where to find the applicable terms.

Additional terms, permissive or non-permissive, may be stated in the form of a separately written license, or stated as exceptions;
the above
requirements apply either way.

8. Termination.

You may not propagate or modify a covered work except as expressly provided under this License. Any attempt otherwise to propagate or modify it is void, and will automatically terminate your rights under this License (including any patent licenses granted under the third paragraph of section 11).

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright
holder, and you cure the violation prior to 30 days after your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, you do not qualify to receive new licenses for the same material under section 10.

9. Acceptance Not Required for Having Copies.

You are not required to accept this License in order to receive or run a copy of the Program. Ancillary propagation of a covered work occurring solely as a consequence of using peer-to-peer transmission to receive a copy likewise does not require acceptance. However, nothing other than this License grants you permission to propagate or modify any covered work. These actions infringe copyright if you do not accept this License. Therefore, by modifying or propagating a covered work, you indicate your acceptance of this License to do so.

10. Automatic Licensing of Downstream Recipients.

Each time you convey a covered work, the recipient automatically receives a license from the original licensors, to run, modify and propagate that work, subject to this License. You are not responsible for enforcing compliance by third parties with this License.

An "entity transaction" is a transaction transferring control of an organization, or substantially all assets of one, or subdividing an organization, or merging organizations. If propagation of a covered work results from an entity transaction, each party to that transaction who receives a copy of the work also receives whatever licenses to the work the party's predecessor in interest had or could give under the previous paragraph, plus a right to possession of the Corresponding Source of the work from the predecessor in interest, if the predecessor has it or can get it with reasonable efforts.

You may not impose any further restrictions on the exercise of the

rights
granted or affirmed under this License. For example, you may not impose a license fee, royalty, or other charge for exercise of rights granted under this License, and you may not initiate litigation (including a cross-claim or counterclaim in a lawsuit) alleging that any patent claim is infringed by making, using, selling, offering for sale, or importing the Program or any portion of it.

11. Patents.

A "contributor" is a copyright holder who authorizes use under this License of the Program or a work on which the Program is based. The work thus licensed is called the contributor's "contributor version".

A contributor's "essential patent claims" are all patent claims owned or controlled by the contributor, whether already acquired or hereafter acquired, that would be infringed by some manner, permitted by this License, of making, using, or selling its contributor version, but do not include claims that would be infringed only as a consequence of further modification of the contributor
version. For
purposes of this definition, "control" includes the right to grant patent sublicenses in a manner consistent with the requirements of this License.

Each contributor grants you a non-exclusive, worldwide, royalty-free patent license under the contributor's essential patent claims, to make, use, sell, offer for sale, import and otherwise run, modify and propagate the contents of its contributor version.

In the following three paragraphs, a "patent license" is any express agreement or commitment, however denominated, not to enforce a patent (such as an express permission to practice a patent or covenant not to sue for patent infringement). To "grant" such a patent license to a party means to make such an agreement or commitment not to enforce a patent against the party.

If you convey a covered work, knowingly relying on a patent license, and the Corresponding Source of the work is not available for anyone to copy, free of charge and under the terms of this
License, through a
publicly available network server or other readily accessible means, then you must either (1) cause the Corresponding Source to be so available, or (2) arrange to deprive yourself of the benefit of the patent license for this particular work, or (3) arrange, in a manner consistent with the requirements of this License, to extend the patent license to downstream recipients. "Knowingly relying" means you have actual knowledge that, but for the patent license, your conveying the

covered work in a country, or your recipient's use of the covered work in a country, would infringe one or more identifiable patents in that country that you have reason to believe are valid.

If, pursuant to or in connection with a single transaction or arrangement, you convey, or propagate by procuring conveyance of, a covered work, and grant a patent license to some of the parties receiving the covered work authorizing them to use, propagate, modify or convey a specific copy of the covered work, then the patent license you grant is automatically extended to all recipients of the covered work and works based on it.

A patent license is "discriminatory" if it does not include within the scope of its coverage, prohibits the exercise of, or is conditioned on the non-exercise of one or more of the rights that are specifically granted under this License. You may not convey a covered work if you are a party to an arrangement with a third party that is in the business of distributing software, under which you make payment to the third party based on the extent of your activity of conveying the work, and under which the third party grants, to any of the parties who would receive the covered work from you, a discriminatory patent license (a) in connection with copies of the covered work conveyed by you (or copies made from those copies), or (b) primarily for and in connection with specific products or compilations that contain the covered work, unless you entered into that arrangement, or that patent license was granted, prior to 28 March 2007.

Nothing in this License shall be construed as excluding or limiting any implied license or other defenses to infringement that may otherwise be available to you under applicable patent law.

12. No Surrender of Others' Freedom.

If conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot convey a covered work so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not convey it at all. For example, if you agree to terms that obligate you to collect a royalty for further conveying from those to whom you convey the Program, the only way you could satisfy both those terms and this License would be to refrain entirely from conveying the Program.

13. Use with the GNU Affero General Public License.

Notwithstanding any other provision of this License, you have permission to link or combine any covered work with a work licensed under version 3 of the GNU Affero General Public License into a single combined work, and to convey the resulting work. The terms of this License will continue to apply to the part which is the covered work, but the special requirements of the GNU Affero General Public License, section 13, concerning interaction through a network will apply to the combination as such.

14. Revised Versions of this License.

The Free Software Foundation may publish revised and/or new versions of the GNU General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies that a certain numbered version of the GNU General Public License "or any later version" applies to it, you
have the
option of following the terms and conditions either of that numbered version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of the GNU General Public License, you may choose any version ever published by the Free Software Foundation.

If the Program specifies that a proxy can decide which future versions of the GNU General Public License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Program.

Later license versions may give you additional or different permissions. However, no additional obligations are imposed on any author or copyright holder as a result of your choosing to follow a later version.

15. Disclaimer of Warranty.

THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS"
WITHOUT WARRANTY
OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. Limitation of Liability.

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MODIFIES AND/OR CONVEYS THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

17.
Interpretation of Sections 15 and 16.

If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

END OF TERMS AND CONDITIONS

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 state 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) <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.

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, see <http://www.gnu.org/licenses/>.

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
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, your program's commands
might be different; for a GUI interface, you would use an "about box".

You should also get your employer (if you work as a programmer) or school,
if any, to sign a "copyright disclaimer" for the program, if necessary.
For more information on this, and how to apply and follow the GNU GPL, see
<http://www.gnu.org/licenses/>.

The GNU 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 Lesser General
Public License instead of this License. But first, please read
<http://www.gnu.org/philosophy/why-not-lgpl.html>.
Boost Software License - Version 1.0 - August 17th, 2003

Permission is hereby granted, free of charge, to any person or organization
obtaining a copy of the software and accompanying documentation covered by
this license (the "Software") to use, reproduce, display, distribute,
execute, and transmit the Software, and to prepare derivative works of the
Software, and to permit third-parties to whom the Software is furnished to
do so, all subject to the following:

The copyright notices in the Software and this entire statement, including
the above license grant, this restriction and the following disclaimer,
must be included in all copies of the Software, in whole or in part, and
all derivative works of the Software, unless such copies or derivative
works are solely in the form of machine-executable object code generated by
a source language processor.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR

IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS
FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT. IN NO EVENT
SHALL THE COPYRIGHT HOLDERS OR ANYONE DISTRIBUTING THE SOFTWARE BE LIABLE
FOR ANY DAMAGES OR OTHER LIABILITY, WHETHER IN CONTRACT, TORT OR OTHERWISE,
ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER
DEALINGS IN THE SOFTWARE.

1.15 llhttp 6.0.6 + P

1.15.1 Available under license :

This software is licensed under the MIT License.

Copyright Fedor Indutny, 2018.

Permission is hereby granted, free of charge, to any person obtaining a
copy of this software and associated documentation files (the
"Software"), to deal in the Software without restriction, including
without limitation the rights to use, copy, modify, merge, publish,
distribute, sublicense, and/or sell copies of the Software, and to permit
persons to whom the Software is furnished to do so, subject to the
following conditions:

The above copyright notice and this permission notice shall be included
in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS
OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN
NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.

1.16 libxml2 2.9.13

1.16.1 Available under license :

Except where otherwise noted in the source code (e.g. the files hash.c,
list.c and the trio files, which are covered by a similar licence but
with different Copyright notices) all the files are:

Copyright (C) 1998-2012 Daniel Veillard. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy
of this software and associated documentation files (the "Software"), to deal

in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE
AND NONINFRINGEMENT. IN NO EVENT SHALL THE
AUTHORS OR COPYRIGHT HOLDERS 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.

1.17 crashpad 0.8.0 + P + 36473e

1.17.1 Available under license :

The MIT License (MIT)

Copyright (c) 2017 yhirose

Permission is hereby granted, free of charge, to any person obtaining a copy
of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom the Software is
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all
copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
AUTHORS OR COPYRIGHT HOLDERS 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.

GNU LESSER GENERAL PUBLIC LICENSE
Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

[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.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

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 for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

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.

GNU LESSER GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

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.

1. You may copy and distribute verbatim copies of the Library's
complete source code as you receive it, in any medium,
provided that
you conspicuously and appropriately publish on each copy an
appropriate copyright notice and disclaimer of warranty; keep intact
all the notices that refer to this License and to the absence of any
warranty; and distribute a copy of this License along with the
Library.

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.

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

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.

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.

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 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.

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.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if
you do not accept this License. Therefore, by
modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein.

You are not responsible for enforcing compliance by third parties with
this License.

11. If, as a consequence of a court judgment or allegation of patent
infringement or for any other reason (not limited to patent issues),
conditions are imposed on you (whether by court order, agreement or
otherwise) that contradict the conditions of this License, they do not
excuse
you from the conditions of this License. If you cannot
distribute so as to satisfy simultaneously your obligations under this
License and any other pertinent obligations, then as a consequence you
may not distribute the Library at all. For example, if a patent
license would not permit royalty-free redistribution of the Library by
all those who receive copies directly or indirectly through you, then
the only way you could satisfy both it and this License would be to
refrain entirely from distribution of the Library.

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.

It is not the purpose of this section to induce you to infringe any
patents or other property right claims or to contest validity of any
such claims; this section has the sole purpose of protecting the
integrity of the free software distribution system
which is
implemented by public license practices. Many people have made
generous contributions to the wide range of software distributed
through that system in reliance on consistent application of that
system; it is up to the author/donor to decide if he or she is willing
to distribute software through any other system and a licensee cannot
impose that choice.

This section is intended to make thoroughly clear what is believed to
be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in
certain countries either by patents or by copyrighted interfaces, the
original copyright holder who places the Library under this License may add
an explicit geographical distribution limitation excluding those countries,
so that distribution is permitted only in or among countries not thus
excluded. In such case, this License incorporates the limitation as if
written in the body of this License.

13. The Free Software Foundation may publish
revised and/or new
versions of the Lesser General Public License from time to time.
Such new versions will be similar in spirit to the present version,

but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision
will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE,
BE LIABLE TO YOU
FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

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.>
Copyright (C) <year> <name of author>

This library 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.

This library 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 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!

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this
License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the
Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices
stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works
that You distribute, all copyright, patent, trademark, and
attribution notices from the Source form of the Work,
excluding those notices that do not pertain to any part of
the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must
include a readable copy of the attribution notices contained
within such NOTICE file, excluding
those notices that do not
pertain to any part of the Derivative Works, in at least one
of the following places: within a NOTICE text file distributed
as part of the Derivative Works; within the Source form or
documentation, if provided along with the Derivative Works; or,
within a display generated by the Derivative Works, if and
wherever such third-party notices normally appear. The contents
of the NOTICE file are for informational purposes only and
do not modify the License. You may add Your own attribution
notices within Derivative Works that You distribute, alongside
or as an addendum to the NOTICE text from the Work, provided
that such additional attribution notices cannot be construed
as modifying the License.

You may add Your own copyright statement to Your modifications and
may provide additional or different license terms and conditions

for use, reproduction, or distribution of Your modifications, or
for any such Derivative Works as a whole, provided Your use,
reproduction, and distribution of the Work otherwise complies with
the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise,
any Contribution intentionally submitted for inclusion in the Work
by You to the Licensor shall be under the terms and conditions of
this License, without any additional terms or conditions.
Notwithstanding the above, nothing herein shall supersede or modify
the terms of any separate license agreement you may have executed
with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade
names, trademarks, service marks, or product names of the Licensor,
except as required for reasonable and customary use in describing the
origin of the Work and reproducing the

content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
Copyright (C) 1997 Gregory Pietsch

[These files] are hereby placed in the public domain without restrictions. Just
give the author credit, don't claim you wrote it or prevent anyone else from
using it.
APPLE PUBLIC SOURCE LICENSE
Version 2.0 - August 6, 2003

Please read this License carefully before downloading this software.
By downloading or using this software, you are agreeing to be bound by
the terms of this License. If you do not or cannot agree to the terms
of this License, please do not download or use the software.

1. General; Definitions. This License applies to any program or other
work which Apple Computer, Inc. ("Apple") makes publicly available and
which contains a notice placed by Apple identifying such program or
work as "Original Code" and stating that it is subject to the terms of
this Apple Public Source License version 2.0 ("License"). As used in
this License:

1.1 "Applicable Patent Rights" mean: (a) in the case where Apple is
the grantor of rights, (i) claims of patents that are now or hereafter
acquired, owned by or assigned to Apple and (ii) that cover subject
matter contained in the Original Code, but only to the extent
necessary to use, reproduce and/or distribute
the Original Code
without infringement; and (b) in the case where You are the grantor of
rights, (i) claims of patents that are now or hereafter acquired,
owned by or assigned to You and (ii) that cover subject matter in Your
Modifications, taken alone or in combination with Original Code.

1.2 "Contributor" means any person or entity that creates or
contributes to the creation of Modifications.

1.3 "Covered Code" means the Original Code, Modifications, the combination of Original Code and any Modifications, and/or any respective portions thereof.

1.4 "Externally Deploy" means: (a) to sublicense, distribute or otherwise make Covered Code available, directly or indirectly, to anyone other than You; and/or (b) to use Covered Code, alone or as part of a Larger Work, in any way to provide a service, including but not limited to delivery of content, through electronic communication with a client other than You.

1.5 "Larger Work" means a work which combines Covered Code or portions thereof
with code not governed by the terms of this License.

1.6 "Modifications" mean any addition to, deletion from, and/or change to, the substance and/or structure of the Original Code, any previous Modifications, the combination of Original Code and any previous Modifications, and/or any respective portions thereof. When code is released as a series of files, a Modification is: (a) any addition to or deletion from the contents of a file containing Covered Code; and/or (b) any new file or other representation of computer program statements that contains any part of Covered Code.

1.7 "Original Code" means (a) the Source Code of a program or other work as originally made available by Apple under this License, including the Source Code of any updates or upgrades to such programs or works made available by Apple under this License, and that has been expressly identified by Apple as such in the header file(s) of such work; and (b) the object code compiled from such Source Code and originally
made available by Apple under this License.

1.8 "Source Code" means the human readable form of a program or other work that is suitable for making modifications to it, including all modules it contains, plus any associated interface definition files, scripts used to control compilation and installation of an executable (object code).

1.9 "You" or "Your" means an individual or a legal entity exercising rights under this License. For legal entities, "You" or "Your" includes any entity which controls, is controlled by, or is under common control with, You, where "control" means (a) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (b) ownership of fifty percent (50%) or more of the outstanding shares or beneficial ownership of such entity.

2. Permitted Uses; Conditions & Restrictions. Subject to the terms and conditions of this License, Apple hereby grants You, effective on the date You accept this License and download the Original Code, a world-wide, royalty-free, non-exclusive license, to the extent of Apple's Applicable Patent Rights and copyrights covering the Original Code, to do the following:

2.1 Unmodified Code. You may use, reproduce, display, perform, internally distribute within Your organization, and Externally Deploy verbatim, unmodified copies of the Original Code, for commercial or non-commercial purposes, provided that in each instance:

(a) You must retain and reproduce in all copies of Original Code the copyright and other proprietary notices and disclaimers of Apple as they appear in the Original Code, and keep intact all notices in the Original Code that refer to this License; and

(b) You must include a copy of this License with every copy of Source Code of Covered Code and documentation You distribute or Externally Deploy, and You may not offer or impose any terms on such Source Code that alter or restrict this License or the recipients' rights hereunder, except as permitted under Section 6.

2.2 Modified Code. You may modify Covered Code and use, reproduce, display, perform, internally distribute within Your organization, and Externally Deploy Your Modifications and Covered Code, for commercial or non-commercial purposes, provided that in each instance You also meet all of these conditions:

(a) You must satisfy all the conditions of Section 2.1 with respect to the Source Code of the Covered Code;

(b) You must duplicate, to the extent it does not already exist, the notice in Exhibit A in each file of the Source Code of all Your Modifications, and cause the modified files to carry prominent notices stating that You changed the files and the date of any change; and

(c) If You Externally Deploy Your Modifications, You must make Source Code of all Your Externally Deployed Modifications either available to those to whom You have Externally Deployed Your Modifications, or publicly available. Source Code of Your Externally Deployed Modifications must be released under the terms set forth in this License, including the license grants set forth in Section 3 below, for as long as you Externally Deploy the Covered Code or twelve (12) months from the date of initial External Deployment, whichever is longer. You should preferably distribute the Source Code of Your Externally Deployed Modifications electronically (e.g. download from a web site).

2.3 Distribution of Executable Versions. In addition, if You Externally Deploy Covered Code (Original Code and/or Modifications) in object code, executable form only, You must include a prominent notice, in the code itself as well as in related documentation, stating that Source Code of the Covered Code is available under the terms of this License with information on how and where to obtain such Source Code.

2.4 Third Party Rights. You expressly acknowledge and agree that although Apple and each Contributor grants the licenses to their respective portions of the Covered Code set forth herein, no assurances are provided by Apple or any Contributor that the Covered Code does not infringe the patent or other intellectual property rights of any other entity. Apple and each Contributor disclaim any liability to You for claims brought by any other entity based on infringement of intellectual property rights or otherwise. As a condition to exercising the rights and licenses granted hereunder, You hereby assume sole responsibility to secure any other intellectual property rights needed, if any. For example, if a third party patent license is required to allow You to distribute the Covered Code, it is Your responsibility to acquire that license before distributing the Covered Code.

3. Your Grants. In consideration of, and as a condition to, the licenses granted to You under this License, You hereby grant to any person or entity receiving or distributing Covered Code under this License a non-exclusive, royalty-free, perpetual, irrevocable license, under Your Applicable Patent Rights and other intellectual property rights (other than patent) owned or controlled by You, to use, reproduce, display, perform, modify, sublicense, distribute and Externally Deploy Your Modifications of the same scope and extent as Apple's licenses under Sections 2.1 and 2.2 above.

4. Larger Works. You may create a Larger Work by combining Covered Code with other code not governed by the terms of this License and distribute the Larger Work as a single product. In each such instance, You must make sure the requirements of this License are fulfilled for the Covered Code or any portion thereof.

5. Limitations on Patent License. Except as expressly stated in Section 2, no other patent rights, express or implied, are granted by Apple herein. Modifications and/or Larger Works may require additional

patent licenses from Apple which Apple may grant in its sole
discretion.

6. Additional Terms. You may choose to offer, and to charge a fee for, warranty, support, indemnity or liability obligations and/or other rights consistent with the scope of the license granted herein ("Additional Terms") to one or more recipients of Covered Code. However, You may do so only on Your own behalf and as Your sole responsibility, and not on behalf of Apple or any Contributor. You must obtain the recipient's agreement that any such Additional Terms are offered by You alone, and You hereby agree to indemnify, defend and hold Apple and every Contributor harmless for any liability incurred by or claims asserted against Apple or such Contributor by reason of any such Additional Terms.

7. Versions of the License. Apple may publish revised and/or new versions of this License from time to time. Each version will be given a distinguishing version number. Once Original Code has been published under a particular version of this License, You may continue to use it under the terms of that version. You may also choose to use such Original Code under the terms of any subsequent version of this License published by Apple. No one other than Apple has the right to modify the terms applicable to Covered Code created under this License.

8. NO WARRANTY OR SUPPORT. The Covered Code may contain in whole or in part pre-release, untested, or not fully tested works. The Covered Code may contain errors that could cause failures or loss of data, and may be incomplete or contain inaccuracies. You expressly acknowledge and agree that use of the Covered Code, or any portion thereof, is at Your sole and entire risk. THE COVERED CODE IS PROVIDED "AS IS" AND WITHOUT WARRANTY, UPGRADES OR SUPPORT OF ANY KIND AND APPLE AND APPLE'S LICENSOR(S) (COLLECTIVELY REFERRED TO AS "APPLE" FOR THE PURPOSES OF SECTIONS 8 AND 9) AND ALL CONTRIBUTORS EXPRESSLY DISCLAIM ALL WARRANTIES AND/OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES AND/OR CONDITIONS OF MERCHANTABILITY, OF SATISFACTORY QUALITY, OF FITNESS FOR A PARTICULAR PURPOSE, OF ACCURACY, OF QUIET ENJOYMENT, AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. APPLE AND EACH CONTRIBUTOR DOES NOT WARRANT AGAINST INTERFERENCE WITH YOUR ENJOYMENT OF THE COVERED CODE, THAT THE FUNCTIONS CONTAINED IN THE COVERED CODE WILL MEET YOUR REQUIREMENTS, THAT THE OPERATION OF THE COVERED CODE WILL BE UNINTERRUPTED OR ERROR-FREE, OR THAT DEFECTS IN THE COVERED CODE WILL BE CORRECTED. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY APPLE, AN APPLE AUTHORIZED REPRESENTATIVE OR ANY CONTRIBUTOR SHALL CREATE A WARRANTY.

You acknowledge that the Covered Code is not intended for use in the
operation of nuclear facilities, aircraft navigation, communication
systems, or air traffic control machines in which case the failure of
the Covered Code could lead to death, personal injury, or severe
physical or environmental damage.

9. LIMITATION OF LIABILITY. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT SHALL APPLE OR ANY CONTRIBUTOR BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR RELATING TO THIS
LICENSE OR YOUR USE OR INABILITY TO USE THE COVERED CODE, OR
ANY PORTION THEREOF, WHETHER UNDER A THEORY OF CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE), PRODUCTS LIABILITY OR OTHERWISE, EVEN IF APPLE OR SUCH CONTRIBUTOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND NOTWITHSTANDING THE FAILURE OF ESSENTIAL PURPOSE OF ANY REMEDY. SOME JURISDICTIONS DO NOT ALLOW THE LIMITATION OF LIABILITY OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THIS LIMITATION MAY NOT APPLY TO YOU. In no event shall Apple's total liability to You for all
damages (other than as may be required by applicable law) under this
License exceed the amount of fifty dollars ($50.00).

10. Trademarks. This License does not grant any rights to use the
trademarks or trade names "Apple", "Apple Computer", "Mac", "Mac OS",
"QuickTime", "QuickTime Streaming Server" or any other trademarks,
service marks, logos or trade names belonging to Apple (collectively
"Apple Marks") or to any trademark, service mark, logo or trade
name
belonging to any Contributor. You agree not to use any Apple Marks in
or as part of the name of products derived from the Original Code or
to endorse or promote products derived from the Original Code other
than as expressly permitted by and in strict compliance at all times
with Apple's third party trademark usage guidelines which are posted
at http://www.apple.com/legal/guidelinesfor3rdparties.html.

11. Ownership. Subject to the licenses granted under this License,
each Contributor retains all rights, title and interest in and to any
Modifications made by such Contributor. Apple retains all rights,
title and interest in and to the Original Code and any Modifications
made by or on behalf of Apple ("Apple Modifications"), and such Apple
Modifications will not be automatically subject to this License. Apple
may, at its sole discretion, choose to license such Apple
Modifications under this License, or on different terms from those
contained in this License or may choose not to license
them at all.

12. Termination.

12.1 Termination. This License and the rights granted hereunder will terminate:

(a) automatically without notice from Apple if You fail to comply with
any term(s) of this License and fail to cure such breach within 30
days of becoming aware of such breach;

(b) immediately in the event of the circumstances described in Section
13.5(b); or

(c) automatically without notice from Apple if You, at any time during
the term of this License, commence an action for patent infringement
against Apple; provided that Apple did not first commence
an action for patent infringement against You in that instance.

12.2 Effect of Termination. Upon termination, You agree to immediately
stop any further use, reproduction, modification, sublicensing and
distribution of the Covered Code. All sublicenses to the Covered Code
which have been properly granted prior to termination shall survive
any termination of this License. Provisions which, by their nature,
should remain
in effect beyond the termination of this License shall
survive, including but not limited to Sections 3, 5, 8, 9, 10, 11,
12.2 and 13. No party will be liable to any other for compensation,
indemnity or damages of any sort solely as a result of terminating
this License in accordance with its terms, and termination of this
License will be without prejudice to any other right or remedy of
any party.

13. Miscellaneous.

13.1 Government End Users. The Covered Code is a "commercial item" as
defined in FAR 2.101. Government software and technical data rights in
the Covered Code include only those rights customarily provided to the
public as defined in this License. This customary commercial license
in technical data and software is provided in accordance with FAR
12.211 (Technical Data) and 12.212 (Computer Software) and, for
Department of Defense purchases, DFAR 252.227-7015 (Technical Data --
Commercial Items) and 227.7202-3 (Rights in Commercial Computer
Software or Computer Software
Documentation). Accordingly, all U.S.
Government End Users acquire Covered Code with only those rights set
forth herein.

13.2 Relationship of Parties. This License will not be construed as
creating an agency, partnership, joint venture or any other form of
legal association between or among You, Apple or any Contributor, and
You will not represent to the contrary, whether expressly, by
implication, appearance or otherwise.

13.3 Independent Development. Nothing in this License will impair Apple's right to acquire, license, develop, have others develop for it, market and/or distribute technology or products that perform the same or similar functions as, or otherwise compete with, Modifications, Larger Works, technology or products that You may develop, produce, market or distribute.

13.4 Waiver; Construction. Failure by Apple or any Contributor to enforce any provision of this License will not be deemed a waiver of future enforcement of that or any other provision. Any law or regulation which provides that the language of a contract shall be construed against the drafter will not apply to this License.

13.5 Severability. (a) If for any reason a court of competent jurisdiction finds any provision of this License, or portion thereof, to be unenforceable, that provision of the License will be enforced to the maximum extent permissible so as to effect the economic benefits and intent of the parties, and the remainder of this License will continue in full force and effect. (b) Notwithstanding the foregoing, if applicable law prohibits or restricts You from fully and/or specifically complying with Sections 2 and/or 3 or prevents the enforceability of either of those Sections, this License will immediately terminate and You must immediately discontinue any use of the Covered Code and destroy all copies of it that are in your possession or control.

13.6 Dispute Resolution. Any litigation or other dispute resolution between You and Apple relating to this License shall take place in the Northern District of California, and You and Apple hereby consent to the personal jurisdiction of, and venue in, the state and federal courts within that District with respect to this License. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded.

13.7 Entire Agreement; Governing Law. This License constitutes the entire agreement between the parties with respect to the subject matter hereof. This License shall be governed by the laws of the United States and the State of California, except that body of California law concerning conflicts of law.

Where You are located in the province of Quebec, Canada, the following clause applies: The parties hereby confirm that they have requested that this License and all related documents be drafted in English. Les parties ont exige que le present contrat et tous les documents connexes soient rediges en anglais.

EXHIBIT A.

"Portions Copyright (c) 1999-2003 Apple Computer,
 Inc. All Rights
Reserved.

This file contains Original Code and/or Modifications of Original Code
as defined in and that are subject to the Apple Public Source License
Version 2.0 (the 'License'). You may not use this file except in
compliance with the License. Please obtain a copy of the License at
http://www.opensource.apple.com/apsl/ and read it before using this
file.

The Original Code and all software distributed under the License are
distributed on an 'AS IS' basis, WITHOUT WARRANTY OF ANY KIND, EITHER
EXPRESS OR IMPLIED, AND APPLE HEREBY DISCLAIMS ALL SUCH WARRANTIES,
INCLUDING WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT OR NON-INFRINGEMENT.
Please see the License for the specific language governing rights and
limitations under the License."
People who have agreed to one of the CLAs and can contribute patches.
The AUTHORS file lists the copyright holders; this file
lists people. For example, Google employees are listed here
but not in AUTHORS, because Google holds the copyright.
#
https://developers.google.com/open-source/cla/individual
https://developers.google.com/open-source/cla/corporate
#
Names should be added to this file as:
Name <email address>

Mark Mentovai <mark@chromium.org>
Robert Sesek <rsesek@chromium.org>
Scott Graham <scottmg@chromium.org>
Joshua Peraza <jperaza@chromium.org>

1.18 sqlite 3.39.3

1.18.1 Available under license :

The author disclaims copyright to this source code. In place of
a legal notice, here is a blessing:

   May you do good and not evil.
   May you find forgiveness for yourself and forgive others.
   May you share freely, never taking more than you give.

The author disclaims copyright to this source code. In place of
a legal notice, here is a blessing:

* May you do good and not evil.
* May you find forgiveness for yourself and forgive others.
* May you share freely, never taking more than you give.

1.19 curl 7.84.0

1.19.1 Available under license :

COPYRIGHT AND PERMISSION NOTICE

Copyright (c) 1996 - 2022, Daniel Stenberg, <daniel@haxx.se>, and many
contributors, see the THANKS file.

All rights reserved.

Permission to use, copy, modify, and distribute this software for any purpose
with or without fee is hereby granted, provided that the above copyright
notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN
NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.

Except as contained in this notice, the name of a copyright holder shall not
be used in advertising or otherwise to promote the sale, use or other
dealings
in this Software without prior written authorization of the copyright holder.

1.20 clamav 0.103.7 + P + a3157de

1.20.1 Available under license :

GNU GENERAL PUBLIC LICENSE
Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.
51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed
to make sure that you
have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute
and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains
a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's
source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

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 Program or any portion of it, thus forming a work based on the Program, 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) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole
or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third

parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, 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 Program, 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 Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) 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; or,

b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, 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 executable. 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.

If distribution of executable or 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 counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to

these terms and conditions. You may not impose any further
restrictions on the recipients' exercise of the rights granted herein.
You are not responsible for enforcing compliance by third parties to
this License.

7. If, as a consequence of a court judgment or allegation of patent
infringement or for any other reason (not limited to patent issues),
conditions are imposed on you (whether by court order, agreement or
otherwise) that contradict the conditions of this License, they do not
excuse you from the conditions of this License. If you cannot
distribute so as to satisfy simultaneously your obligations under this
License and any other pertinent obligations, then as a consequence you
may not distribute the Program at all. For example, if a patent
license would not permit royalty-free redistribution
of the Program by
all those who receive copies directly or indirectly through you, then
the only way you could satisfy both it and this License would be to
refrain entirely from distribution of the Program.

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.

It is not the purpose of this section to induce you to infringe any
patents or other property right claims or to contest validity of any
such claims; this section has the sole purpose of protecting the
integrity of the free software distribution system, which is
implemented by public license practices. Many people have made
generous contributions to the wide range of software distributed
through that system in reliance on consistent application of that
system; it is up to the author/donor to decide if he or she is willing
to distribute software through
any other system and a licensee cannot
impose that choice.

This section is intended to make thoroughly clear what is believed to
be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in
certain countries either by patents or by copyrighted interfaces, the
original copyright holder who places the Program under this License
may add an explicit geographical distribution limitation excluding
those countries, so that distribution is permitted only in or among
countries not thus excluded. In such case, this License incorporates
the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions

of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number
of this License which applies to it and "any
later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW.
EXCEPT WHEN
OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN
IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

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) <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 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., 59 Temple Place, Suite 330, Boston, MA 02111-1307 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) 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

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.

REGARDING
OPENSSL

In addition, as a special exception, the copyright holders give permission to link the code of portions of this program with the OpenSSL library under certain conditions as described in each individual source file, and distribute linked combinations including the two.

You must obey the GNU General Public License in all respects for all of the code used other than OpenSSL. If you modify file(s) with this exception, you may extend this exception to your version of the file(s), but you are not obligated to do so. If you do not wish to do so, delete this exception statement from your version. If you delete this exception statement from all source files in the program, then also delete it here.

GNU LESSER GENERAL PUBLIC LICENSE
Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.
51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

[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.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

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 for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

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.

GNU LESSER GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

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.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium,
provided that
you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact

all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

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.

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

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.

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.

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 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.

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.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent

license would not permit royalty-free redistribution of the Library by
all those who receive copies directly or indirectly through you, then
the only way you could satisfy both it and this License would be to
refrain entirely from distribution of the Library.

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.

It is not the purpose of this section to induce you to infringe any
patents or other property right claims or to contest validity of any
such claims; this section has the sole purpose of protecting the
integrity of the free software distribution system
which is
implemented by public license practices. Many people have made
generous contributions to the wide range of software distributed
through that system in reliance on consistent application of that
system; it is up to the author/donor to decide if he or she is willing
to distribute software through any other system and a licensee cannot
impose that choice.

This section is intended to make thoroughly clear what is believed to
be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in
certain countries either by patents or by copyrighted interfaces, the
original copyright holder who places the Library under this License
may add an explicit geographical distribution limitation excluding those
countries, so that distribution is permitted only in or among
countries not thus excluded. In such case, this License incorporates
the limitation as if written in the body of this License.

13. The Free Software Foundation may publish
revised and/or new
versions of the Lesser General Public License from time to time.
Such new versions will be similar in spirit to the present version,
but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library
specifies a version number of this License which applies to it and
"any later version", you have the option of following the terms and
conditions either of that version or of any later version published by
the Free Software Foundation. If the Library does not specify a
license version number, you may choose any version ever published by
the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free

programs whose distribution conditions are incompatible with these,
write to the author to ask for permission. For software which is
copyrighted by the Free Software Foundation, write to the Free
Software Foundation; we sometimes make exceptions for this. Our
decision will
be guided by the two goals of preserving the free status
of all derivatives of our free software and of promoting the sharing
and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO
WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW.
EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR
OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY
KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE
IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR
PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE
LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME
THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN
WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY
AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE
LIABLE TO YOU
FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR
CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE
LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING
RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A
FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF
SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH
DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest
possible use to the public, we recommend making it free software that
everyone can redistribute and change. You can do so by permitting
redistribution under these terms (or, alternatively, under the terms
of the ordinary General Public License).

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.>
Copyright (C) <year> <name of author>

This library 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.

This library 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 library; if not, write to the Free Software Foundation, Inc., 51 Franklin St, 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!

GNU LESSER GENERAL PUBLIC LICENSE
Version 2.1, February 1999

[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.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest
you first think carefully about whether
this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

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 for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

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.

GNU LESSER GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

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.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that

you conspicuously and appropriately publish
on each copy an
appropriate copyright notice and disclaimer of warranty; keep intact
all the notices that refer to this License and to the absence of any
warranty; and distribute a copy of this License along with the
Library.

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.

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

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.

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.

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 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.

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.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot

distribute
so as to satisfy simultaneously your obligations under this
License and any other pertinent obligations, then as a consequence you
may not distribute the Library at all. For example, if a patent
license would not permit royalty-free redistribution of the Library by
all those who receive copies directly or indirectly through you, then
the only way you could satisfy both it and this License would be to
refrain entirely from distribution of the Library.

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.

It is not the purpose of this section to induce you to infringe any
patents or other property right claims or to contest validity of any
such claims; this section has the sole purpose of protecting the
integrity of the free software distribution system which is
implemented by public license practices. Many people
have made
generous contributions to the wide range of software distributed
through that system in reliance on consistent application of that
system; it is up to the author/donor to decide if he or she is willing
to distribute software through any other system and a licensee cannot
impose that choice.

This section is intended to make thoroughly clear what is believed to
be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in
certain countries either by patents or by copyrighted interfaces, the
original copyright holder who places the Library under this License may add
an explicit geographical distribution limitation excluding those countries,
so that distribution is permitted only in or among countries not thus
excluded. In such case, this License incorporates the limitation as if
written in the body of this License.

13. The Free Software Foundation may publish revised and/or new
versions of the Lesser General Public License
from time to time.
Such new versions will be similar in spirit to the present version,
but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library
specifies a version number of this License which applies to it and
"any later version", you have the option of following the terms and
conditions either of that version or of any later version published by
the Free Software Foundation. If the Library does not specify a
license version number, you may choose any version ever published by

the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of
all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL
DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

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.>
Copyright (C) <year> <name of author>

This library 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.

This library 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 library; if not, write to the Free Software
Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307 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!
LLVM System Interface Library

The LLVM System Interface Library is licensed under the Illinois Open Source
License and has the following additional copyright:

Copyright (C) 2004 eXtensible Systems, Inc.
getopt.c - my re-implementation of getopt.
Copyright 1997, 2000, 2001, 2002, 2006, Benjamin Sittler

Permission is hereby granted, free of charge, to any person
obtaining a copy of this software and associated documentation
files (the "Software"), to deal in the Software without
restriction, including without limitation the rights to use, copy,

modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be
included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF
MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT
HOLDERS 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.

```
 ******    *****   ******   UnRAR - free utility for RAR archives
**   **  **  **   **  **   **  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
******   *******  ******    License for use and distribution of
**   **  **  **   **  **   **   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
**   **  **  **   **  **   **       FREE portable version
                                ~~~~~~~~~~~~~~~~~~~~~
```

The source code of UnRAR utility is freeware. This means:

1. All copyrights to RAR and the utility UnRAR are exclusively
owned by the author - Alexander Roshal.

2. UnRAR source code may be used in any software to handle
RAR archives without limitations free of charge, but cannot be
used to develop RAR (WinRAR) compatible archiver and to
re-create RAR compression algorithm, which is proprietary.
Distribution of modified UnRAR source code in separate form
or as a part of other software is permitted, provided that
full text of this paragraph, starting from "UnRAR source
code"
words, is included in license, or in documentation if license
is not available, and in source code comments of resulting package.

3. The UnRAR utility may be freely distributed. It is allowed
to distribute UnRAR inside of other software packages.

4. THE RAR ARCHIVER AND THE UnRAR UTILITY ARE DISTRIBUTED "AS IS".
NO WARRANTY OF ANY KIND IS EXPRESSED OR IMPLIED. YOU USE AT
YOUR OWN RISK. THE AUTHOR WILL NOT BE LIABLE FOR DATA LOSS,
DAMAGES, LOSS OF PROFITS OR ANY OTHER KIND OF LOSS WHILE USING
OR MISUSING THIS SOFTWARE.

5. Installing and using the UnRAR utility signifies acceptance of these terms and conditions of the license.

6. If you don't agree with terms of the license you must remove UnRAR files from your storage devices and cease to use the utility.

Thank you for your interest in RAR and UnRAR.

Alexander L. Roshal

GNU GENERAL PUBLIC LICENSE
Version 2, June 1991

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed
to make sure that you
have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate

copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

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 Program or any portion of it, thus forming a work based on the Program, 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) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, 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 Program, 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 Program.

In addition, mere aggregation of another work not based on the Program
with the Program (or with a work based on the Program) on a volume of
a storage or distribution medium does not bring the other work under
the scope of this License.

3. You may copy and distribute the Program (or a work based
on it,
under Section 2) in object code or executable form under the terms of
Sections 1 and 2 above provided that you also do one of the following:

a) 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; or,

b) Accompany it with a written offer, valid for at least three
years, to give any third party, for a charge no more than your
cost of physically performing source distribution, a complete
machine-readable copy of the corresponding source code, to be
distributed under the terms of Sections 1 and 2 above on a medium
customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer
to distribute corresponding source code. (This alternative is
allowed only for noncommercial distribution and only if you
received the program in object code or
executable form with such
an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for
making modifications to it. For an executable work, 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 executable. 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.

If distribution of executable or 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 counts as
distribution of the source code, even though third parties are not
compelled to copy the
source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program

except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each
time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution
of the Program by
all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

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.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED

OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN
IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

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) <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 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., 59 Temple Place, Suite 330, Boston, MA 02111-1307 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) 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

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.
libclamav/textdet.c includes modified code from file-4.23/src/ascmagic.c.
The original LEGAL.NOTICE file for file-4.23 is reproduced below.

$File: LEGAL.NOTICE,v 1.15 2006/05/03 18:48:33 christos Exp $
Copyright (c) Ian F. Darwin 1986, 1987, 1989, 1990, 1991, 1992, 1994, 1995.
Software written by Ian F. Darwin and others;
maintained 1994- Christos Zoulas.

This software is not subject to any export provision of the United States
Department of Commerce, and may be exported to any country or planet.

Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions
are met:
1. Redistributions of source code must retain the above copyright

notice immediately at the beginning of the file, without modification,
this list of conditions, and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright
notice,
this list of conditions and the following disclaimer in the
documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS'' AND
ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR
ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL
DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT
LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY
OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
SUCH DAMAGE.
zlib/libpng license

This software is provided 'as-is', without any express or implied warranty. In
no event will the authors be held liable for any damages arising from the use
of this software.

Permission is granted to anyone to use this software for any purpose, including
commercial applications, and to alter it and redistribute it freely, subject to
the following restrictions:

1. The origin of this software must not be misrepresented; you must not
claim that you wrote the original software. If you use this software in
a product, an acknowledgment in the product documentation would be
appreciated but is not required.

2. Altered source versions must be plainly marked as such, and must not be
misrepresented as being the original software.

3. This notice may not be removed or altered from any source distribution.

Modified files from libbzip2 are present under libclamav/nsis.
The original LICENSE file for bzip2 and libbzip2 is reproduced below.

This program, "bzip2", the associated library "libbzip2", and all
documentation, are copyright (C) 1996-2006 Julian R Seward. All
rights reserved.

Redistribution and use in source and binary forms, with or without

modification, are permitted provided that the following conditions
are met:

1. Redistributions of source code must retain the above copyright
  notice, this list of conditions and the following disclaimer.

2. The origin of this software must not be misrepresented; you must
  not claim that you wrote the original software. If you use this
  software in a product, an acknowledgment in the product
  documentation would be appreciated but is not required.

3. Altered source versions must be plainly marked as such, and must
  not be misrepresented as being the original
 software.

4. The name of the author may not be used to endorse or promote
  products derived from this software without specific prior written
  permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS
OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED
WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY
DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL
DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE
GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS
INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY,
WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING
NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS
SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Julian Seward, Cambridge, UK.
jseward@bzip.org
bzip2/libbzip2 version 1.0.4 of 20 December 2006

==
LLVM Release License
==
University of Illinois/NCSA
Open Source License

Developed by:

   LLVM Team

University of Illinois at Urbana-Champaign

http://llvm.org

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal with the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimers.

* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimers in the documentation and/or other materials provided with the distribution.

* Neither the names of the LLVM Team, University of Illinois at Urbana-Champaign, nor the names of its contributors may be used to endorse or promote products derived from this Software without specific prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.

==

Copyrights and Licenses for Third Party Software Distributed with LLVM:

==

The LLVM software contains code written by third parties. Such software will have its own individual LICENSE.TXT file in the directory in which it appears. This file will describe the copyrights, license, and restrictions which apply to that code.

The disclaimer of warranty in the University of Illinois Open Source License applies to all code in the LLVM Distribution, and nothing in any of the other licenses gives permission to use the names of the LLVM Team or the University of Illinois to endorse or promote products derived from this Software.

The following pieces of software have additional or alternate copyrights,
licenses, and/or restrictions:

Program Directory
------- ---------
Autoconf llvm/autoconf
llvm/projects/ModuleMaker/autoconf
llvm/projects/sample/autoconf
CellSPU
backend llvm/lib/Target/CellSPU/README.txt
Google Test llvm/utils/unittest/googletest
OpenBSD regex llvm/lib/Support/{reg*, COPYRIGHT.regex}
COPYRIGHT AND PERMISSION NOTICE

Copyright (c) 1996 - 2019, Daniel Stenberg, <daniel@haxx.se>, and many
contributors, see the THANKS file.

All rights reserved.

Permission to use, copy, modify, and distribute this software for any purpose
with or without fee is hereby granted, provided that the above copyright
notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN
NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.

Except as contained in this notice, the name of a copyright holder shall not
be used in advertising or otherwise to promote the sale, use or other
dealings
in this Software without prior written authorization of the copyright holder.
$OpenBSD: COPYRIGHT,v 1.3 2003/06/02 20:18:36 millert Exp $

Copyright 1992, 1993, 1994 Henry Spencer. All rights reserved.
This software is not subject to any license of the American Telephone
and Telegraph Company or of the Regents of the University of California.

Permission is granted to anyone to use this software for any purpose on
any computer system, and to alter it and redistribute it, subject
to the following restrictions:

1. The author is not responsible for the consequences of use of this
software, no matter how awful, even if they arise from flaws in it.

2. The origin of this software must not be misrepresented, either by
explicit claim or by omission. Since few users ever read sources,
credits must appear in the documentation.

3. Altered versions must be plainly marked as such, and must not be
misrepresented as being the original software. Since few users
ever read sources, credits must appear in the documentation.

4. This notice may not be removed or
altered.

=-=

GNU LESSER GENERAL PUBLIC LICENSE
Version 2.1, February 1999

Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

[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.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who
decide to use it. You
can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

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 for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

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.

GNU LESSER GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

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.

1. You may copy and distribute verbatim copies of the Library's
complete source code as you receive it, in any medium,
provided that
you conspicuously and appropriately publish on each copy an
appropriate copyright notice and disclaimer of warranty; keep intact
all the notices that refer to this License and to the absence of any
warranty; and distribute a copy of this License along with the
Library.

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.

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

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.

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.

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 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.

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.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if
you do not accept this License. Therefore, by
modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein.

You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse
you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

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.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system
which is
implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish
revised and/or new
versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version,

but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision
will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE,
BE LIABLE TO YOU
FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

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.>
Copyright (C) <year> <name of author>

This library 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.

This library 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 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!
Modified files from the YARA project exist in libclamav. These have file names with "yara_" prefixing the original yara file names. The YARA project uses the license below:

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or
management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix
below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition, "submitted"
means any form of electronic, verbal, or
written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative Works of,
publicly display, publicly perform, sublicense,
and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
(except as stated in this section) patent license to make, have made,
use, offer to sell, sell, import, and otherwise transfer the Work,
where such license applies only to those patent claims licensable
by such Contributor that are necessarily infringed by their
Contribution(s) alone or by combination of their Contribution(s)
with the Work to which such Contribution(s) was submitted. If You
institute patent litigation against any entity (including a
cross-claim or counterclaim in a lawsuit) alleging that the Work
or a Contribution incorporated within the Work constitutes direct
or contributory patent infringement, then any patent
licenses
granted to You under this License for that Work shall terminate
as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the
Work or Derivative Works thereof in any medium, with or without
modifications, and in Source or Object form, provided that You

meet the following conditions:

(a) You must give any other recipients of the Work or
Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices
stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works
that You distribute, all copyright, patent, trademark, and
attribution notices from the Source form of the Work,
excluding those notices that do not pertain to any part of
the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its
distribution,
then any Derivative Works that You distribute must
include a readable copy of the attribution notices contained
within such NOTICE file, excluding those notices that do not
pertain to any part of the Derivative Works, in at least one
of the following places: within a NOTICE text file distributed
as part of the Derivative Works; within the Source form or
documentation, if provided along with the Derivative Works; or,
within a display generated by the Derivative Works, if and
wherever such third-party notices normally appear. The contents
of the NOTICE file are for informational purposes only and
do not modify the License. You may add Your own attribution
notices within Derivative Works that You distribute, alongside
or as an addendum to the NOTICE text from the Work, provided
that such additional attribution notices cannot be construed
as
modifying the License.

You may add Your own copyright statement to Your modifications and
may provide additional or different license terms and conditions
for use, reproduction, or distribution of Your modifications, or
for any such Derivative Works as a whole, provided Your use,
reproduction, and distribution of the Work otherwise complies with
the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise,
any Contribution intentionally submitted for inclusion in the Work
by You to the Licensor shall be under the terms and conditions of
this License, without any additional terms or conditions.
Notwithstanding the above, nothing herein shall supersede or modify
the terms of any separate license agreement you may have executed
with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks,
service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required
by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your
sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include

the brackets!) The text should be enclosed in the appropriate
comment syntax for the file format. We also recommend that a
file or class name and description of purpose be included on the
same "printed page" as the copyright notice for easier
identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the
Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

TomsFastMath is public domain.

Note some ideas were borrowed from LibTomMath and OpenSSL. All of the code is original or ported from LibTomMath [no code was ported from OpenSSL]. As such the origins and status of this code are both public domain.

-- Tom St Denis

The original lzma.txt license file, a small portion of which is reproduced below,
is available under libclamav/7z/lzma.txt.

LICENSE

LZMA SDK is written and placed in the public domain by Igor Pavlov.

The files in libclamav/c++/llvm are from the LLVM project, original license is
in libclamav/c++/llvm/LICENSE.TXT:

==
LLVM Release License
==
University of Illinois/NCSA
Open Source License

Copyright (c) 2003-2009 University of Illinois at Urbana-Champaign.
All rights reserved.

Developed by:

LLVM Team

University of Illinois at Urbana-Champaign

http://llvm.org

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal with the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimers.

* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimers in the documentation and/or other materials provided with the distribution.

* Neither the names of the LLVM Team, University of Illinois at Urbana-Champaign, nor the names of its contributors may be used to endorse or promote products derived from this Software without specific prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.

==

Copyrights and Licenses for Third Party Software Distributed with LLVM:

==

The LLVM software contains code written by third parties. Such software will have its own individual LICENSE.TXT file in the directory in which it appears. This file will describe the copyrights, license, and restrictions which apply to that code.

The disclaimer of warranty in the University of Illinois Open Source License applies to all code in the LLVM Distribution, and nothing in any of the other licenses gives permission to use the names of the LLVM Team or the University of Illinois to endorse or promote products derived from this Software.

The following pieces of software have additional or alternate copyrights,
licenses, and/or restrictions:

Program Directory
------- ---------
Autoconf
llvm/autoconf
llvm/projects/ModuleMaker/autoconf
llvm/projects/sample/autoconf
CellSPU backend llvm/lib/Target/CellSPU/README.txt
Google Test llvm/utils/unittest/googletest
The code in libclamav/regex/ is derived from OpenBSD's libc/regex, original license follows:

This code is derived from software contributed to Berkeley by
Henry Spencer.

Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions
are met:
1. Redistributions of source code must retain the above copyright
   notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright
   notice, this list of conditions and the following disclaimer in the
   documentation and/or other materials provided with the distribution.
3. Neither the name of the University nor the names of its contributors
   may be used to endorse or promote products derived from this software
   without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS ``AS IS'' AND
ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE
FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL
DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT
LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY
OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
SUCH DAMAGE.
The libclamunrar code is based on the work of Alexander L. Roshal (C)

The UnRAR sources may be used in any software to handle RAR
archives without limitations free of charge, but cannot be used

to re-create the RAR compression algorithm, which is proprietary.
Distribution of modified unRAR sources in separate form or as a
part of other software is permitted, provided that it is clearly
stated in the documentation and source comments that the code may
not be used to develop a RAR (WinRAR) compatible archiver.

Original UnRAR licence:

```
******    *****   ******   UnRAR - free utility for RAR archives
**   **  **   **  **   ** ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
******   *******  ******    License for use and distribution of
**   **  **   **  **   **   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
**   **  **   **  **   **         FREE portable version
                                   ~~~~~~~~~~~~~~~~~~~~~~
```

The source code of UnRAR utility is freeware. This means:

1. All copyrights
to RAR and the utility UnRAR are exclusively
owned by the author - Alexander Roshal.

2. The UnRAR sources may be used in any software to handle RAR
archives without limitations free of charge, but cannot be used
to re-create the RAR compression algorithm, which is proprietary.
Distribution of modified UnRAR sources in separate form or as a
part of other software is permitted, provided that it is clearly
stated in the documentation and source comments that the code may
not be used to develop a RAR (WinRAR) compatible archiver.

3. The UnRAR utility may be freely distributed. It is allowed
to distribute UnRAR inside of other software packages.

4. THE RAR ARCHIVER AND THE UnRAR UTILITY ARE DISTRIBUTED "AS IS".
NO WARRANTY OF ANY KIND IS EXPRESSED OR IMPLIED. YOU USE AT
YOUR OWN RISK. THE AUTHOR WILL NOT BE LIABLE FOR DATA LOSS,
DAMAGES, LOSS OF PROFITS OR ANY OTHER KIND OF LOSS WHILE USING
OR MISUSING
THIS SOFTWARE.

5. Installing and using the UnRAR utility signifies acceptance of
these terms and conditions of the license.

6. If you don't agree with terms of the license you must remove
UnRAR files from your storage devices and cease to use the
utility.

Thank you for your interest in RAR and UnRAR.

Alexander L. Roshal

The MIT License (MIT)

Autoconf Files

All autoconf files are licensed under the LLVM license with the following additions:

llvm/autoconf/install-sh:

This script is licensed under the LLVM license, with the following additional copyrights and restrictions:

Please see the source files for additional copyrights.

PCRE LICENCE

PCRE is a library of functions to support regular expressions whose syntax
and semantics are as close as possible to those of the Perl 5 language.

Release 7 of PCRE is distributed under the terms of the "BSD" licence, as
specified below. The documentation for PCRE, supplied in the "doc"
directory, is distributed under the same terms as the software itself.

The basic library functions are written in C and are freestanding. Also
included in the distribution is a set of C++ wrapper functions.

THE BASIC LIBRARY FUNCTIONS

Written by: Philip Hazel
Email local part: ph10
Email domain: cam.ac.uk

University of Cambridge Computing Service,
Cambridge, England. Phone: +44 1223 334714.

THE C++ WRAPPER FUNCTIONS

Contributed by: Google Inc.

THE "BSD" LICENCE

Redistribution
and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice,
  this list of conditions and the following disclaimer.

* Redistributions in binary form must reproduce the above copyright

1.21 llvm 15.0.7

1.21.1 Available under license :

```
; NOTE: Assertions have been autogenerated by utils/update_llc_test_checks.py
; RUN: llc < %s -mtriple=aarch64-- | FileCheck %s

; A shuffle mask with all undef elements is always legal.

define <4 x i32> @PR41535(<2 x i32> %p1, <2 x i32> %p2) {
; CHECK-LABEL: PR41535:
; CHECK:       // %bb.0:
; CHECK-NEXT:    ext v0.8b, v0.8b, v1.8b, #4
; CHECK-NEXT:    mov v0.d[1], v0.d[0]
; CHECK-NEXT:    ret
 %cat1 = shufflevector <2 x i32> %p1, <2 x i32> undef, <4 x i32> <i32 undef, i32 1, i32 undef, i32 undef>
 %cat2 = shufflevector <2 x i32> %p2, <2 x i32> undef, <4 x i32> <i32 0, i32 undef, i32 undef, i32 undef>
 %r = shufflevector <4 x i32> %cat1, <4 x i32> %cat2, <4 x i32> <i32 undef, i32 undef, i32 1, i32 4>
 ret <4 x i32> %r
}
; RUN: llc < %s -mtriple=s390x-linux-gnu -mcpu=zEC12 -verify-machineinstrs | FileCheck %s
;
; Test that early if conversion produces LOCR with operands of the right
; register classes.
```

```
define void @autogen_SD4739(i8*) {
; CHECK-NOT: Expected a GR32Bit register, but got a GRX32Bit register
BB:
 %L34 = load i8, i8* %0
 %Cmp56 = icmp sgt i8 undef, %L34
 br label %CF246

CF246:                                            ; preds = %CF246, %BB
 %Sl163 = select i1 %Cmp56, i8 %L34, i8 undef
 br i1 undef, label %CF246, label %CF248

CF248:                                            ; preds = %CF248, %CF246
 store i8 %Sl163, i8* %0
 br label %CF248
}
; RUN: opt < %s -passes=argpromotion -S | FileCheck %s

; CHECK-LABEL: define i32 @foo() #0 {
; CHECK-NEXT:      %.val = load <32 x half>, <32 x half>* undef, align 4
; CHECK-NEXT:      call void @bar(<32 x half> %.val)
; CHECK-NEXT:      ret i32 0
; CHECK-NEXT:    }

; CHECK-LABEL: define internal void @bar(<32 x half> %.0.val) #0 {
; CHECK-NEXT:      ret void
; CHECK-NEXT:    }

; CHECK:    attributes #0 = { uwtable "min-legal-vector-width"="512" }

define i32 @foo() #0 {
 call void @bar(<32 x half>* undef)
 ret i32 0
}

define internal void @bar(<32 x half>*) #0 {
 %2 = load <32 x half>, <32 x half>* %0, align 4
 ret void
}

attributes #0 = { uwtable "min-legal-vector-width"="0" }
```

```
; RUN: llc -march=hexagon < %s
; REQUIRES: asserts

; The two loads based on %struct.0, loading two different data types
; cause LSR to assume type "void" for the memory type. This would then
; cause an assert in isLegalAddressingMode. Make sure we no longer crash.

target triple = "hexagon"

%struct.0 = type { i8*, i8, %union.anon.0 }
%union.anon.0 = type { i8* }

define hidden fastcc void @fred() unnamed_addr #0 {
entry:
 br i1 undef, label %while.end, label %while.body.lr.ph

while.body.lr.ph:                                 ; preds = %entry
 br label %while.body

while.body:                                       ; preds = %exit.2, %while.body.lr.ph
 %lsr.iv = phi %struct.0* [ %cgep22, %exit.2 ], [ undef, %while.body.lr.ph ]
 switch i32 undef, label %exit [
   i32 1, label %sw.bb.i
   i32 2, label %sw.bb3.i
 ]

sw.bb.i:                                          ; preds = %while.body
 unreachable
```

```
sw.bb3.i:                                        ; preds = %while.body
 unreachable

exit:
                                        ; preds = %while.body
 switch i32 undef, label %exit.2 [
   i32 1, label %sw.bb.i17
   i32 2, label %sw.bb3.i20
 ]

sw.bb.i17:                                       ; preds = %.exit
 %0 = bitcast %struct.0* %lsr.iv to i32*
 %1 = load i32, i32* %0, align 4
 unreachable

sw.bb3.i20:                                      ; preds = %exit
 %2 = bitcast %struct.0* %lsr.iv to i8**
 %3 = load i8*, i8** %2, align 4
 unreachable

exit.2:                                          ; preds = %exit
 %cgep22 = getelementptr %struct.0, %struct.0* %lsr.iv, i32 1
 br label %while.body

while.end:                                       ; preds = %entry
 ret void
}

attributes #0 = { nounwind optsize "target-cpu"="hexagonv55" }
; RUN: opt -consthoist -S -o - %s | FileCheck %s
target datalayout = "e-m:e-p:32:32-i64:64-v128:64:128-a:0:32-n32-S64"
target triple = "thumbv6m-none--musleabi"

; Check that for i8 type, the maximum legal offset is 31.
; Also check that an constant used as value to be stored rather than
; pointer in a store instruction is hoisted.
; CHECK: foo_i8
; CHECK-DAG:  %[[C1:const[0-9]?]] = bitcast i32 805874720 to i32
; CHECK-DAG:  %[[C2:const[0-9]?]] = bitcast i32 805874688 to i32
; CHECK-DAG:  %[[C3:const[0-9]?]] = bitcast i32 805873720 to i32
; CHECK-DAG:  %[[C4:const[0-9]?]] = bitcast i32 805873688 to i32
; CHECK:  %0 = inttoptr i32 %[[C2]] to i8*
; CHECK-NEXT:  %1 = load volatile i8, i8* %0
; CHECK-NEXT:  %[[M1:const_mat[0-9]?]] = add i32 %[[C2]], 4
; CHECK-NEXT:  %2 = inttoptr i32 %[[M1]] to i8*
; CHECK-NEXT:  %3 = load volatile i8, i8* %2
; CHECK-NEXT:  %[[M2:const_mat[0-9]?]] = add i32 %[[C2]], 31
```

```
; CHECK-NEXT:  %4 = inttoptr i32 %[[M2]] to i8*
; CHECK-NEXT:  %5 = load volatile i8, i8*
 %4
; CHECK-NEXT:  %6 = inttoptr i32 %[[C1]] to i8*
; CHECK-NEXT:  %7 = load volatile i8, i8* %6
; CHECK-NEXT:  %[[M3:const_mat[0-9]?]] = add i32 %[[C1]], 7
; CHECK-NEXT:  %8 = inttoptr i32 %[[M3]] to i8*
; CHECK-NEXT:  %9 = load volatile i8, i8* %8
; CHECK-NEXT:  %10 = inttoptr i32 %[[C4]] to i8*
; CHECK-NEXT:  store i8 %9, i8* %10
; CHECK-NEXT:  %[[M4:const_mat[0-9]?]] = add i32 %[[C4]], 31
; CHECK-NEXT:  %11 = inttoptr i32 %[[M4]] to i8*
; CHECK-NEXT:  store i8 %7, i8* %11
; CHECK-NEXT:  %12 = inttoptr i32 %[[C3]] to i8*
; CHECK-NEXT:  store i8 %5, i8* %12
; CHECK-NEXT:  %[[M5:const_mat[0-9]?]] = add i32 %[[C3]], 7
; CHECK-NEXT:  %13 = inttoptr i32 %[[M5]] to i8*
; CHECK-NEXT:  store i8 %3, i8* %13
; CHECK-NEXT:  %[[M6:const_mat[0-9]?]] = add i32 %[[C1]], 80
; CHECK-NEXT:  %14 = inttoptr i32 %[[M6]] to i8*
; CHECK-NEXT:  store i8* %14, i8** @goo

@goo = global i8* undef

define void @foo_i8() {
entry:
 %0 = load volatile i8, i8* inttoptr (i32 805874688 to i8*)
 %1 = load volatile
 i8, i8* inttoptr (i32 805874692 to i8*)
 %2 = load volatile i8, i8* inttoptr (i32 805874719 to i8*)
 %3 = load volatile i8, i8* inttoptr (i32 805874720 to i8*)
 %4 = load volatile i8, i8* inttoptr (i32 805874727 to i8*)
 store i8 %4, i8* inttoptr(i32 805873688 to i8*)
 store i8 %3, i8* inttoptr(i32 805873719 to i8*)
 store i8 %2, i8* inttoptr(i32 805873720 to i8*)
 store i8 %1, i8* inttoptr(i32 805873727 to i8*)
 store i8* inttoptr(i32 805874800 to i8*), i8** @goo
 ret void
}

; Check that for i16 type, the maximum legal offset is 62.
; CHECK: foo_i16
; CHECK-DAG: %[[C1:const[0-9]?]] = bitcast i32 805874752 to i32
; CHECK-DAG: %[[C2:const[0-9]?]] = bitcast i32 805874688 to i32
; CHECK: %0 = inttoptr i32 %[[C2]] to i16*
; CHECK-NEXT: %1 = load volatile i16, i16* %0, align 2
; CHECK-NEXT: %[[M1:const_mat[0-9]?]] = add i32 %[[C2]], 4
; CHECK-NEXT: %2 = inttoptr i32 %[[M1]] to i16*
```

```
; CHECK-NEXT: %3 = load volatile i16, i16* %2, align 2
; CHECK-NEXT: %[[M2:const_mat[0-9]?]] = add i32
 %[[C2]], 32
; CHECK-NEXT: %4 = inttoptr i32 %[[M2]] to i16*
; CHECK-NEXT: %5 = load volatile i16, i16* %4, align 2
; CHECK-NEXT: %[[M3:const_mat[0-9]?]] = add i32 %[[C2]], 62
; CHECK-NEXT: %6 = inttoptr i32 %[[M3]] to i16*
; CHECK-NEXT: %7 = load volatile i16, i16* %6, align 2
; CHECK-NEXT: %8 = inttoptr i32 %[[C1]] to i16*
; CHECK-NEXT: %9 = load volatile i16, i16* %8, align 2
; CHECK-NEXT: %[[M4:const_mat[0-9]?]] = add i32 %[[C1]], 22
; CHECK-NEXT: %10 = inttoptr i32 %[[M4]] to i16*
; CHECK-NEXT: %11 = load volatile i16, i16* %10, align 2

define void @foo_i16() {
entry:
 %0 = load volatile i16, i16* inttoptr (i32 805874688 to i16*), align 2
 %1 = load volatile i16, i16* inttoptr (i32 805874692 to i16*), align 2
 %2 = load volatile i16, i16* inttoptr (i32 805874720 to i16*), align 2
 %3 = load volatile i16, i16* inttoptr (i32 805874750 to i16*), align 2
 %4 = load volatile i16, i16* inttoptr (i32 805874752 to i16*), align 2
 %5 = load volatile i16, i16* inttoptr (i32 805874774
 to i16*), align 2
 ret void
}

; Check that for i32 type, the maximum legal offset is 124.
; CHECK: foo_i32
; CHECK-DAG:  %[[C1:const[0-9]?]] = bitcast i32 805874816 to i32
; CHECK-DAG:  %[[C2:const[0-9]?]] = bitcast i32 805874688 to i32
; CHECK:  %0 = inttoptr i32 %[[C2]] to i32*
; CHECK-NEXT:  %1 = load volatile i32, i32* %0, align 4
; CHECK-NEXT:  %[[M1:const_mat[0-9]?]] = add i32 %[[C2]], 4
; CHECK-NEXT:  %2 = inttoptr i32 %[[M1]] to i32*
; CHECK-NEXT:  %3 = load volatile i32, i32* %2, align 4
; CHECK-NEXT:  %[[M2:const_mat[0-9]?]] = add i32 %[[C2]], 124
; CHECK-NEXT:  %4 = inttoptr i32 %[[M2]] to i32*
; CHECK-NEXT:  %5 = load volatile i32, i32* %4, align 4
; CHECK-NEXT:  %6 = inttoptr i32 %[[C1]] to i32*
; CHECK-NEXT:  %7 = load volatile i32, i32* %6, align 4
; CHECK-NEXT:  %[[M3:const_mat[0-9]?]] = add i32 %[[C1]], 8
; CHECK-NEXT:  %8 = inttoptr i32 %[[M3]] to i32*
; CHECK-NEXT:  %9 = load volatile i32, i32* %8, align 4
; CHECK-NEXT:  %[[M4:const_mat[0-9]?]] = add i32 %[[C1]],
 12
; CHECK-NEXT:  %10 = inttoptr i32 %[[M4]] to i32*
; CHECK-NEXT:  %11 = load volatile i32, i32* %10, align 4
```

```
define void @foo_i32() {
entry:
 %0 = load volatile i32, i32* inttoptr (i32 805874688 to i32*), align 4
 %1 = load volatile i32, i32* inttoptr (i32 805874692 to i32*), align 4
 %2 = load volatile i32, i32* inttoptr (i32 805874812 to i32*), align 4
 %3 = load volatile i32, i32* inttoptr (i32 805874816 to i32*), align 4
 %4 = load volatile i32, i32* inttoptr (i32 805874824 to i32*), align 4
 %5 = load volatile i32, i32* inttoptr (i32 805874828 to i32*), align 4
 ret void
}
```

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the
power, direct or indirect, to cause the
direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner

or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
(except as stated in this section) patent license to make, have made,
use, offer to sell, sell, import, and otherwise transfer the Work,
where such license applies only to those patent claims licensable
by such Contributor that are necessarily infringed by their
Contribution(s) alone or by combination of their Contribution(s)
with the Work to which such Contribution(s) was submitted. If You
institute patent litigation against any entity (including a
cross-claim or counterclaim in a lawsuit) alleging that the Work
or a Contribution incorporated within the Work constitutes direct
or contributory patent infringement, then any patent licenses
granted to You under this License for that Work shall terminate
as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the
Work or Derivative Works thereof in any medium, with or without
modifications, and in Source or Object form, provided that You
meet the following conditions:

(a) You must give any other recipients of the Work or
Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license terms. All such code will be identified clearly using at least one of two mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or `LICENSE` file at the top containing the specific license and restrictions which apply to that software, or
2) It will contain specific license and restriction terms at the top of every file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==

The GPURuntime library is dual licensed under both the University of Illinois
"BSD-Like" license and the MIT license. As a user of this code you may choose
to use it under either license. As a contributor, you agree to allow your code
to be used under both.

Full text of the relevant licenses is included below.

==

University of Illinois/NCSA
Open Source License

Developed by:

Polly Team

http://polly.llvm.org

Permission is hereby granted,
free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal with
the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished to do
so, subject to the following conditions:

* Redistributions of source code must retain the above copyright notice,
  this list of conditions and the following disclaimers.

* Redistributions in binary form must reproduce the above copyright notice,
  this list of conditions and the following disclaimers in the
  documentation and/or other materials provided with the distribution.

* Neither the names of the LLVM Team, University of Illinois at
  Urbana-Champaign, nor the names of its contributors may be used to
  endorse or promote products derived from this Software without specific
  prior
  written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS
FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE
SOFTWARE.

==

Copyright (c) 2009-2016 by the contributors listed in CREDITS.TXT

Permission is hereby granted, free of charge, to any person obtaining a copy
of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom
 the Software is
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
AUTHORS OR COPYRIGHT HOLDERS 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.
; NOTE: Assertions have been autogenerated by utils/update_llc_test_checks.py
; RUN: llc < %s -mtriple=x86_64-unknown-unknown -mcpu=skylake-avx512 -mattr=prefer-256-bit | FileCheck %s --check-prefixes=CHECK,CHECK-AVX512
; RUN: llc < %s -mtriple=x86_64-unknown-unknown -mcpu=skylake-avx512 -mattr=prefer-256-bit,avx512vbmi | FileCheck %s --check-prefixes=CHECK,CHECK-VBMI
; Make sure CPUs default to prefer-256-bit. avx512vnni isn't interesting as it just adds an isel peephole for vpmaddwd+vpaddd
; RUN: llc < %s -mtriple=x86_64-unknown-unknown -mcpu=skylake-avx512 | FileCheck %s --check-prefixes=CHECK,CHECK-AVX512
; RUN: llc < %s -mtriple=x86_64-unknown-unknown -mattr=-avx512vnni -mcpu=cascadelake | FileCheck %s --check-prefixes=CHECK,CHECK-AVX512
; RUN: llc < %s -mtriple=x86_64-unknown-unknown -mattr=-avx512vnni -mcpu=cooperlake | FileCheck %s --check-prefixes=CHECK,CHECK-AVX512
; RUN: llc < %s -mtriple=x86_64-unknown-unknown -mcpu=cannonlake | FileCheck %s --check-prefixes=CHECK,CHECK-VBMI
;
 RUN: llc < %s -mtriple=x86_64-unknown-unknown -mattr=-avx512vnni -mcpu=icelake-client | FileCheck %s --check-prefixes=CHECK,CHECK-VBMI
; RUN: llc < %s -mtriple=x86_64-unknown-unknown -mattr=-avx512vnni -mcpu=icelake-server | FileCheck %s --check-prefixes=CHECK,CHECK-VBMI
; RUN: llc < %s -mtriple=x86_64-unknown-unknown -mattr=-avx512vnni -mcpu=tigerlake | FileCheck %s --check-prefixes=CHECK,CHECK-VBMI

```
; This file primarily contains tests for specific places in X86ISelLowering.cpp that needed be made aware of the
legalizer not allowing 512-bit vectors due to prefer-256-bit even though AVX512 is enabled.

define dso_local void @add256(<16 x i32>* %a, <16 x i32>* %b, <16 x i32>* %c) "min-legal-vector-
width"="256" {
; CHECK-LABEL: add256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-NEXT:    vpaddd 32(%rsi), %ymm1, %ymm1
; CHECK-NEXT:    vpaddd (%rsi), %ymm0, %ymm0
; CHECK-NEXT:    vmovdqa %ymm0, (%rdx)
; CHECK-NEXT:
 vmovdqa %ymm1, 32(%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %d = load <16 x i32>, <16 x i32>* %a
 %e = load <16 x i32>, <16 x i32>* %b
 %f = add <16 x i32> %d, %e
 store <16 x i32> %f, <16 x i32>* %c
 ret void
}

define dso_local void @add512(<16 x i32>* %a, <16 x i32>* %b, <16 x i32>* %c) "min-legal-vector-
width"="512" {
; CHECK-LABEL: add512:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa64 (%rdi), %zmm0
; CHECK-NEXT:    vpaddd (%rsi), %zmm0, %zmm0
; CHECK-NEXT:    vmovdqa64 %zmm0, (%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %d = load <16 x i32>, <16 x i32>* %a
 %e = load <16 x i32>, <16 x i32>* %b
 %f = add <16 x i32> %d, %e
 store <16 x i32> %f, <16 x i32>* %c
 ret void
}

define dso_local void @avg_v64i8_256(<64 x i8>* %a, <64 x i8>* %b) "min-legal-vector-width"="256" {
; CHECK-LABEL: avg_v64i8_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rsi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rsi), %ymm1
; CHECK-NEXT:    vpavgb (%rdi), %ymm0,
 %ymm0
; CHECK-NEXT:    vpavgb 32(%rdi), %ymm1, %ymm1
```

```
; CHECK-NEXT:    vmovdqu %ymm1, (%rax)
; CHECK-NEXT:    vmovdqu %ymm0, (%rax)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %1 = load <64 x i8>, <64 x i8>* %a
 %2 = load <64 x i8>, <64 x i8>* %b
 %3 = zext <64 x i8> %1 to <64 x i32>
 %4 = zext <64 x i8> %2 to <64 x i32>
 %5 = add nuw nsw <64 x i32> %3, <i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1,
i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32
1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1,
i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1>
 %6 = add nuw nsw <64 x i32> %5, %4
 %7 = lshr <64 x i32> %6, <i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1,
i32 1, i32 1, i32 1,
 i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1,
i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32
1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1>
 %8 = trunc <64 x i32> %7 to <64 x i8>
 store <64 x i8> %8, <64 x i8>* undef, align 4
 ret void
}


define dso_local void @avg_v64i8_512(<64 x i8>* %a, <64 x i8>* %b) "min-legal-vector-width"="512" {
; CHECK-LABEL: avg_v64i8_512:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa64 (%rdi), %zmm0
; CHECK-NEXT:    vpavgb (%rsi), %zmm0, %zmm0
; CHECK-NEXT:    vmovdqu64 %zmm0, (%rax)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %1 = load <64 x i8>, <64 x i8>* %a
 %2 = load <64 x i8>, <64 x i8>* %b
 %3 = zext <64 x i8> %1 to <64 x i32>
 %4 = zext <64 x i8> %2 to <64 x i32>
 %5 = add nuw nsw <64 x i32> %3, <i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32
 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1,
i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32
1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1,
i32 1>
 %6 = add nuw nsw <64 x i32> %5, %4
 %7 = lshr <64 x i32> %6, <i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1,
i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32
1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1,
i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1, i32 1>
 %8 = trunc <64 x i32> %7 to <64 x i8>
 store <64 x i8> %8, <64 x i8>* undef, align 4
```

```
  ret void
}

define dso_local void @pmaddwd_32_256(<32 x i16>* %APtr, <32 x i16>* %BPtr, <16 x i32>* %CPtr) "min-
legal-vector-width"="256" {
; CHECK-LABEL: pmaddwd_32_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-NEXT:    vpmaddwd 32(%rsi), %ymm1, %ymm1
; CHECK-NEXT:    vpmaddwd (%rsi), %ymm0, %ymm0
; CHECK-NEXT:    vmovdqa %ymm0, (%rdx)
; CHECK-NEXT:    vmovdqa %ymm1, 32(%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
  %A = load <32 x i16>, <32 x i16>* %APtr
  %B = load <32 x i16>, <32 x i16>* %BPtr
  %a = sext <32 x i16> %A to <32 x i32>
  %b = sext <32 x i16> %B to <32 x i32>
  %m = mul nsw <32 x i32> %a, %b
  %odd = shufflevector <32 x i32> %m, <32 x i32> undef, <16 x i32> <i32 0, i32 2, i32 4, i32 6, i32 8, i32 10, i32
12, i32 14, i32 16, i32 18, i32 20, i32 22, i32 24, i32 26, i32 28, i32 30>
  %even = shufflevector <32 x i32> %m, <32 x i32> undef, <16 x i32> <i32 1, i32 3, i32 5, i32 7, i32 9,
 i32 11, i32 13, i32 15, i32 17, i32 19, i32 21, i32 23, i32 25, i32 27, i32 29, i32 31>
  %ret = add <16 x i32> %odd, %even
  store <16 x i32> %ret, <16 x i32>* %CPtr
  ret void
}

define dso_local void @pmaddwd_32_512(<32 x i16>* %APtr, <32 x i16>* %BPtr, <16 x i32>* %CPtr) "min-
legal-vector-width"="512" {
; CHECK-LABEL: pmaddwd_32_512:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa64 (%rdi), %zmm0
; CHECK-NEXT:    vpmaddwd (%rsi), %zmm0, %zmm0
; CHECK-NEXT:    vmovdqa64 %zmm0, (%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
  %A = load <32 x i16>, <32 x i16>* %APtr
  %B = load <32 x i16>, <32 x i16>* %BPtr
  %a = sext <32 x i16> %A to <32 x i32>
  %b = sext <32 x i16> %B to <32 x i32>
  %m = mul nsw <32 x i32> %a, %b
  %odd = shufflevector <32 x i32> %m, <32 x i32> undef, <16 x i32> <i32 0, i32 2, i32 4, i32 6, i32 8, i32 10, i32
12, i32 14, i32 16, i32 18, i32 20, i32 22, i32 24, i32 26, i32 28, i32 30>
  %even = shufflevector <32 x i32> %m, <32 x i32> undef, <16
 x i32> <i32 1, i32 3, i32 5, i32 7, i32 9, i32 11, i32 13, i32 15, i32 17, i32 19, i32 21, i32 23, i32 25, i32 27, i32 29,
i32 31>
```

```
  %ret = add <16 x i32> %odd, %even
  store <16 x i32> %ret, <16 x i32>* %CPtr
  ret void
}

define dso_local void @psubus_64i8_max_256(<64 x i8>* %xptr, <64 x i8>* %yptr, <64 x i8>* %zptr) "min-legal-vector-width"="256" {
; CHECK-LABEL: psubus_64i8_max_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-NEXT:    vpsubusb 32(%rsi), %ymm1, %ymm1
; CHECK-NEXT:    vpsubusb (%rsi), %ymm0, %ymm0
; CHECK-NEXT:    vmovdqa %ymm0, (%rdx)
; CHECK-NEXT:    vmovdqa %ymm1, 32(%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %x = load <64 x i8>, <64 x i8>* %xptr
 %y = load <64 x i8>, <64 x i8>* %yptr
 %cmp = icmp ult <64 x i8> %x, %y
 %max = select <64 x i1> %cmp, <64 x i8> %y, <64 x i8> %x
 %res = sub <64 x i8> %max, %y
 store <64 x i8> %res, <64 x i8>* %zptr
 ret void
}

define dso_local
 void @psubus_64i8_max_512(<64 x i8>* %xptr, <64 x i8>* %yptr, <64 x i8>* %zptr) "min-legal-vector-width"="512" {
; CHECK-LABEL: psubus_64i8_max_512:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa64 (%rdi), %zmm0
; CHECK-NEXT:    vpsubusb (%rsi), %zmm0, %zmm0
; CHECK-NEXT:    vmovdqa64 %zmm0, (%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %x = load <64 x i8>, <64 x i8>* %xptr
 %y = load <64 x i8>, <64 x i8>* %yptr
 %cmp = icmp ult <64 x i8> %x, %y
 %max = select <64 x i1> %cmp, <64 x i8> %y, <64 x i8> %x
 %res = sub <64 x i8> %max, %y
 store <64 x i8> %res, <64 x i8>* %zptr
 ret void
}

define dso_local i32 @_Z9test_charPcS_i_256(i8* nocapture readonly, i8* nocapture readonly, i32) "min-legal-vector-width"="256" {
; CHECK-LABEL: _Z9test_charPcS_i_256:
```

```
; CHECK:       # %bb.0: # %entry
; CHECK-NEXT:    movl %edx, %eax
; CHECK-NEXT:    vpxor %xmm0, %xmm0, %xmm0
; CHECK-NEXT:    xorl %ecx, %ecx
; CHECK-NEXT:    vpxor %xmm1, %xmm1, %xmm1
; CHECK-NEXT:    vpxor %xmm2,
 %xmm2, %xmm2
; CHECK-NEXT:    .p2align 4, 0x90
; CHECK-NEXT:  .LBB8_1: # %vector.body
; CHECK-NEXT:    # =>This Inner Loop Header: Depth=1
; CHECK-NEXT:    vpmovsxbw 16(%rdi,%rcx), %ymm3
; CHECK-NEXT:    vpmovsxbw (%rdi,%rcx), %ymm4
; CHECK-NEXT:    vpmovsxbw 16(%rsi,%rcx), %ymm5
; CHECK-NEXT:    vpmaddwd %ymm3, %ymm5, %ymm3
; CHECK-NEXT:    vpaddd %ymm2, %ymm3, %ymm2
; CHECK-NEXT:    vpmovsxbw (%rsi,%rcx), %ymm3
; CHECK-NEXT:    vpmaddwd %ymm4, %ymm3, %ymm3
; CHECK-NEXT:    vpaddd %ymm1, %ymm3, %ymm1
; CHECK-NEXT:    addq $32, %rcx
; CHECK-NEXT:    cmpq %rcx, %rax
; CHECK-NEXT:    jne .LBB8_1
; CHECK-NEXT:  # %bb.2: # %middle.block
; CHECK-NEXT:    vpaddd %ymm0, %ymm1, %ymm1
; CHECK-NEXT:    vpaddd %ymm0, %ymm2, %ymm0
; CHECK-NEXT:    vpaddd %ymm0, %ymm1, %ymm0
; CHECK-NEXT:    vextracti128 $1, %ymm0, %xmm1
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vpshufd {{.*#+}} xmm1 = xmm0[2,3,2,3]
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vpshufd {{.*#+}} xmm1
 = xmm0[1,1,1,1]
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vmovd %xmm0, %eax
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
entry:
 %3 = zext i32 %2 to i64
 br label %vector.body

vector.body:
 %index = phi i64 [ %index.next, %vector.body ], [ 0, %entry ]
 %vec.phi = phi <32 x i32> [ %11, %vector.body ], [ zeroinitializer, %entry ]
 %4 = getelementptr inbounds i8, i8* %0, i64 %index
 %5 = bitcast i8* %4 to <32 x i8>*
 %wide.load = load <32 x i8>, <32 x i8>* %5, align 1
 %6 = sext <32 x i8> %wide.load to <32 x i32>
 %7 = getelementptr inbounds i8, i8* %1, i64 %index
 %8 = bitcast i8* %7 to <32 x i8>*
```

```
 %wide.load14 = load <32 x i8>, <32 x i8>* %8, align 1
 %9 = sext <32 x i8> %wide.load14 to <32 x i32>
 %10 = mul nsw <32 x i32> %9, %6
 %11 = add nsw <32 x i32> %10, %vec.phi
 %index.next = add i64 %index, 32
 %12 = icmp eq i64 %index.next, %3
 br i1 %12, label %middle.block, label %vector.body

middle.block:
 %rdx.shuf1 = shufflevector <32 x i32> %11,
 <32 x i32> undef, <32 x i32> <i32 16, i32 17, i32 18, i32 19, i32 20, i32 21, i32 22, i32 23, i32 24, i32 25, i32 26,
i32 27, i32 28, i32 29, i32 30, i32 31, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx1 = add <32 x i32> %11, %rdx.shuf1
 %rdx.shuf = shufflevector <32 x i32> %bin.rdx1, <32 x i32> undef, <32 x i32> <i32 8, i32 9, i32 10, i32 11, i32
12, i32 13, i32 14, i32 15, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx = add <32 x i32> %bin.rdx1, %rdx.shuf
 %rdx.shuf15 = shufflevector <32 x i32> %bin.rdx, <32 x i32> undef, <32 x i32> <i32 4, i32 5, i32 6, i32 7, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef,
 i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef>
 %bin.rdx32 = add <32 x i32> %bin.rdx, %rdx.shuf15
 %rdx.shuf17 = shufflevector <32 x i32> %bin.rdx32, <32 x i32> undef, <32 x i32> <i32 2, i32 3, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx18 = add <32 x i32> %bin.rdx32, %rdx.shuf17
 %rdx.shuf19 = shufflevector <32 x i32> %bin.rdx18, <32 x i32> undef, <32 x i32> <i32 1, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx20 = add <32 x i32> %bin.rdx18, %rdx.shuf19
 %13 = extractelement <32 x i32> %bin.rdx20, i32 0
 ret i32 %13
}

define dso_local i32 @_Z9test_charPcS_i_512(i8* nocapture readonly, i8* nocapture readonly, i32) "min-legal-
vector-width"="512" {
; CHECK-LABEL: _Z9test_charPcS_i_512:
; CHECK:       # %bb.0: # %entry
; CHECK-NEXT:    movl %edx, %eax
; CHECK-NEXT:    vpxor %xmm0, %xmm0, %xmm0
; CHECK-NEXT:    xorl %ecx, %ecx
; CHECK-NEXT:    vpxor %xmm1, %xmm1, %xmm1
; CHECK-NEXT:    .p2align 4, 0x90
```

```
; CHECK-NEXT:  .LBB9_1: # %vector.body
; CHECK-NEXT:    # =>This Inner Loop Header: Depth=1
; CHECK-NEXT:    vpmovsxbw (%rdi,%rcx), %zmm2
; CHECK-NEXT:    vpmovsxbw (%rsi,%rcx), %zmm3
; CHECK-NEXT:    vpmaddwd %zmm2, %zmm3, %zmm2
; CHECK-NEXT:    vpaddd %zmm1, %zmm2, %zmm1
;
 CHECK-NEXT:    addq $32, %rcx
; CHECK-NEXT:    cmpq %rcx, %rax
; CHECK-NEXT:    jne .LBB9_1
; CHECK-NEXT:  # %bb.2: # %middle.block
; CHECK-NEXT:    vpaddd %zmm0, %zmm1, %zmm0
; CHECK-NEXT:    vextracti64x4 $1, %zmm0, %ymm1
; CHECK-NEXT:    vpaddd %zmm1, %zmm0, %zmm0
; CHECK-NEXT:    vextracti128 $1, %ymm0, %xmm1
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vpshufd {{.*#+}} xmm1 = xmm0[2,3,2,3]
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vpshufd {{.*#+}} xmm1 = xmm0[1,1,1,1]
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vmovd %xmm0, %eax
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
entry:
 %3 = zext i32 %2 to i64
 br label %vector.body

vector.body:
 %index = phi i64 [ %index.next, %vector.body ], [ 0, %entry ]
 %vec.phi = phi <32 x i32> [ %11, %vector.body ], [ zeroinitializer, %entry ]
 %4 = getelementptr inbounds i8, i8* %0, i64 %index
 %5 = bitcast i8* %4 to <32 x i8>*
 %wide.load = load <32 x i8>, <32 x i8>* %5, align
 1
 %6 = sext <32 x i8> %wide.load to <32 x i32>
 %7 = getelementptr inbounds i8, i8* %1, i64 %index
 %8 = bitcast i8* %7 to <32 x i8>*
 %wide.load14 = load <32 x i8>, <32 x i8>* %8, align 1
 %9 = sext <32 x i8> %wide.load14 to <32 x i32>
 %10 = mul nsw <32 x i32> %9, %6
 %11 = add nsw <32 x i32> %10, %vec.phi
 %index.next = add i64 %index, 32
 %12 = icmp eq i64 %index.next, %3
 br i1 %12, label %middle.block, label %vector.body

middle.block:
 %rdx.shuf1 = shufflevector <32 x i32> %11, <32 x i32> undef, <32 x i32> <i32 16, i32 17, i32 18, i32 19, i32 20,
i32 21, i32 22, i32 23, i32 24, i32 25, i32 26, i32 27, i32 28, i32 29, i32 30, i32 31, i32 undef, i32 undef, i32 undef,
```

```
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef>
 %bin.rdx1 = add <32 x i32> %11, %rdx.shuf1
 %rdx.shuf = shufflevector <32 x i32> %bin.rdx1, <32 x i32> undef, <32 x i32> <i32 8, i32 9, i32 10, i32 11, i32
12,
 i32 13, i32 14, i32 15, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx = add <32 x i32> %bin.rdx1, %rdx.shuf
 %rdx.shuf15 = shufflevector <32 x i32> %bin.rdx, <32 x i32> undef, <32 x i32> <i32 4, i32 5, i32 6, i32 7, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx32 = add <32 x i32> %bin.rdx, %rdx.shuf15
 %rdx.shuf17 = shufflevector <32 x i32> %bin.rdx32, <32 x i32> undef, <32 x i32> <i32 2, i32 3, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
 i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx18 = add <32 x i32> %bin.rdx32, %rdx.shuf17
 %rdx.shuf19 = shufflevector <32 x i32> %bin.rdx18, <32 x i32> undef, <32 x i32> <i32 1, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx20 = add <32 x i32> %bin.rdx18, %rdx.shuf19
 %13 = extractelement <32 x i32> %bin.rdx20, i32 0
 ret i32 %13
}

@a = dso_local global [1024 x i8] zeroinitializer, align 16
@b = dso_local global [1024 x i8] zeroinitializer, align 16

define dso_local i32 @sad_16i8_256()
 "min-legal-vector-width"="256" {
; CHECK-LABEL: sad_16i8_256:
; CHECK:       # %bb.0: # %entry
; CHECK-NEXT:    vpxor %xmm0, %xmm0, %xmm0
; CHECK-NEXT:    movq $-1024, %rax # imm = 0xFC00
; CHECK-NEXT:    vpxor %xmm1, %xmm1, %xmm1
; CHECK-NEXT:    .p2align 4, 0x90
; CHECK-NEXT:  .LBB10_1: # %vector.body
; CHECK-NEXT:    # =>This Inner Loop Header: Depth=1
; CHECK-NEXT:    vmovdqu a+1024(%rax), %xmm2
; CHECK-NEXT:    vpsadbw b+1024(%rax), %xmm2, %xmm2
; CHECK-NEXT:    vpaddd %ymm1, %ymm2, %ymm1
; CHECK-NEXT:    addq $4, %rax
; CHECK-NEXT:    jne .LBB10_1
; CHECK-NEXT:  # %bb.2: # %middle.block
; CHECK-NEXT:    vpaddd %ymm0, %ymm1, %ymm0
```

```
; CHECK-NEXT:    vextracti128 $1, %ymm0, %xmm1
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vpshufd {{.*#+}} xmm1 = xmm0[2,3,2,3]
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vpshufd {{.*#+}} xmm1 = xmm0[1,1,1,1]
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vmovd %xmm0, %eax
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:
    retq
entry:
 br label %vector.body

vector.body:
 %index = phi i64 [ 0, %entry ], [ %index.next, %vector.body ]
 %vec.phi = phi <16 x i32> [ zeroinitializer, %entry ], [ %10, %vector.body ]
 %0 = getelementptr inbounds [1024 x i8], [1024 x i8]* @a, i64 0, i64 %index
 %1 = bitcast i8* %0 to <16 x i8>*
 %wide.load = load <16 x i8>, <16 x i8>* %1, align 4
 %2 = zext <16 x i8> %wide.load to <16 x i32>
 %3 = getelementptr inbounds [1024 x i8], [1024 x i8]* @b, i64 0, i64 %index
 %4 = bitcast i8* %3 to <16 x i8>*
 %wide.load1 = load <16 x i8>, <16 x i8>* %4, align 4
 %5 = zext <16 x i8> %wide.load1 to <16 x i32>
 %6 = sub nsw <16 x i32> %2, %5
 %7 = icmp sgt <16 x i32> %6, <i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -
1, i32 -1, i32 -1, i32 -1, i32 -1>
 %8 = sub nsw <16 x i32> zeroinitializer, %6
 %9 = select <16 x i1> %7, <16 x i32> %6, <16 x i32> %8
 %10 = add nsw <16 x i32> %9, %vec.phi
 %index.next = add i64 %index,
 4
 %11 = icmp eq i64 %index.next, 1024
 br i1 %11, label %middle.block, label %vector.body

middle.block:
 %rdx.shuf = shufflevector <16 x i32> %10, <16 x i32> undef, <16 x i32> <i32 8, i32 9, i32 10, i32 11, i32 12, i32
13, i32 14, i32 15, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx = add <16 x i32> %10, %rdx.shuf
 %rdx.shuf2 = shufflevector <16 x i32> %bin.rdx, <16 x i32> undef, <16 x i32> <i32 4, i32 5, i32 6, i32 7, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef>
 %bin.rdx2 = add <16 x i32> %bin.rdx, %rdx.shuf2
 %rdx.shuf3 = shufflevector <16 x i32> %bin.rdx2, <16 x i32> undef, <16 x i32> <i32 2, i32 3, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef>
 %bin.rdx3 = add <16 x i32> %bin.rdx2, %rdx.shuf3
 %rdx.shuf4 = shufflevector
```

```
 <16 x i32> %bin.rdx3, <16 x i32> undef, <16 x i32> <i32 1, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx4 = add <16 x i32> %bin.rdx3, %rdx.shuf4
 %12 = extractelement <16 x i32> %bin.rdx4, i32 0
 ret i32 %12
}

define dso_local i32 @sad_16i8_512() "min-legal-vector-width"="512" {
; CHECK-LABEL: sad_16i8_512:
; CHECK:       # %bb.0: # %entry
; CHECK-NEXT:    vpxor %xmm0, %xmm0, %xmm0
; CHECK-NEXT:    movq $-1024, %rax # imm = 0xFC00
; CHECK-NEXT:    .p2align 4, 0x90
; CHECK-NEXT:  .LBB11_1: # %vector.body
; CHECK-NEXT:    # =>This Inner Loop Header: Depth=1
; CHECK-NEXT:    vmovdqu a+1024(%rax), %xmm1
; CHECK-NEXT:    vpsadbw b+1024(%rax), %xmm1, %xmm1
; CHECK-NEXT:    vpaddd %zmm0, %zmm1, %zmm0
; CHECK-NEXT:    addq $4, %rax
; CHECK-NEXT:    jne .LBB11_1
; CHECK-NEXT:  # %bb.2: # %middle.block
; CHECK-NEXT:    vextracti64x4 $1, %zmm0, %ymm1
; CHECK-NEXT:
   vpaddd %zmm1, %zmm0, %zmm0
; CHECK-NEXT:    vextracti128 $1, %ymm0, %xmm1
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vpshufd {{.*#+}} xmm1 = xmm0[2,3,2,3]
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vpshufd {{.*#+}} xmm1 = xmm0[1,1,1,1]
; CHECK-NEXT:    vpaddd %xmm1, %xmm0, %xmm0
; CHECK-NEXT:    vmovd %xmm0, %eax
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
entry:
 br label %vector.body

vector.body:
 %index = phi i64 [ 0, %entry ], [ %index.next, %vector.body ]
 %vec.phi = phi <16 x i32> [ zeroinitializer, %entry ], [ %10, %vector.body ]
 %0 = getelementptr inbounds [1024 x i8], [1024 x i8]* @a, i64 0, i64 %index
 %1 = bitcast i8* %0 to <16 x i8>*
 %wide.load = load <16 x i8>, <16 x i8>* %1, align 4
 %2 = zext <16 x i8> %wide.load to <16 x i32>
 %3 = getelementptr inbounds [1024 x i8], [1024 x i8]* @b, i64 0, i64 %index
 %4 = bitcast i8* %3 to <16 x i8>*
 %wide.load1 = load <16 x i8>, <16 x i8>* %4, align 4
 %5 = zext <16 x i8> %wide.load1
```

```
 to <16 x i32>
 %6 = sub nsw <16 x i32> %2, %5
 %7 = icmp sgt <16 x i32> %6, <i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -1, i32 -
1, i32 -1, i32 -1, i32 -1, i32 -1>
 %8 = sub nsw <16 x i32> zeroinitializer, %6
 %9 = select <16 x i1> %7, <16 x i32> %6, <16 x i32> %8
 %10 = add nsw <16 x i32> %9, %vec.phi
 %index.next = add i64 %index, 4
 %11 = icmp eq i64 %index.next, 1024
 br i1 %11, label %middle.block, label %vector.body

middle.block:
 %rdx.shuf = shufflevector <16 x i32> %10, <16 x i32> undef, <16 x i32> <i32 8, i32 9, i32 10, i32 11, i32 12, i32
13, i32 14, i32 15, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef>
 %bin.rdx = add <16 x i32> %10, %rdx.shuf
 %rdx.shuf2 = shufflevector <16 x i32> %bin.rdx, <16 x i32> undef, <16 x i32> <i32 4, i32 5, i32 6, i32 7, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef>
  %bin.rdx2 = add <16 x i32> %bin.rdx, %rdx.shuf2
 %rdx.shuf3 = shufflevector <16 x i32> %bin.rdx2, <16 x i32> undef, <16 x i32> <i32 2, i32 3, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef>
 %bin.rdx3 = add <16 x i32> %bin.rdx2, %rdx.shuf3
 %rdx.shuf4 = shufflevector <16 x i32> %bin.rdx3, <16 x i32> undef, <16 x i32> <i32 1, i32 undef, i32 undef, i32
undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef, i32 undef,
i32 undef, i32 undef>
 %bin.rdx4 = add <16 x i32> %bin.rdx3, %rdx.shuf4
 %12 = extractelement <16 x i32> %bin.rdx4, i32 0
 ret i32 %12
}

define dso_local void @sbto16f32_256(<16 x i16> %a, <16 x float>* %res) "min-legal-vector-width"="256" {
; CHECK-LABEL: sbto16f32_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpmovw2m %ymm0, %k0
; CHECK-NEXT:    kshiftrw $8, %k0, %k1
; CHECK-NEXT:    vpmovm2d %k1, %ymm0
;
 CHECK-NEXT:    vcvtdq2ps %ymm0, %ymm0
; CHECK-NEXT:    vpmovm2d %k0, %ymm1
; CHECK-NEXT:    vcvtdq2ps %ymm1, %ymm1
; CHECK-NEXT:    vmovaps %ymm1, (%rdi)
; CHECK-NEXT:    vmovaps %ymm0, 32(%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %mask = icmp slt <16 x i16> %a, zeroinitializer
 %1 = sitofp <16 x i1> %mask to <16 x float>
 store <16 x float> %1, <16 x float>* %res
```

```
 ret void
}

define dso_local void @sbto16f32_512(<16 x i16> %a, <16 x float>* %res) "min-legal-vector-width"="512" {
; CHECK-LABEL: sbto16f32_512:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpmovw2m %ymm0, %k0
; CHECK-NEXT:    vpmovm2d %k0, %zmm0
; CHECK-NEXT:    vcvtdq2ps %zmm0, %zmm0
; CHECK-NEXT:    vmovaps %zmm0, (%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %mask = icmp slt <16 x i16> %a, zeroinitializer
 %1 = sitofp <16 x i1> %mask to <16 x float>
 store <16 x float> %1, <16 x float>* %res
 ret void
}

define dso_local void @sbto16f64_256(<16 x i16> %a, <16 x double>* %res)  "min-legal-vector-width"="256"
 {
; CHECK-LABEL: sbto16f64_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpmovw2m %ymm0, %k0
; CHECK-NEXT:    kshiftrw $8, %k0, %k1
; CHECK-NEXT:    vpmovm2d %k1, %ymm0
; CHECK-NEXT:    vcvtdq2pd %xmm0, %ymm1
; CHECK-NEXT:    vextracti128 $1, %ymm0, %xmm0
; CHECK-NEXT:    vcvtdq2pd %xmm0, %ymm0
; CHECK-NEXT:    vpmovm2d %k0, %ymm2
; CHECK-NEXT:    vcvtdq2pd %xmm2, %ymm3
; CHECK-NEXT:    vextracti128 $1, %ymm2, %xmm2
; CHECK-NEXT:    vcvtdq2pd %xmm2, %ymm2
; CHECK-NEXT:    vmovaps %ymm2, 32(%rdi)
; CHECK-NEXT:    vmovaps %ymm3, (%rdi)
; CHECK-NEXT:    vmovaps %ymm0, 96(%rdi)
; CHECK-NEXT:    vmovaps %ymm1, 64(%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %mask = icmp slt <16 x i16> %a, zeroinitializer
 %1 = sitofp <16 x i1> %mask to <16 x double>
 store <16 x double> %1, <16 x double>* %res
 ret void
}

define dso_local void @sbto16f64_512(<16 x i16> %a, <16 x double>* %res)  "min-legal-vector-width"="512" {
; CHECK-LABEL: sbto16f64_512:
; CHECK:
```

```
  # %bb.0:
; CHECK-NEXT:    vpmovw2m %ymm0, %k0
; CHECK-NEXT:    vpmovm2d %k0, %zmm0
; CHECK-NEXT:    vcvtdq2pd %ymm0, %zmm1
; CHECK-NEXT:    vextracti64x4 $1, %zmm0, %ymm0
; CHECK-NEXT:    vcvtdq2pd %ymm0, %zmm0
; CHECK-NEXT:    vmovaps %zmm0, 64(%rdi)
; CHECK-NEXT:    vmovaps %zmm1, (%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %mask = icmp slt <16 x i16> %a, zeroinitializer
 %1 = sitofp <16 x i1> %mask to <16 x double>
 store <16 x double> %1, <16 x double>* %res
 ret void
}

define dso_local void @ubto16f32_256(<16 x i16> %a, <16 x float>* %res) "min-legal-vector-width"="256" {
; CHECK-LABEL: ubto16f32_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpmovw2m %ymm0, %k0
; CHECK-NEXT:    kshiftrw $8, %k0, %k1
; CHECK-NEXT:    vpmovm2d %k1, %ymm0
; CHECK-NEXT:    vpsrld $31, %ymm0, %ymm0
; CHECK-NEXT:    vcvtdq2ps %ymm0, %ymm0
; CHECK-NEXT:    vpmovm2d %k0, %ymm1
; CHECK-NEXT:    vpsrld $31, %ymm1, %ymm1
; CHECK-NEXT:    vcvtdq2ps %ymm1, %ymm1
; CHECK-NEXT:    vmovaps %ymm1,
 (%rdi)
; CHECK-NEXT:    vmovaps %ymm0, 32(%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %mask = icmp slt <16 x i16> %a, zeroinitializer
 %1 = uitofp <16 x i1> %mask to <16 x float>
 store <16 x float> %1, <16 x float>* %res
 ret void
}

define dso_local void @ubto16f32_512(<16 x i16> %a, <16 x float>* %res) "min-legal-vector-width"="512" {
; CHECK-LABEL: ubto16f32_512:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpmovw2m %ymm0, %k0
; CHECK-NEXT:    vpmovm2d %k0, %zmm0
; CHECK-NEXT:    vpsrld $31, %zmm0, %zmm0
; CHECK-NEXT:    vcvtdq2ps %zmm0, %zmm0
; CHECK-NEXT:    vmovaps %zmm0, (%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
```

```
 %mask = icmp slt <16 x i16> %a, zeroinitializer
 %1 = uitofp <16 x i1> %mask to <16 x float>
 store <16 x float> %1, <16 x float>* %res
 ret void
}

define dso_local void @ubto16f64_256(<16 x i16> %a, <16 x double>* %res) "min-legal-vector-width"="256" {
; CHECK-LABEL: ubto16f64_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpmovw2m
 %ymm0, %k0
; CHECK-NEXT:    kshiftrw $8, %k0, %k1
; CHECK-NEXT:    vpmovm2d %k1, %ymm0
; CHECK-NEXT:    vpsrld $31, %ymm0, %ymm0
; CHECK-NEXT:    vcvtdq2pd %xmm0, %ymm1
; CHECK-NEXT:    vextracti128 $1, %ymm0, %xmm0
; CHECK-NEXT:    vcvtdq2pd %xmm0, %ymm0
; CHECK-NEXT:    vpmovm2d %k0, %ymm2
; CHECK-NEXT:    vpsrld $31, %ymm2, %ymm2
; CHECK-NEXT:    vcvtdq2pd %xmm2, %ymm3
; CHECK-NEXT:    vextracti128 $1, %ymm2, %xmm2
; CHECK-NEXT:    vcvtdq2pd %xmm2, %ymm2
; CHECK-NEXT:    vmovaps %ymm2, 32(%rdi)
; CHECK-NEXT:    vmovaps %ymm3, (%rdi)
; CHECK-NEXT:    vmovaps %ymm0, 96(%rdi)
; CHECK-NEXT:    vmovaps %ymm1, 64(%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %mask = icmp slt <16 x i16> %a, zeroinitializer
 %1 = uitofp <16 x i1> %mask to <16 x double>
 store <16 x double> %1, <16 x double>* %res
 ret void
}

define dso_local void @ubto16f64_512(<16 x i16> %a, <16 x double>* %res) "min-legal-vector-width"="512" {
; CHECK-LABEL: ubto16f64_512:
; CHECK:       # %bb.0:
; CHECK-NEXT:
   vpmovw2m %ymm0, %k0
; CHECK-NEXT:    vpmovm2d %k0, %zmm0
; CHECK-NEXT:    vpsrld $31, %zmm0, %zmm0
; CHECK-NEXT:    vcvtdq2pd %ymm0, %zmm1
; CHECK-NEXT:    vextracti64x4 $1, %zmm0, %ymm0
; CHECK-NEXT:    vcvtdq2pd %ymm0, %zmm0
; CHECK-NEXT:    vmovaps %zmm0, 64(%rdi)
; CHECK-NEXT:    vmovaps %zmm1, (%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
```

```
 %mask = icmp slt <16 x i16> %a, zeroinitializer
 %1 = uitofp <16 x i1> %mask to <16 x double>
 store <16 x double> %1, <16 x double>* %res
 ret void
}

define <16 x i16> @test_16f32toub_256(<16 x float>* %ptr, <16 x i16> %passthru) "min-legal-vector-
width"="256" {
; CHECK-LABEL: test_16f32toub_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vcvttps2dq (%rdi), %ymm1
; CHECK-NEXT:    vpslld $31, %ymm1, %ymm1
; CHECK-NEXT:    vpmovd2m %ymm1, %k0
; CHECK-NEXT:    vcvttps2dq 32(%rdi), %ymm1
; CHECK-NEXT:    vpslld $31, %ymm1, %ymm1
; CHECK-NEXT:    vpmovd2m %ymm1, %k1
; CHECK-NEXT:    kunpckbw %k0, %k1, %k1
; CHECK-NEXT:    vmovdqu16
 %ymm0, %ymm0 {%k1} {z}
; CHECK-NEXT:    retq
 %a = load <16 x float>, <16 x float>* %ptr
 %mask = fptoui <16 x float> %a to <16 x i1>
 %select = select <16 x i1> %mask, <16 x i16> %passthru, <16 x i16> zeroinitializer
 ret <16 x i16> %select
}

define <16 x i16> @test_16f32toub_512(<16 x float>* %ptr, <16 x i16> %passthru) "min-legal-vector-
width"="512" {
; CHECK-LABEL: test_16f32toub_512:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vcvttps2dq (%rdi), %zmm1
; CHECK-NEXT:    vpslld $31, %zmm1, %zmm1
; CHECK-NEXT:    vpmovd2m %zmm1, %k1
; CHECK-NEXT:    vmovdqu16 %ymm0, %ymm0 {%k1} {z}
; CHECK-NEXT:    retq
 %a = load <16 x float>, <16 x float>* %ptr
 %mask = fptoui <16 x float> %a to <16 x i1>
 %select = select <16 x i1> %mask, <16 x i16> %passthru, <16 x i16> zeroinitializer
 ret <16 x i16> %select
}

define <16 x i16> @test_16f32tosb_256(<16 x float>* %ptr, <16 x i16> %passthru) "min-legal-vector-
width"="256" {
; CHECK-LABEL: test_16f32tosb_256:
; CHECK:       # %bb.0:
; CHECK-NEXT:
   vcvttps2dq (%rdi), %ymm1
; CHECK-NEXT:    vpmovd2m %ymm1, %k0
```

```
; CHECK-NEXT:    vcvttps2dq 32(%rdi), %ymm1
; CHECK-NEXT:    vpmovd2m %ymm1, %k1
; CHECK-NEXT:    kunpckbw %k0, %k1, %k1
; CHECK-NEXT:    vmovdqu16 %ymm0, %ymm0 {%k1} {z}
; CHECK-NEXT:    retq
 %a = load <16 x float>, <16 x float>* %ptr
 %mask = fptosi <16 x float> %a to <16 x i1>
 %select = select <16 x i1> %mask, <16 x i16> %passthru, <16 x i16> zeroinitializer
 ret <16 x i16> %select
}

define <16 x i16> @test_16f32tosb_512(<16 x float>* %ptr, <16 x i16> %passthru) "min-legal-vector-
width"="512" {
; CHECK-LABEL: test_16f32tosb_512:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vcvttps2dq (%rdi), %zmm1
; CHECK-NEXT:    vpmovd2m %zmm1, %k1
; CHECK-NEXT:    vmovdqu16 %ymm0, %ymm0 {%k1} {z}
; CHECK-NEXT:    retq
 %a = load <16 x float>, <16 x float>* %ptr
 %mask = fptosi <16 x float> %a to <16 x i1>
 %select = select <16 x i1> %mask, <16 x i16> %passthru, <16 x i16> zeroinitializer
 ret <16 x i16> %select
}

define
 dso_local void @mul256(<64 x i8>* %a, <64 x i8>* %b, <64 x i8>* %c) "min-legal-vector-width"="256" {
; CHECK-AVX512-LABEL: mul256:
; CHECK-AVX512:       # %bb.0:
; CHECK-AVX512-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-AVX512-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-AVX512-NEXT:    vmovdqa (%rsi), %ymm2
; CHECK-AVX512-NEXT:    vmovdqa 32(%rsi), %ymm3
; CHECK-AVX512-NEXT:    vpunpckhbw {{.*#+}} ymm4 =
ymm3[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-AVX512-NEXT:    vpunpckhbw {{.*#+}} ymm5 =
ymm1[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-AVX512-NEXT:    vpmullw %ymm4, %ymm5, %ymm4
; CHECK-AVX512-NEXT:    vmovdqa {{.*#+}} ymm5 =
[255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255]
; CHECK-AVX512-NEXT:    vpand %ymm5, %ymm4, %ymm4
; CHECK-AVX512-NEXT:    vpunpcklbw {{.*#+}} ymm3 =
ymm3[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
;
 CHECK-AVX512-NEXT:    vpunpcklbw {{.*#+}} ymm1 =
ymm1[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-AVX512-NEXT:    vpmullw %ymm3, %ymm1, %ymm1
; CHECK-AVX512-NEXT:    vpand %ymm5, %ymm1, %ymm1
```

```
; CHECK-AVX512-NEXT:    vpackuswb %ymm4, %ymm1, %ymm1
; CHECK-AVX512-NEXT:    vpunpckhbw {{.*#+}} ymm3 =
ymm2[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-AVX512-NEXT:    vpunpckhbw {{.*#+}} ymm4 =
ymm0[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-AVX512-NEXT:    vpmullw %ymm3, %ymm4, %ymm3
; CHECK-AVX512-NEXT:    vpand %ymm5, %ymm3, %ymm3
; CHECK-AVX512-NEXT:    vpunpcklbw {{.*#+}} ymm2 =
ymm2[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-AVX512-NEXT:    vpunpcklbw {{.*#+}} ymm0 =
ymm0[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-AVX512-NEXT:    vpmullw
 %ymm2, %ymm0, %ymm0
; CHECK-AVX512-NEXT:    vpand %ymm5, %ymm0, %ymm0
; CHECK-AVX512-NEXT:    vpackuswb %ymm3, %ymm0, %ymm0
; CHECK-AVX512-NEXT:    vmovdqa %ymm0, (%rdx)
; CHECK-AVX512-NEXT:    vmovdqa %ymm1, 32(%rdx)
; CHECK-AVX512-NEXT:    vzeroupper
; CHECK-AVX512-NEXT:    retq
;
; CHECK-VBMI-LABEL: mul256:
; CHECK-VBMI:       # %bb.0:
; CHECK-VBMI-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-VBMI-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-VBMI-NEXT:    vmovdqa (%rsi), %ymm2
; CHECK-VBMI-NEXT:    vmovdqa 32(%rsi), %ymm3
; CHECK-VBMI-NEXT:    vpunpckhbw {{.*#+}} ymm4 =
ymm3[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-VBMI-NEXT:    vpunpckhbw {{.*#+}} ymm5 =
ymm1[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-VBMI-NEXT:    vpmullw %ymm4, %ymm5, %ymm4
; CHECK-VBMI-NEXT:    vpunpcklbw {{.*#+}} ymm3 =
ymm3[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
;
 CHECK-VBMI-NEXT:    vpunpcklbw {{.*#+}} ymm1 =
ymm1[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-VBMI-NEXT:    vpmullw %ymm3, %ymm1, %ymm1
; CHECK-VBMI-NEXT:    vmovdqa {{.*#+}} ymm3 =
[0,2,4,6,8,10,12,14,32,34,36,38,40,42,44,46,16,18,20,22,24,26,28,30,48,50,52,54,56,58,60,62]
; CHECK-VBMI-NEXT:    vpermt2b %ymm4, %ymm3, %ymm1
; CHECK-VBMI-NEXT:    vpunpckhbw {{.*#+}} ymm4 =
ymm2[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-VBMI-NEXT:    vpunpckhbw {{.*#+}} ymm5 =
ymm0[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-VBMI-NEXT:    vpmullw %ymm4, %ymm5, %ymm4
; CHECK-VBMI-NEXT:    vpunpcklbw {{.*#+}} ymm2 =
ymm2[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-VBMI-NEXT:    vpunpcklbw {{.*#+}} ymm0 =
```

```
ymm0[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-VBMI-NEXT:
    vpmullw %ymm2, %ymm0, %ymm0
; CHECK-VBMI-NEXT:    vpermt2b %ymm4, %ymm3, %ymm0
; CHECK-VBMI-NEXT:    vmovdqa %ymm0, (%rdx)
; CHECK-VBMI-NEXT:    vmovdqa %ymm1, 32(%rdx)
; CHECK-VBMI-NEXT:    vzeroupper
; CHECK-VBMI-NEXT:    retq
 %d = load <64 x i8>, <64 x i8>* %a
 %e = load <64 x i8>, <64 x i8>* %b
 %f = mul <64 x i8> %d, %e
 store <64 x i8> %f, <64 x i8>* %c
 ret void
}

define dso_local void @mul512(<64 x i8>* %a, <64 x i8>* %b, <64 x i8>* %c) "min-legal-vector-width"="512" {
; CHECK-AVX512-LABEL: mul512:
; CHECK-AVX512:       # %bb.0:
; CHECK-AVX512-NEXT:    vmovdqa64 (%rdi), %zmm0
; CHECK-AVX512-NEXT:    vmovdqa64 (%rsi), %zmm1
; CHECK-AVX512-NEXT:    vpunpckhbw {{.*#+}} zmm2 =
zmm1[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31,40,40,41,41,4
2,42,43,43,44,44,45,45,46,46,47,47,56,56,57,57,58,58,59,59,60,60,61,61,62,62,63,63]
; CHECK-AVX512-NEXT:    vpunpckhbw {{.*#+}} zmm3 =
zmm0[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31,40,40,41,41,4
2,42,43,43,44,44,45,45,46,46,47,47,56,56,57,57,58,58,59,59,60,60,61,61,62,62,63,63]
;
 CHECK-AVX512-NEXT:    vpmullw %zmm2, %zmm3, %zmm2
; CHECK-AVX512-NEXT:    vmovdqa64 {{.*#+}} zmm3 =
[255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,2
55,255,255,255,255,255]
; CHECK-AVX512-NEXT:    vpandq %zmm3, %zmm2, %zmm2
; CHECK-AVX512-NEXT:    vpunpcklbw {{.*#+}} zmm1 =
zmm1[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23,32,32,33,33,34,34,35,35,36,3
6,37,37,38,38,39,39,48,48,49,49,50,50,51,51,52,52,53,53,54,54,55,55]
; CHECK-AVX512-NEXT:    vpunpcklbw {{.*#+}} zmm0 =
zmm0[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23,32,32,33,33,34,34,35,35,36,3
6,37,37,38,38,39,39,48,48,49,49,50,50,51,51,52,52,53,53,54,54,55,55]
; CHECK-AVX512-NEXT:    vpmullw %zmm1, %zmm0, %zmm0
; CHECK-AVX512-NEXT:    vpandq %zmm3, %zmm0,
 %zmm0
; CHECK-AVX512-NEXT:    vpackuswb %zmm2, %zmm0, %zmm0
; CHECK-AVX512-NEXT:    vmovdqa64 %zmm0, (%rdx)
; CHECK-AVX512-NEXT:    vzeroupper
; CHECK-AVX512-NEXT:    retq
;
; CHECK-VBMI-LABEL: mul512:
; CHECK-VBMI:       # %bb.0:
```

```
; CHECK-VBMI-NEXT:    vmovdqa64 (%rdi), %zmm0
; CHECK-VBMI-NEXT:    vmovdqa64 (%rsi), %zmm1
; CHECK-VBMI-NEXT:    vpunpckhbw {{.*#+}} zmm2 =
zmm1[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31,40,40,41,41,4
2,42,43,43,44,44,45,45,46,46,47,47,56,56,57,57,58,58,59,59,60,60,61,61,62,62,63,63]
; CHECK-VBMI-NEXT:    vpunpckhbw {{.*#+}} zmm3 =
zmm0[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31,40,40,41,41,4
2,42,43,43,44,44,45,45,46,46,47,47,56,56,57,57,58,58,59,59,60,60,61,61,62,62,63,63]
; CHECK-VBMI-NEXT:    vpmullw %zmm2, %zmm3, %zmm2
; CHECK-VBMI-NEXT:    vpunpcklbw {{.*#+}} zmm1 =
zmm1[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23,32,32,33,33,34,34,35,35,36,3
6,37,37,38,38,39,39,48,48,49,49,50,50,51,51,52,52,53,53,54,54,55,55]
;
 CHECK-VBMI-NEXT:    vpunpcklbw {{.*#+}} zmm0 =
zmm0[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23,32,32,33,33,34,34,35,35,36,3
6,37,37,38,38,39,39,48,48,49,49,50,50,51,51,52,52,53,53,54,54,55,55]
; CHECK-VBMI-NEXT:    vpmullw %zmm1, %zmm0, %zmm0
; CHECK-VBMI-NEXT:    vmovdqa64 {{.*#+}} zmm1 =
[0,2,4,6,8,10,12,14,64,66,68,70,72,74,76,78,16,18,20,22,24,26,28,30,80,82,84,86,88,90,92,94,32,34,36,38,40,42,44,
46,96,98,100,102,104,106,108,110,48,50,52,54,56,58,60,62,112,114,116,118,120,122,124,126]
; CHECK-VBMI-NEXT:    vpermi2b %zmm2, %zmm0, %zmm1
; CHECK-VBMI-NEXT:    vmovdqa64 %zmm1, (%rdx)
; CHECK-VBMI-NEXT:    vzeroupper
; CHECK-VBMI-NEXT:    retq
 %d = load <64 x i8>, <64 x i8>* %a
 %e = load <64 x i8>, <64 x i8>* %b
 %f = mul <64 x i8> %d, %e
 store <64 x i8> %f, <64 x i8>* %c
 ret void
}

; This threw an assertion at one point.
define <4 x i32> @mload_v4i32(<4
 x i32> %trigger, <4 x i32>* %addr, <4 x i32> %dst) "min-legal-vector-width"="256" {
; CHECK-LABEL: mload_v4i32:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vptestnmd %xmm0, %xmm0, %k1
; CHECK-NEXT:    vpblendmd (%rdi), %xmm1, %xmm0 {%k1}
; CHECK-NEXT:    retq
 %mask = icmp eq <4 x i32> %trigger, zeroinitializer
 %res = call <4 x i32> @llvm.masked.load.v4i32.p0v4i32(<4 x i32>* %addr, i32 4, <4 x i1> %mask, <4 x i32>
%dst)
 ret <4 x i32> %res
}
declare <4 x i32> @llvm.masked.load.v4i32.p0v4i32(<4 x i32>*, i32, <4 x i1>, <4 x i32>)

define <16 x i32> @trunc_v16i64_v16i32(<16 x i64>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v16i64_v16i32:
```

```
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-NEXT:    vmovdqa 64(%rdi), %ymm2
; CHECK-NEXT:    vmovdqa 96(%rdi), %ymm3
; CHECK-NEXT:    vpmovqd %ymm0, %xmm0
; CHECK-NEXT:    vpmovqd %ymm1, %xmm1
; CHECK-NEXT:    vinserti128 $1, %xmm1, %ymm0, %ymm0
; CHECK-NEXT:
    vpmovqd %ymm2, %xmm1
; CHECK-NEXT:    vpmovqd %ymm3, %xmm2
; CHECK-NEXT:    vinserti128 $1, %xmm2, %ymm1, %ymm1
; CHECK-NEXT:    retq
 %a = load <16 x i64>, <16 x i64>* %x
 %b = trunc <16 x i64> %a to <16 x i32>
 ret <16 x i32> %b
}

define <16 x i8> @trunc_v16i64_v16i8(<16 x i64>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v16i64_v16i8:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-NEXT:    vmovdqa 64(%rdi), %ymm2
; CHECK-NEXT:    vmovdqa 96(%rdi), %ymm3
; CHECK-NEXT:    vpmovqb %ymm3, %xmm3
; CHECK-NEXT:    vpmovqb %ymm2, %xmm2
; CHECK-NEXT:    vpunpckldq {{.*#+}} xmm2 = xmm2[0],xmm3[0],xmm2[1],xmm3[1]
; CHECK-NEXT:    vpmovqb %ymm1, %xmm1
; CHECK-NEXT:    vpmovqb %ymm0, %xmm0
; CHECK-NEXT:    vpunpckldq {{.*#+}} xmm0 = xmm0[0],xmm1[0],xmm0[1],xmm1[1]
; CHECK-NEXT:    vpunpcklqdq {{.*#+}} xmm0 = xmm0[0],xmm2[0]
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %a = load <16 x i64>, <16
 x i64>* %x
 %b = trunc <16 x i64> %a to <16 x i8>
 ret <16 x i8> %b
}

define <16 x i8> @trunc_v16i32_v16i8(<16 x i32>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v16i32_v16i8:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-NEXT:    vpmovdb %ymm1, %xmm1
; CHECK-NEXT:    vpmovdb %ymm0, %xmm0
; CHECK-NEXT:    vpunpcklqdq {{.*#+}} xmm0 = xmm0[0],xmm1[0]
```

```
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %a = load <16 x i32>, <16 x i32>* %x
 %b = trunc <16 x i32> %a to <16 x i8>
 ret <16 x i8> %b
}

define <8 x i8> @trunc_v8i64_v8i8(<8 x i64>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v8i64_v8i8:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-NEXT:    vpmovqb %ymm1, %xmm1
; CHECK-NEXT:    vpmovqb %ymm0, %xmm0
; CHECK-NEXT:    vpunpckldq {{.*#+}} xmm0 = xmm0[0],xmm1[0],xmm0[1],xmm1[1]
; CHECK-NEXT:    vzeroupper
;
 CHECK-NEXT:    retq
 %a = load <8 x i64>, <8 x i64>* %x
 %b = trunc <8 x i64> %a to <8 x i8>
 ret <8 x i8> %b
}

define <8 x i16> @trunc_v8i64_v8i16(<8 x i64>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v8i64_v8i16:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm1
; CHECK-NEXT:    vpmovqw %ymm1, %xmm1
; CHECK-NEXT:    vpmovqw %ymm0, %xmm0
; CHECK-NEXT:    vpunpcklqdq {{.*#+}} xmm0 = xmm0[0],xmm1[0]
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %a = load <8 x i64>, <8 x i64>* %x
 %b = trunc <8 x i64> %a to <8 x i16>
 ret <8 x i16> %b
}

define <8 x i32> @trunc_v8i64_v8i32_zeroes(<8 x i64>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v8i64_v8i32_zeroes:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpsrlq $48, 32(%rdi), %ymm0
; CHECK-NEXT:    vpsrlq $48, (%rdi), %ymm1
; CHECK-NEXT:    vpackusdw %ymm0, %ymm1, %ymm0
; CHECK-NEXT:    vpermq {{.*#+}} ymm0 = ymm0[0,2,1,3]
; CHECK-NEXT:
   retq
 %a = load <8 x i64>, <8 x i64>* %x
```

```
 %b = lshr <8 x i64> %a, <i64 48, i64 48, i64 48, i64 48, i64 48, i64 48, i64 48, i64 48>
 %c = trunc <8 x i64> %b to <8 x i32>
 ret <8 x i32> %c
}

define <16 x i16> @trunc_v16i32_v16i16_zeroes(<16 x i32>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v16i32_v16i16_zeroes:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm1
; CHECK-NEXT:    vmovdqa {{.*#+}} ymm0 = [1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31]
; CHECK-NEXT:    vpermi2w 32(%rdi), %ymm1, %ymm0
; CHECK-NEXT:    retq
 %a = load <16 x i32>, <16 x i32>* %x
 %b = lshr <16 x i32> %a, <i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32
16, i32 16, i32 16, i32 16, i32 16>
 %c = trunc <16 x i32> %b to <16 x i16>
 ret <16 x i16> %c
}

define <32 x i8> @trunc_v32i16_v32i8_zeroes(<32 x i16>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-AVX512-LABEL: trunc_v32i16_v32i8_zeroes:
; CHECK-AVX512:
   # %bb.0:
; CHECK-AVX512-NEXT:    vpsrlw $8, 32(%rdi), %ymm0
; CHECK-AVX512-NEXT:    vpsrlw $8, (%rdi), %ymm1
; CHECK-AVX512-NEXT:    vpackuswb %ymm0, %ymm1, %ymm0
; CHECK-AVX512-NEXT:    vpermq {{.*#+}} ymm0 = ymm0[0,2,1,3]
; CHECK-AVX512-NEXT:    retq
;
; CHECK-VBMI-LABEL: trunc_v32i16_v32i8_zeroes:
; CHECK-VBMI:       # %bb.0:
; CHECK-VBMI-NEXT:    vmovdqa (%rdi), %ymm1
; CHECK-VBMI-NEXT:    vmovdqa {{.*#+}} ymm0 =
[1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63]
; CHECK-VBMI-NEXT:    vpermi2b 32(%rdi), %ymm1, %ymm0
; CHECK-VBMI-NEXT:    retq
 %a = load <32 x i16>, <32 x i16>* %x
 %b = lshr <32 x i16> %a, <i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8,
i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8>
 %c = trunc <32 x i16> %b to <32 x i8>
 ret <32 x i8> %c
}

define <8 x i32> @trunc_v8i64_v8i32_sign(<8 x i64>*
 %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v8i64_v8i32_sign:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpsraq $48, 32(%rdi), %ymm0
```

```
; CHECK-NEXT:    vpsraq $48, (%rdi), %ymm1
; CHECK-NEXT:    vpmovqd %ymm1, %xmm1
; CHECK-NEXT:    vpmovqd %ymm0, %xmm0
; CHECK-NEXT:    vinserti128 $1, %xmm0, %ymm1, %ymm0
; CHECK-NEXT:    retq
 %a = load <8 x i64>, <8 x i64>* %x
 %b = ashr <8 x i64> %a, <i64 48, i64 48, i64 48, i64 48, i64 48, i64 48, i64 48, i64 48>
 %c = trunc <8 x i64> %b to <8 x i32>
 ret <8 x i32> %c
}

define <16 x i16> @trunc_v16i32_v16i16_sign(<16 x i32>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: trunc_v16i32_v16i16_sign:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm1
; CHECK-NEXT:    vmovdqa {{.*#+}} ymm0 = [1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31]
; CHECK-NEXT:    vpermi2w 32(%rdi), %ymm1, %ymm0
; CHECK-NEXT:    retq
 %a = load <16 x i32>, <16 x i32>* %x
 %b = ashr <16 x i32> %a, <i32 16, i32 16, i32 16, i32 16,
 i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16, i32 16>
 %c = trunc <16 x i32> %b to <16 x i16>
 ret <16 x i16> %c
}

define <32 x i8> @trunc_v32i16_v32i8_sign(<32 x i16>* %x) nounwind "min-legal-vector-width"="256" {
; CHECK-AVX512-LABEL: trunc_v32i16_v32i8_sign:
; CHECK-AVX512:       # %bb.0:
; CHECK-AVX512-NEXT:    vpsrlw $8, 32(%rdi), %ymm0
; CHECK-AVX512-NEXT:    vpsrlw $8, (%rdi), %ymm1
; CHECK-AVX512-NEXT:    vpackuswb %ymm0, %ymm1, %ymm0
; CHECK-AVX512-NEXT:    vpermq {{.*#+}} ymm0 = ymm0[0,2,1,3]
; CHECK-AVX512-NEXT:    retq
;
; CHECK-VBMI-LABEL: trunc_v32i16_v32i8_sign:
; CHECK-VBMI:       # %bb.0:
; CHECK-VBMI-NEXT:    vmovdqa (%rdi), %ymm1
; CHECK-VBMI-NEXT:    vmovdqa {{.*#+}} ymm0 =
[1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63]
; CHECK-VBMI-NEXT:    vpermi2b 32(%rdi), %ymm1, %ymm0
; CHECK-VBMI-NEXT:    retq
 %a = load <32 x i16>, <32 x i16>* %x
 %b = ashr <32 x i16> %a, <i16 8, i16
 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8,
i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8, i16 8>
 %c = trunc <32 x i16> %b to <32 x i8>
 ret <32 x i8> %c
}
```

```
define dso_local void @zext_v16i8_v16i64(<16 x i8> %x, <16 x i64>* %y) nounwind "min-legal-vector-
width"="256" {
; CHECK-LABEL: zext_v16i8_v16i64:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpmovzxbw {{.*#+}} ymm1 =
xmm0[0],zero,xmm0[1],zero,xmm0[2],zero,xmm0[3],zero,xmm0[4],zero,xmm0[5],zero,xmm0[6],zero,xmm0[7],zer
o,xmm0[8],zero,xmm0[9],zero,xmm0[10],zero,xmm0[11],zero,xmm0[12],zero,xmm0[13],zero,xmm0[14],zero,xm
m0[15],zero
; CHECK-NEXT:    vpshufd {{.*#+}} xmm2 = xmm1[2,3,2,3]
; CHECK-NEXT:    vpmovzxwq {{.*#+}} ymm2 =
xmm2[0],zero,zero,zero,xmm2[1],zero,zero,zero,xmm2[2],zero,zero,zero,xmm2[3],zero,zero,zero
; CHECK-NEXT:    vextracti128 $1, %ymm1, %xmm1
; CHECK-NEXT:    vpshufd {{.*#+}} xmm3 = xmm1[2,3,2,3]
; CHECK-NEXT:
    vpmovzxwq {{.*#+}} ymm3 =
xmm3[0],zero,zero,zero,xmm3[1],zero,zero,zero,xmm3[2],zero,zero,zero,xmm3[3],zero,zero,zero
; CHECK-NEXT:    vpmovzxwq {{.*#+}} ymm1 =
xmm1[0],zero,zero,zero,xmm1[1],zero,zero,zero,xmm1[2],zero,zero,zero,xmm1[3],zero,zero,zero
; CHECK-NEXT:    vpmovzxbq {{.*#+}} ymm0 =
xmm0[0],zero,zero,zero,zero,zero,zero,zero,xmm0[1],zero,zero,zero,zero,zero,zero,zero,xmm0[2],zero,zero,zero,zer
o,zero,zero,zero,xmm0[3],zero,zero,zero,zero,zero,zero,zero
; CHECK-NEXT:    vmovdqa %ymm0, (%rdi)
; CHECK-NEXT:    vmovdqa %ymm1, 64(%rdi)
; CHECK-NEXT:    vmovdqa %ymm3, 96(%rdi)
; CHECK-NEXT:    vmovdqa %ymm2, 32(%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %a = zext <16 x i8> %x to <16 x i64>
 store <16 x i64> %a, <16 x i64>* %y
 ret void
}

define dso_local void @sext_v16i8_v16i64(<16 x i8> %x, <16 x i64>* %y) nounwind "min-legal-vector-
width"="256" {
; CHECK-LABEL: sext_v16i8_v16i64:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpmovsxbw %xmm0, %ymm1
; CHECK-NEXT:
    vpshufd {{.*#+}} xmm2 = xmm1[2,3,2,3]
; CHECK-NEXT:    vpmovsxwq %xmm2, %ymm2
; CHECK-NEXT:    vextracti128 $1, %ymm1, %xmm1
; CHECK-NEXT:    vpshufd {{.*#+}} xmm3 = xmm1[2,3,2,3]
; CHECK-NEXT:    vpmovsxwq %xmm3, %ymm3
; CHECK-NEXT:    vpmovsxwq %xmm1, %ymm1
; CHECK-NEXT:    vpmovsxbq %xmm0, %ymm0
; CHECK-NEXT:    vmovdqa %ymm0, (%rdi)
; CHECK-NEXT:    vmovdqa %ymm1, 64(%rdi)
```

```
; CHECK-NEXT:    vmovdqa %ymm3, 96(%rdi)
; CHECK-NEXT:    vmovdqa %ymm2, 32(%rdi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %a = sext <16 x i8> %x to <16 x i64>
 store <16 x i64> %a, <16 x i64>* %y
 ret void
}

define dso_local void @vselect_split_v8i16_setcc(<8 x i16> %s, <8 x i16> %t, <8 x i64>* %p, <8 x i64>* %q, <8
x i64>* %r) "min-legal-vector-width"="256" {
; CHECK-LABEL: vselect_split_v8i16_setcc:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rsi), %ymm2
; CHECK-NEXT:    vmovdqa 32(%rsi), %ymm3
; CHECK-NEXT:    vpcmpeqw %xmm1, %xmm0, %k1
; CHECK-NEXT:    kshiftrb $4, %k1, %k2
;
 CHECK-NEXT:    vmovdqa64 32(%rdi), %ymm3 {%k2}
; CHECK-NEXT:    vmovdqa64 (%rdi), %ymm2 {%k1}
; CHECK-NEXT:    vmovdqa %ymm2, (%rdx)
; CHECK-NEXT:    vmovdqa %ymm3, 32(%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %x = load <8 x i64>, <8 x i64>* %p
 %y = load <8 x i64>, <8 x i64>* %q
 %a = icmp eq <8 x i16> %s, %t
 %b = select <8 x i1> %a, <8 x i64> %x, <8 x i64> %y
 store <8 x i64> %b, <8 x i64>* %r
 ret void
}

define dso_local void @vselect_split_v8i32_setcc(<8 x i32> %s, <8 x i32> %t, <8 x i64>* %p, <8 x i64>* %q, <8
x i64>* %r) "min-legal-vector-width"="256" {
; CHECK-LABEL: vselect_split_v8i32_setcc:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rsi), %ymm2
; CHECK-NEXT:    vmovdqa 32(%rsi), %ymm3
; CHECK-NEXT:    vpcmpeqd %ymm1, %ymm0, %k1
; CHECK-NEXT:    kshiftrb $4, %k1, %k2
; CHECK-NEXT:    vmovdqa64 32(%rdi), %ymm3 {%k2}
; CHECK-NEXT:    vmovdqa64 (%rdi), %ymm2 {%k1}
; CHECK-NEXT:    vmovdqa %ymm2, (%rdx)
; CHECK-NEXT:    vmovdqa %ymm3, 32(%rdx)
; CHECK-NEXT:
   vzeroupper
; CHECK-NEXT:    retq
 %x = load <8 x i64>, <8 x i64>* %p
```

```
 %y = load <8 x i64>, <8 x i64>* %q
 %a = icmp eq <8 x i32> %s, %t
 %b = select <8 x i1> %a, <8 x i64> %x, <8 x i64> %y
 store <8 x i64> %b, <8 x i64>* %r
 ret void
}

define dso_local void @vselect_split_v16i8_setcc(<16 x i8> %s, <16 x i8> %t, <16 x i32>* %p, <16 x i32>* %q,
<16 x i32>* %r) "min-legal-vector-width"="256" {
; CHECK-LABEL: vselect_split_v16i8_setcc:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rsi), %ymm2
; CHECK-NEXT:    vmovdqa 32(%rsi), %ymm3
; CHECK-NEXT:    vpcmpeqb %xmm1, %xmm0, %k1
; CHECK-NEXT:    kshiftrw $8, %k1, %k2
; CHECK-NEXT:    vmovdqa32 32(%rdi), %ymm3 {%k2}
; CHECK-NEXT:    vmovdqa32 (%rdi), %ymm2 {%k1}
; CHECK-NEXT:    vmovdqa %ymm2, (%rdx)
; CHECK-NEXT:    vmovdqa %ymm3, 32(%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %x = load <16 x i32>, <16 x i32>* %p
 %y = load <16 x i32>, <16 x i32>* %q
 %a = icmp eq <16 x i8> %s, %t
 %b = select <16 x i1>
 %a, <16 x i32> %x, <16 x i32> %y
 store <16 x i32> %b, <16 x i32>* %r
 ret void
}

define dso_local void @vselect_split_v16i16_setcc(<16 x i16> %s, <16 x i16> %t, <16 x i32>* %p, <16 x i32>*
%q, <16 x i32>* %r) "min-legal-vector-width"="256" {
; CHECK-LABEL: vselect_split_v16i16_setcc:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rsi), %ymm2
; CHECK-NEXT:    vmovdqa 32(%rsi), %ymm3
; CHECK-NEXT:    vpcmpeqw %ymm1, %ymm0, %k1
; CHECK-NEXT:    kshiftrw $8, %k1, %k2
; CHECK-NEXT:    vmovdqa32 32(%rdi), %ymm3 {%k2}
; CHECK-NEXT:    vmovdqa32 (%rdi), %ymm2 {%k1}
; CHECK-NEXT:    vmovdqa %ymm2, (%rdx)
; CHECK-NEXT:    vmovdqa %ymm3, 32(%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %x = load <16 x i32>, <16 x i32>* %p
 %y = load <16 x i32>, <16 x i32>* %q
 %a = icmp eq <16 x i16> %s, %t
 %b = select <16 x i1> %a, <16 x i32> %x, <16 x i32> %y
```

```
 store <16 x i32> %b, <16 x i32>* %r
 ret void
}

define <16 x i8> @trunc_packus_v16i32_v16i8(<16 x i32>* %p) "min-legal-vector-width"="256"
 {
; CHECK-LABEL: trunc_packus_v16i32_v16i8:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vpackusdw 32(%rdi), %ymm0, %ymm0
; CHECK-NEXT:    vpermq {{.*#+}} ymm0 = ymm0[0,2,1,3]
; CHECK-NEXT:    vpmovuswb %ymm0, %xmm0
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %a = load <16 x i32>, <16 x i32>* %p
 %b = icmp slt <16 x i32> %a, <i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32
255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255>
 %c = select <16 x i1> %b, <16 x i32> %a, <16 x i32> <i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32
255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255>
 %d = icmp sgt <16 x i32> %c, zeroinitializer
 %e = select <16 x i1> %d, <16 x i32> %c, <16 x i32> zeroinitializer
 %f = trunc <16 x i32> %e to <16 x i8>
 ret <16 x i8> %f
}

define dso_local void @trunc_packus_v16i32_v16i8_store(<16 x i32>* %p, <16 x i8>* %q) "min-legal-vector-
width"="256"
 {
; CHECK-LABEL: trunc_packus_v16i32_v16i8_store:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rdi), %ymm0
; CHECK-NEXT:    vpackusdw 32(%rdi), %ymm0, %ymm0
; CHECK-NEXT:    vpermq {{.*#+}} ymm0 = ymm0[0,2,1,3]
; CHECK-NEXT:    vpmovuswb %ymm0, (%rsi)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %a = load <16 x i32>, <16 x i32>* %p
 %b = icmp slt <16 x i32> %a, <i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32
255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255>
 %c = select <16 x i1> %b, <16 x i32> %a, <16 x i32> <i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32
255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255, i32 255>
 %d = icmp sgt <16 x i32> %c, zeroinitializer
 %e = select <16 x i1> %d, <16 x i32> %c, <16 x i32> zeroinitializer
 %f = trunc <16 x i32> %e to <16 x i8>
 store <16 x i8> %f, <16 x i8>* %q
 ret void
}
```

```
define <64 x i1> @v64i1_argument_return(<64 x
 i1> %x) "min-legal-vector-width"="256" {
; CHECK-LABEL: v64i1_argument_return:
; CHECK:       # %bb.0:
; CHECK-NEXT:    retq
 ret <64 x i1> %x
}

define dso_local void @v64i1_shuffle(<64 x i8>* %x, <64 x i8>* %y) "min-legal-vector-width"="256" {
; CHECK-LABEL: v64i1_shuffle:
; CHECK:       # %bb.0: # %entry
; CHECK-NEXT:    vmovdqa (%rdi), %ymm1
; CHECK-NEXT:    vmovdqa 32(%rdi), %ymm0
; CHECK-NEXT:    vptestnmb %ymm1, %ymm1, %k0
; CHECK-NEXT:    kshiftrd $1, %k0, %k1
; CHECK-NEXT:    kshiftlq $63, %k0, %k2
; CHECK-NEXT:    kshiftrq $62, %k2, %k2
; CHECK-NEXT:    kshiftlq $63, %k1, %k1
; CHECK-NEXT:    kshiftrq $63, %k1, %k1
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-5, %rax
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $3, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $61, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-9, %rax
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:
    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $2, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $60, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-17, %rax
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $5, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $59, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-33, %rax
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $4, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $58, %k2, %k2
```

```
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-65, %rax
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $7, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $57, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-129, %rax
; CHECK-NEXT:
    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $6, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $56, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-257, %rax # imm = 0xFEFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $9, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $55, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-513, %rax # imm = 0xFDFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $8, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $54, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-1025, %rax # imm = 0xFBFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $11, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $53, %k2,
 %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-2049, %rax # imm = 0xF7FF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $10, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $52, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-4097, %rax # imm = 0xEFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
```

```
; CHECK-NEXT:    kshiftrd $13, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $51, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-8193, %rax # imm = 0xDFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $12, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $50, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-16385, %rax # imm = 0xBFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:
  kshiftrd $15, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $49, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-32769, %rax # imm = 0xFFFF7FFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $14, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $48, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-65537, %rax # imm = 0xFFFEFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $17, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $47, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-131073, %rax # imm = 0xFFFDFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $16, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $46, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:
  movq $-262145, %rax # imm = 0xFFFBFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $19, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $45, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
```

```
; CHECK-NEXT:    movq $-524289, %rax # imm = 0xFFF7FFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $18, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $44, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-1048577, %rax # imm = 0xFFEFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $21, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $43, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-2097153, %rax # imm = 0xFFDFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $20, %k0,
 %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $42, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-4194305, %rax # imm = 0xFFBFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $23, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $41, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-8388609, %rax # imm = 0xFF7FFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $22, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $40, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-16777217, %rax # imm = 0xFEFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $25, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $39, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-33554433,
 %rax # imm = 0xFDFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $24, %k0, %k2
```

```
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $38, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-67108865, %rax # imm = 0xFBFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $27, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $37, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-134217729, %rax # imm = 0xF7FFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $26, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $36, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-268435457, %rax # imm = 0xEFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $29, %k0, %k2
; CHECK-NEXT:
    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $35, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-536870913, %rax # imm = 0xDFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $28, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $34, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movq $-1073741825, %rax # imm = 0xBFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k1
; CHECK-NEXT:    kshiftrd $31, %k0, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $33, %k2, %k2
; CHECK-NEXT:    korq %k2, %k1, %k1
; CHECK-NEXT:    movabsq $-2147483649, %rax # imm = 0xFFFFFFFF7FFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k1, %k2
; CHECK-NEXT:    vptestnmb %ymm0, %ymm0, %k1
; CHECK-NEXT:    kshiftrd $30, %k0, %k0
; CHECK-NEXT:    kshiftlq $63, %k0, %k0
; CHECK-NEXT:    kshiftrq $32, %k0, %k0
; CHECK-NEXT:
```

```
    korq %k0, %k2, %k0
; CHECK-NEXT:    movabsq $-4294967297, %rax # imm = 0xFFFFFFFEFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $1, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $31, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-8589934593, %rax # imm = 0xFFFFFFFDFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftlq $63, %k1, %k2
; CHECK-NEXT:    kshiftrq $30, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-17179869185, %rax # imm = 0xFFFFFFFBFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $3, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $29, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-34359738369, %rax # imm = 0xFFFFFFF7FFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq
 %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $2, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $28, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-68719476737, %rax # imm = 0xFFFFFFEFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $5, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $27, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-137438953473, %rax # imm = 0xFFFFFFDFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $4, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $26, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-274877906945, %rax # imm = 0xFFFFFFBFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $7, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
```

```
; CHECK-NEXT:
  kshiftrq $25, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-549755813889, %rax # imm = 0xFFFFFF7FFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $6, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $24, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-1099511627777, %rax # imm = 0xFFFFFEFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $9, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $23, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-2199023255553, %rax # imm = 0xFFFFFDFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $8, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $22, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-4398046511105,
 %rax # imm = 0xFFFFFBFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $11, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $21, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-8796093022209, %rax # imm = 0xFFFFF7FFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $10, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $20, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-17592186044417, %rax # imm = 0xFFFFEFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $13, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $19, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-35184372088833, %rax # imm = 0xFFFFDFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
```

; CHECK-NEXT: kandq %k2, %k0,
%k0
; CHECK-NEXT: kshiftrd $12, %k1, %k2
; CHECK-NEXT: kshiftlq $63, %k2, %k2
; CHECK-NEXT: kshiftrq $18, %k2, %k2
; CHECK-NEXT: korq %k2, %k0, %k0
; CHECK-NEXT: movabsq $-70368744177665, %rax # imm = 0xFFFFBFFFFFFFFFFF
; CHECK-NEXT: kmovq %rax, %k2
; CHECK-NEXT: kandq %k2, %k0, %k0
; CHECK-NEXT: kshiftrd $15, %k1, %k2
; CHECK-NEXT: kshiftlq $63, %k2, %k2
; CHECK-NEXT: kshiftrq $17, %k2, %k2
; CHECK-NEXT: korq %k2, %k0, %k0
; CHECK-NEXT: movabsq $-140737488355329, %rax # imm = 0xFFFF7FFFFFFFFFFF
; CHECK-NEXT: kmovq %rax, %k2
; CHECK-NEXT: kandq %k2, %k0, %k0
; CHECK-NEXT: kshiftrd $14, %k1, %k2
; CHECK-NEXT: kshiftlq $63, %k2, %k2
; CHECK-NEXT: kshiftrq $16, %k2, %k2
; CHECK-NEXT: korq %k2, %k0, %k0
; CHECK-NEXT: movabsq $-281474976710657, %rax # imm = 0xFFFEFFFFFFFFFFFF
; CHECK-NEXT: kmovq %rax, %k2
; CHECK-NEXT: kandq %k2, %k0, %k0
; CHECK-NEXT: kshiftrd $17, %k1, %k2
; CHECK-NEXT: kshiftlq $63, %k2, %k2
; CHECK-NEXT:
kshiftrq $15, %k2, %k2
; CHECK-NEXT: korq %k2, %k0, %k0
; CHECK-NEXT: movabsq $-562949953421313, %rax # imm = 0xFFFDFFFFFFFFFFFF
; CHECK-NEXT: kmovq %rax, %k2
; CHECK-NEXT: kandq %k2, %k0, %k0
; CHECK-NEXT: kshiftrd $16, %k1, %k2
; CHECK-NEXT: kshiftlq $63, %k2, %k2
; CHECK-NEXT: kshiftrq $14, %k2, %k2
; CHECK-NEXT: korq %k2, %k0, %k0
; CHECK-NEXT: movabsq $-1125899906842625, %rax # imm = 0xFFFBFFFFFFFFFFFF
; CHECK-NEXT: kmovq %rax, %k2
; CHECK-NEXT: kandq %k2, %k0, %k0
; CHECK-NEXT: kshiftrd $19, %k1, %k2
; CHECK-NEXT: kshiftlq $63, %k2, %k2
; CHECK-NEXT: kshiftrq $13, %k2, %k2
; CHECK-NEXT: korq %k2, %k0, %k0
; CHECK-NEXT: movabsq $-2251799813685249, %rax # imm = 0xFFF7FFFFFFFFFFFF
; CHECK-NEXT: kmovq %rax, %k2
; CHECK-NEXT: kandq %k2, %k0, %k0
; CHECK-NEXT: kshiftrd $18, %k1, %k2
; CHECK-NEXT: kshiftlq $63, %k2, %k2
; CHECK-NEXT: kshiftrq $12, %k2, %k2

```
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-4503599627370497,
 %rax # imm = 0xFFEFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $21, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $11, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-9007199254740993, %rax # imm = 0xFFDFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $20, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $10, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-18014398509481985, %rax # imm = 0xFFBFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $23, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $9, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-36028797018963969, %rax # imm = 0xFF7FFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:
    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $22, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $8, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-72057594037927937, %rax # imm = 0xFEFFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $25, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $7, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-144115188075855873, %rax # imm = 0xFDFFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $24, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $6, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-288230376151711745, %rax # imm = 0xFBFFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
```

```
; CHECK-NEXT:    kshiftrd $27, %k1, %k2
; CHECK-NEXT:    kshiftlq
 $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $5, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-576460752303423489, %rax # imm = 0xF7FFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $26, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $4, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-1152921504606846977, %rax # imm = 0xEFFFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $29, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $3, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    movabsq $-2305843009213693953, %rax # imm = 0xDFFFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $28, %k1, %k2
; CHECK-NEXT:    kshiftlq $63, %k2, %k2
; CHECK-NEXT:    kshiftrq $2, %k2, %k2
; CHECK-NEXT:    korq %k2,
 %k0, %k0
; CHECK-NEXT:    movabsq $-4611686018427387905, %rax # imm = 0xBFFFFFFFFFFFFFFF
; CHECK-NEXT:    kmovq %rax, %k2
; CHECK-NEXT:    kandq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $31, %k1, %k2
; CHECK-NEXT:    kshiftlq $62, %k2, %k2
; CHECK-NEXT:    korq %k2, %k0, %k0
; CHECK-NEXT:    kshiftrd $30, %k1, %k1
; CHECK-NEXT:    kshiftlq $1, %k0, %k0
; CHECK-NEXT:    kshiftrq $1, %k0, %k0
; CHECK-NEXT:    kshiftlq $63, %k1, %k1
; CHECK-NEXT:    korq %k1, %k0, %k1
; CHECK-NEXT:    vmovdqu8 %ymm1, (%rsi) {%k1}
; CHECK-NEXT:    kshiftrq $32, %k1, %k1
; CHECK-NEXT:    vmovdqu8 %ymm0, 32(%rsi) {%k1}
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
entry:
 %a = load <64 x i8>, <64 x i8>* %x
 %b = icmp eq <64 x i8> %a, zeroinitializer
 %shuf = shufflevector <64 x i1> %b, <64 x i1> undef, <64 x i32> <i32 1, i32 0, i32 3, i32 2, i32 5, i32 4, i32 7, i32
6, i32 9, i32 8, i32 11, i32 10, i32 13, i32 12, i32 15, i32 14, i32 17, i32 16, i32 19, i32 18, i32 21, i32 20, i32 23, i32
```

```
22, i32 25,
 i32 24, i32 27, i32 26, i32 29, i32 28, i32 31, i32 30, i32 33, i32 32, i32 35, i32 34, i32 37, i32 36, i32 39, i32 38,
i32 41, i32 40, i32 43, i32 42, i32 45, i32 44, i32 47, i32 46, i32 49, i32 48, i32 51, i32 50, i32 53, i32 52, i32 55, i32
54, i32 57, i32 56, i32 59, i32 58, i32 61, i32 60, i32 63, i32 62>
 call void @llvm.masked.store.v64i8.p0v64i8(<64 x i8> %a, <64 x i8>* %y, i32 1, <64 x i1> %shuf)
 ret void
}
declare void @llvm.masked.store.v64i8.p0v64i8(<64 x i8>, <64 x i8>*, i32, <64 x i1>)

@mem64_dst = dso_local global i64 0, align 8
@mem64_src = dso_local global i64 0, align 8
define dso_local i32 @v64i1_inline_asm() "min-legal-vector-width"="256" {
; CHECK-LABEL: v64i1_inline_asm:
; CHECK:       # %bb.0:
; CHECK-NEXT:    kmovq mem64_src(%rip), %k0
; CHECK-NEXT:    #APP
; CHECK-NEXT:    #NO_APP
; CHECK-NEXT:    kmovq %k0, mem64_dst(%rip)
; CHECK-NEXT:    movl -{{[0-9]+}}(%rsp), %eax
; CHECK-NEXT:    retq
 %1 = alloca i32, align 4
 %2 = load i64, i64* @mem64_src, align
 8
 %3 = call i64 asm "", "=k,k,~{dirflag},~{fpsr},~{flags}"(i64 %2)
 store i64 %3, i64* @mem64_dst, align 8
 %4 = load i32, i32* %1, align 4
 ret i32 %4
}

define dso_local void @cmp_v8i64_sext(<8 x i64>* %xptr, <8 x i64>* %yptr, <8 x i64>* %zptr) "min-legal-
vector-width"="256" {
; CHECK-LABEL: cmp_v8i64_sext:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rsi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rsi), %ymm1
; CHECK-NEXT:    vpcmpgtq 32(%rdi), %ymm1, %ymm1
; CHECK-NEXT:    vpcmpgtq (%rdi), %ymm0, %ymm0
; CHECK-NEXT:    vmovdqa %ymm0, (%rdx)
; CHECK-NEXT:    vmovdqa %ymm1, 32(%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %x = load <8 x i64>, <8 x i64>* %xptr
 %y = load <8 x i64>, <8 x i64>* %yptr
 %cmp = icmp slt <8 x i64> %x, %y
 %ext = sext <8 x i1> %cmp to <8 x i64>
 store <8 x i64> %ext, <8 x i64>* %zptr
 ret void
}
```

```
define dso_local void @cmp_v8i64_zext(<8 x i64>* %xptr, <8 x i64>* %yptr, <8 x i64>* %zptr) "min-legal-
vector-width"="256" {
; CHECK-LABEL: cmp_v8i64_zext:
;
 CHECK:       # %bb.0:
; CHECK-NEXT:    vmovdqa (%rsi), %ymm0
; CHECK-NEXT:    vmovdqa 32(%rsi), %ymm1
; CHECK-NEXT:    vpcmpgtq 32(%rdi), %ymm1, %ymm1
; CHECK-NEXT:    vpcmpgtq (%rdi), %ymm0, %ymm0
; CHECK-NEXT:    vpsrlq $63, %ymm1, %ymm1
; CHECK-NEXT:    vpsrlq $63, %ymm0, %ymm0
; CHECK-NEXT:    vmovdqa %ymm0, (%rdx)
; CHECK-NEXT:    vmovdqa %ymm1, 32(%rdx)
; CHECK-NEXT:    vzeroupper
; CHECK-NEXT:    retq
 %x = load <8 x i64>, <8 x i64>* %xptr
 %y = load <8 x i64>, <8 x i64>* %yptr
 %cmp = icmp slt <8 x i64> %x, %y
 %ext = zext <8 x i1> %cmp to <8 x i64>
 store <8 x i64> %ext, <8 x i64>* %zptr
 ret void
}

define <16 x i8> @var_rotate_v16i8(<16 x i8> %a, <16 x i8> %b) nounwind "min-legal-vector-width"="256" {
; CHECK-AVX512-LABEL: var_rotate_v16i8:
; CHECK-AVX512:       # %bb.0:
; CHECK-AVX512-NEXT:    vpand {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %xmm1, %xmm1
; CHECK-AVX512-NEXT:    vpmovzxbw {{.*#+}} ymm1 =
xmm1[0],zero,xmm1[1],zero,xmm1[2],zero,xmm1[3],zero,xmm1[4],zero,xmm1[5],zero,xmm1[6],zero,xmm1[7],zer
o,xmm1[8],zero,xmm1[9],zero,xmm1[10],zero,xmm1[11],zero,xmm1[12],zero,xmm1[13],zero,xmm1[14],zero,xm
m1[15],zero
;
 CHECK-AVX512-NEXT:    vpmovzxbw {{.*#+}} ymm0 =
xmm0[0],zero,xmm0[1],zero,xmm0[2],zero,xmm0[3],zero,xmm0[4],zero,xmm0[5],zero,xmm0[6],zero,xmm0[7],zer
o,xmm0[8],zero,xmm0[9],zero,xmm0[10],zero,xmm0[11],zero,xmm0[12],zero,xmm0[13],zero,xmm0[14],zero,xm
m0[15],zero
; CHECK-AVX512-NEXT:    vpshufb {{.*#+}} ymm0 =
ymm0[0,0,2,2,4,4,6,6,8,8,10,10,12,12,14,14,16,16,18,18,20,20,22,22,24,24,26,26,28,28,30,30]
; CHECK-AVX512-NEXT:    vpsllvw %ymm1, %ymm0, %ymm0
; CHECK-AVX512-NEXT:    vpsrlw $8, %ymm0, %ymm0
; CHECK-AVX512-NEXT:    vpmovwb %ymm0, %xmm0
; CHECK-AVX512-NEXT:    vzeroupper
; CHECK-AVX512-NEXT:    retq
;
; CHECK-VBMI-LABEL: var_rotate_v16i8:
; CHECK-VBMI:       # %bb.0:
; CHECK-VBMI-NEXT:    # kill: def $xmm0 killed $xmm0 def $ymm0
```

```
; CHECK-VBMI-NEXT:    vmovdqa {{.*#+}} ymm2 =
[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15]
;
 CHECK-VBMI-NEXT:    vpand {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %xmm1, %xmm1
; CHECK-VBMI-NEXT:    vpermb %ymm0, %ymm2, %ymm0
; CHECK-VBMI-NEXT:    vpmovzxbw {{.*#+}} ymm1 =
xmm1[0],zero,xmm1[1],zero,xmm1[2],zero,xmm1[3],zero,xmm1[4],zero,xmm1[5],zero,xmm1[6],zero,xmm1[7],zer
o,xmm1[8],zero,xmm1[9],zero,xmm1[10],zero,xmm1[11],zero,xmm1[12],zero,xmm1[13],zero,xmm1[14],zero,xm
m1[15],zero
; CHECK-VBMI-NEXT:    vpsllvw %ymm1, %ymm0, %ymm0
; CHECK-VBMI-NEXT:    vpsrlw $8, %ymm0, %ymm0
; CHECK-VBMI-NEXT:    vpmovwb %ymm0, %xmm0
; CHECK-VBMI-NEXT:    vzeroupper
; CHECK-VBMI-NEXT:    retq
 %b8 = sub <16 x i8> <i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8>, %b
 %shl = shl <16 x i8> %a, %b
 %lshr = lshr <16 x i8> %a, %b8
 %or = or <16 x i8> %shl, %lshr
 ret <16 x i8> %or
}

define <32 x i8> @var_rotate_v32i8(<32 x i8> %a, <32 x i8> %b) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: var_rotate_v32i8:
; CHECK:
 # %bb.0:
; CHECK-NEXT:    vpand {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %ymm1, %ymm1
; CHECK-NEXT:    vpxor %xmm2, %xmm2, %xmm2
; CHECK-NEXT:    vpunpckhbw {{.*#+}} ymm3 =
ymm1[8],ymm2[8],ymm1[9],ymm2[9],ymm1[10],ymm2[10],ymm1[11],ymm2[11],ymm1[12],ymm2[12],ymm1[13
],ymm2[13],ymm1[14],ymm2[14],ymm1[15],ymm2[15],ymm1[24],ymm2[24],ymm1[25],ymm2[25],ymm1[26],ym
m2[26],ymm1[27],ymm2[27],ymm1[28],ymm2[28],ymm1[29],ymm2[29],ymm1[30],ymm2[30],ymm1[31],ymm2[
31]
; CHECK-NEXT:    vpunpckhbw {{.*#+}} ymm4 =
ymm0[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-NEXT:    vpsllvw %ymm3, %ymm4, %ymm3
; CHECK-NEXT:    vpsrlw $8, %ymm3, %ymm3
; CHECK-NEXT:    vpunpcklbw {{.*#+}} ymm1 =
ymm1[0],ymm2[0],ymm1[1],ymm2[1],ymm1[2],ymm2[2],ymm1[3],ymm2[3],ymm1[4],ymm2[4],ymm1[5],ymm2[
5],ymm1[6],ymm2[6],ymm1[7],ymm2[7],ymm1[16],ymm2[16],ymm1[17],ymm2[17],ymm1[18],ymm2[18],ymm1[
19],ymm2[19],ymm1[20],ymm2[20],ymm1[21],ymm2[21],ymm1[22],ymm2[22],ymm1[23],ymm2[23]
; CHECK-NEXT:
    vpunpcklbw {{.*#+}} ymm0 =
ymm0[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-NEXT:    vpsllvw %ymm1, %ymm0, %ymm0
; CHECK-NEXT:    vpsrlw $8, %ymm0, %ymm0
; CHECK-NEXT:    vpackuswb %ymm3, %ymm0, %ymm0
; CHECK-NEXT:    retq
 %b8 = sub <32 x i8> <i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8
```

```
8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8>, %b
 %shl = shl <32 x i8> %a, %b
 %lshr = lshr <32 x i8> %a, %b8
 %or = or <32 x i8> %shl, %lshr
 ret <32 x i8> %or
}

define <32 x i8> @splatvar_rotate_v32i8(<32 x i8> %a, <32 x i8> %b) nounwind "min-legal-vector-width"="256"
{
; CHECK-LABEL: splatvar_rotate_v32i8:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpunpckhbw {{.*#+}} ymm2 =
ymm0[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-NEXT:    vpand {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %xmm1, %xmm1
; CHECK-NEXT:
    vpsllw %xmm1, %ymm2, %ymm2
; CHECK-NEXT:    vpsrlw $8, %ymm2, %ymm2
; CHECK-NEXT:    vpunpcklbw {{.*#+}} ymm0 =
ymm0[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-NEXT:    vpsllw %xmm1, %ymm0, %ymm0
; CHECK-NEXT:    vpsrlw $8, %ymm0, %ymm0
; CHECK-NEXT:    vpackuswb %ymm2, %ymm0, %ymm0
; CHECK-NEXT:    retq
 %splat = shufflevector <32 x i8> %b, <32 x i8> undef, <32 x i32> zeroinitializer
 %splat8 = sub <32 x i8> <i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8
8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8, i8 8>, %splat
 %shl = shl <32 x i8> %a, %splat
 %lshr = lshr <32 x i8> %a, %splat8
 %or = or <32 x i8> %shl, %lshr
 ret <32 x i8> %or
}

define <32 x i8> @constant_rotate_v32i8(<32 x i8> %a) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: constant_rotate_v32i8:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpunpckhbw {{.*#+}} ymm1
 = ymm0[8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,24,24,25,25,26,26,27,27,28,28,29,29,30,30,31,31]
; CHECK-NEXT:    vpsllvw {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %ymm1, %ymm1
; CHECK-NEXT:    vpsrlw $8, %ymm1, %ymm1
; CHECK-NEXT:    vpunpcklbw {{.*#+}} ymm0 =
ymm0[0,0,1,1,2,2,3,3,4,4,5,5,6,6,7,7,16,16,17,17,18,18,19,19,20,20,21,21,22,22,23,23]
; CHECK-NEXT:    vpsllvw {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %ymm0, %ymm0
; CHECK-NEXT:    vpsrlw $8, %ymm0, %ymm0
; CHECK-NEXT:    vpackuswb %ymm1, %ymm0, %ymm0
; CHECK-NEXT:    retq
 %shl = shl <32 x i8> %a, <i8 0, i8 1, i8 2, i8 3, i8 4, i8 5, i8 6, i8 7, i8 8, i8 7, i8 6, i8 5, i8 4, i8 3, i8 2, i8 1, i8 0, i8
1, i8 2, i8 3, i8 4, i8 5, i8 6, i8 7, i8 8, i8 7, i8 6, i8 5, i8 4, i8 3, i8 2, i8 1>
 %lshr = lshr <32 x i8> %a, <i8 8, i8 7, i8 6, i8 5, i8 4, i8 3, i8 2, i8 1, i8 0, i8 1, i8 2, i8 3, i8 4, i8 5, i8 6, i8 7, i8 8,
```

```
i8 7, i8 6, i8 5, i8 4, i8 3, i8 2, i8 1, i8 0, i8 1, i8 2, i8 3, i8 4, i8 5, i8 6, i8 7>
 %or = or <32 x i8> %shl, %lshr
  ret <32 x i8> %or
}

define <32 x i8> @splatconstant_rotate_v32i8(<32 x i8> %a) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: splatconstant_rotate_v32i8:
; CHECK:       # %bb.0:
; CHECK-NEXT:    vpsllw $4, %ymm0, %ymm1
; CHECK-NEXT:    vpsrlw $4, %ymm0, %ymm0
; CHECK-NEXT:    vpternlogq $216, {{\.?LCPI[0-9]+_[0-9]+}}(%rip){1to4}, %ymm1, %ymm0
; CHECK-NEXT:    retq
 %shl = shl <32 x i8> %a, <i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8
4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4>
 %lshr = lshr <32 x i8> %a, <i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4,
i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4>
 %or = or <32 x i8> %shl, %lshr
 ret <32 x i8> %or
}

define <32 x i8> @splatconstant_rotate_mask_v32i8(<32 x i8> %a) nounwind "min-legal-vector-width"="256" {
; CHECK-LABEL: splatconstant_rotate_mask_v32i8:
;
 CHECK:       # %bb.0:
; CHECK-NEXT:    vpsllw $4, %ymm0, %ymm1
; CHECK-NEXT:    vpsrlw $4, %ymm0, %ymm0
; CHECK-NEXT:    vpternlogq $216, {{\.?LCPI[0-9]+_[0-9]+}}(%rip){1to4}, %ymm1, %ymm0
; CHECK-NEXT:    vpand {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %ymm0, %ymm0
; CHECK-NEXT:    retq
 %shl = shl <32 x i8> %a, <i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8
4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4>
 %lshr = lshr <32 x i8> %a, <i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4,
i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4, i8 4>
 %rmask = and <32 x i8> %lshr, <i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55,
i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8 55, i8
 55, i8 55>
 %lmask = and <32 x i8> %shl, <i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33,
i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8 33, i8
33>
 %or = or <32 x i8> %lmask, %rmask
 ret <32 x i8> %or
}
```

the Software, and to permit persons to whom the Software is furnished to do so,
subject to the following conditions:

The above copyright notice and this permission notice shall be included in all
copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.
==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the
power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical

transformation or translation of a Source form, including but
not limited to compiled object code, generated documentation,
and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or
Object form, made available under the License, as indicated by a
copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object
form, that is based on (or derived from) the Work and for which the
editorial revisions, annotations, elaborations, or other modifications
represent, as a whole, an original work of authorship. For the purposes
of this License, Derivative Works shall not include works that remain
separable from, or merely link (or bind by name) to the interfaces of,
the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable

(except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity,

or other liability obligations and/or rights consistent with this
License. However, in accepting such
obligations, You may act only
on Your own behalf and on Your sole responsibility, not on behalf
of any other Contributor, and only if You agree to indemnify,
defend, and hold each Contributor harmless for any liability
incurred by, or claims asserted against, such Contributor by reason
of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following
boilerplate notice, with the fields enclosed by brackets "[]"
replaced with your own identifying information. (Don't include
the brackets!) The text should be enclosed in the appropriate
comment syntax for the file format. We also recommend that a
file or class name and description of purpose be included on the
same "printed page" as the copyright notice for easier
identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions
of this Software are embedded into an Object form of such source code, you
may redistribute such embedded portions in such Object form without complying
with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled
forms of this Software with
software that is licensed under the GPLv2 ("Combined Software") and if a
court of competent jurisdiction determines that the patent provision (Section

3), the indemnity provision (Section 9) or other Section of the License
conflicts with the conditions of the GPLv2, you may retroactively and
prospectively choose to deem waived or otherwise exclude such Section(s) of
the License, but only in their entirety and only with respect to the Combined
Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license
terms. All such code will be identified clearly using at least one of two
mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or
  `LICENSE` file at the top containing the specific
 license and restrictions
  which apply to that software, or
2) It will contain specific license and restriction terms at the top of every
  file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==
University of Illinois/NCSA
Open Source License

Copyright (c) 2003-2019 University of Illinois at Urbana-Champaign.
All rights reserved.

Developed by:

   LLVM Team

   University of Illinois at Urbana-Champaign

   http://llvm.org

Permission is hereby granted, free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal with
the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished
 to do
so, subject to the following conditions:

   * Redistributions of source code must retain the above copyright notice,
     this list of conditions and the following disclaimers.

   * Redistributions in binary form must reproduce the above copyright notice,

this list of conditions and the following disclaimers in the
documentation and/or other materials provided with the distribution.

* Neither the names of the LLVM Team, University of Illinois at
Urbana-Champaign, nor the names of its contributors may be used to
endorse or promote products derived from this Software without specific
prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.

==

The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:

==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical
transformation or translation of a Source form, including but
not limited to compiled object code, generated documentation,
and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or
Object form, made available under the License, as indicated by a
copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object
form, that is based on (or derived from) the Work and for which the
editorial revisions, annotations, elaborations, or other modifications
represent, as a whole, an original work of authorship. For the purposes
of this License, Derivative Works shall not include works that remain
separable from, or merely link (or bind by name) to the interfaces of,
the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work
includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided

that such additional
attribution notices cannot be construed
as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License
does not grant permission to use the trade
names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including
negligence), contract, or otherwise,
unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled

forms of this Software with
software that is licensed under the GPLv2 ("Combined Software") and if a
court of competent jurisdiction determines that the patent provision (Section
3), the indemnity provision (Section 9) or other Section of the License
conflicts with the conditions of the GPLv2, you may retroactively and
prospectively choose to deem waived or otherwise exclude such Section(s) of
the License, but only in their entirety and only with respect to the Combined
Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license
terms. All such code will be identified clearly using at least one of two
mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or
  `LICENSE` file at the top containing the specific
 license and restrictions
  which apply to that software, or
2) It will contain specific license and restriction terms at the top of every
  file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==
University of Illinois/NCSA
Open Source License

Developed by:

   LLDB Team

   http://lldb.llvm.org/

Permission is hereby granted, free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal with
the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished to do
so, subject to the following conditions:

   * Redistributions of
 source code must retain the above copyright notice,
     this list of conditions and the following disclaimers.

ISC LICENSE

----
clang-tidy High-Integrity C++ Files

MIT License (MIT)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.

==

The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:

==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity

exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative

Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work
includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents

of the NOTICE file are for informational purposes only and
do not modify the License. You may add Your own attribution
notices within Derivative Works that You distribute, alongside
or as an addendum to the NOTICE text from the Work, provided
that such additional
attribution notices cannot be construed
as modifying the License.

You may add Your own copyright statement to Your modifications and
may provide additional or different license terms and conditions
for use, reproduction, or distribution of Your modifications, or
for any such Derivative Works as a whole, provided Your use,
reproduction, and distribution of the Work otherwise complies with
the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise,
any Contribution intentionally submitted for inclusion in the Work
by You to the Licensor shall be under the terms and conditions of
this License, without any additional terms or conditions.
Notwithstanding the above, nothing herein shall supersede or modify
the terms of any separate license agreement you may have executed
with Licensor regarding such Contributions.

6. Trademarks. This License
does not grant permission to use the trade
names, trademarks, service marks, or product names of the Licensor,
except as required for reasonable and customary use in describing the
origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or
agreed to in writing, Licensor provides the Work (and each
Contributor provides its Contributions) on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or
implied, including, without limitation, any warranties or conditions
of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A
PARTICULAR PURPOSE. You are solely responsible for determining the
appropriateness of using or redistributing the Work and assume any
risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory,
whether in tort (including
negligence), contract, or otherwise,
unless required by applicable law (such as deliberate and grossly
negligent acts) or agreed to in writing, shall any Contributor be
liable to You for damages, including any direct, indirect, special,
incidental, or consequential damages of any character arising as a
result of this License or out of the use or inability to use the
Work (including but not limited to damages for loss of goodwill,

work stoppage, computer failure or malfunction, or any and all
other commercial damages or losses), even if such Contributor
has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you

may redistribute such embedded portions in such Object form without complying
with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license terms. All such code will be identified clearly using at least one of two mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or `LICENSE` file at the top containing the specific license and restrictions which apply to that software, or
2) It will contain specific license and restriction terms at the top of every file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==

The libc++ library is dual licensed under both the University of Illinois "BSD-Like" license and the MIT license. As a user of this code you may choose to use it under either license. As a contributor, you agree to allow your code to be used under both.

Full text of the relevant licenses is included below.

==

University of Illinois/NCSA
Open Source License

Copyright (c) 2009-2019 by the contributors listed in CREDITS.TXT

All rights reserved.

Developed by:

LLVM Team

University of Illinois at Urbana-Champaign

http://llvm.org

Permission
is hereby granted, free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal with
the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished to do
so, subject to the following conditions:

* Redistributions of source code must retain the above copyright notice,
  this list of conditions and the following disclaimers.

* Redistributions in binary form must reproduce the above copyright notice,
  this list of conditions and the following disclaimers in the
  documentation and/or other materials provided with the distribution.

* Neither the names of the LLVM Team, University of Illinois at
  Urbana-Champaign, nor the names of its contributors may be used to
  endorse or promote products derived from this
  Software without specific
  prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.

==

Copyright (c) 2009-2014 by the contributors listed in CREDITS.TXT

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software,
and to permit persons to whom the Software is
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.
This work is released into the public domain with CC0 1.0. Alternatively, it is licensed under the Apache License 2.0.

Creative Commons Legal Code

CC0 1.0 Universal

CREATIVE COMMONS CORPORATION IS NOT A LAW FIRM AND DOES NOT PROVIDE LEGAL SERVICES. DISTRIBUTION OF THIS DOCUMENT DOES NOT CREATE AN ATTORNEY-CLIENT RELATIONSHIP. CREATIVE COMMONS PROVIDES THIS INFORMATION ON AN "AS-IS" BASIS. CREATIVE COMMONS MAKES NO WARRANTIES REGARDING THE USE OF THIS DOCUMENT OR THE INFORMATION OR WORKS PROVIDED HEREUNDER, AND DISCLAIMS LIABILITY FOR DAMAGES RESULTING FROM THE USE OF THIS DOCUMENT OR THE INFORMATION OR WORKS PROVIDED HEREUNDER.

Statement of Purpose

The laws of most jurisdictions throughout the world automatically confer exclusive Copyright and Related Rights (defined below) upon the creator and subsequent owner(s) (each and all, an "owner") of an original work of authorship
and/or a database (each, a "Work").

Certain owners wish to permanently relinquish those rights to a Work for the purpose of contributing to a commons of creative, cultural and scientific works ("Commons") that the public can reliably and without fear of later claims of infringement build upon, modify, incorporate in other works, reuse and redistribute as freely as possible in any form whatsoever and for any purposes, including without limitation commercial purposes. These owners may contribute to the Commons to promote the ideal of a free culture and the further production of creative, cultural and scientific works, or to gain reputation or greater distribution for their Work in part through the use and efforts of others.

For these and/or other purposes and motivations, and without any expectation of additional consideration or compensation, the person

associating CC0 with a Work (the "Affirmer"), to the extent that he or she
is an owner of Copyright and Related Rights in the Work,
voluntarily
elects to apply CC0 to the Work and publicly distribute the Work under its
terms, with knowledge of his or her Copyright and Related Rights in the
Work and the meaning and intended legal effect of CC0 on those rights.

1. Copyright and Related Rights. A Work made available under CC0 may be
protected by copyright and related or neighboring rights ("Copyright and
Related Rights"). Copyright and Related Rights include, but are not
limited to, the following:

i. the right to reproduce, adapt, distribute, perform, display,
communicate, and translate a Work;
ii. moral rights retained by the original author(s) and/or performer(s);
iii. publicity and privacy rights pertaining to a person's image or
likeness depicted in a Work;
iv. rights protecting against unfair competition in regards to a Work,
subject to the limitations in paragraph 4(a), below;
v. rights protecting the extraction, dissemination, use and reuse of data
in a Work;
vi. database rights
(such as those arising under Directive 96/9/EC of the
European Parliament and of the Council of 11 March 1996 on the legal
protection of databases, and under any national implementation
thereof, including any amended or successor version of such
directive); and
vii. other similar, equivalent or corresponding rights throughout the
world based on applicable law or treaty, and any national
implementations thereof.

2. Waiver. To the greatest extent permitted by, but not in contravention
of, applicable law, Affirmer hereby overtly, fully, permanently,
irrevocably and unconditionally waives, abandons, and surrenders all of
Affirmer's Copyright and Related Rights and associated claims and causes
of action, whether now known or unknown (including existing as well as
future claims and causes of action), in the Work (i) in all territories
worldwide, (ii) for the maximum duration provided by applicable law or
treaty (including future time extensions), (iii) in any current
or future
medium and for any number of copies, and (iv) for any purpose whatsoever,
including without limitation commercial, advertising or promotional
purposes (the "Waiver"). Affirmer makes the Waiver for the benefit of each
member of the public at large and to the detriment of Affirmer's heirs and
successors, fully intending that such Waiver shall not be subject to
revocation, rescission, cancellation, termination, or any other legal or
equitable action to disrupt the quiet enjoyment of the Work by the public
as contemplated by Affirmer's express Statement of Purpose.

3. Public License Fallback. Should any part of the Waiver for any reason be judged legally invalid or ineffective under applicable law, then the Waiver shall be preserved to the maximum extent permitted taking into account Affirmer's express Statement of Purpose. In addition, to the extent the Waiver is so judged Affirmer hereby grants to each affected person a royalty-free, non transferable, non sublicensable, non exclusive, irrevocable and unconditional license to exercise Affirmer's Copyright and Related Rights in the Work (i) in all territories worldwide, (ii) for the maximum duration provided by applicable law or treaty (including future time extensions), (iii) in any current or future medium and for any number of copies, and (iv) for any purpose whatsoever, including without limitation commercial, advertising or promotional purposes (the "License"). The License shall be deemed effective as of the date CC0 was applied by Affirmer to the Work. Should any part of the License for any reason be judged legally invalid or ineffective under applicable law, such partial invalidity or ineffectiveness shall not invalidate the remainder of the License, and in such case Affirmer hereby affirms that he or she will not (i) exercise any of his or her remaining Copyright and Related Rights in the Work or (ii) assert any associated claims and causes of action with respect to the Work, in either case contrary to Affirmer's express Statement of Purpose.

4. Limitations and Disclaimers.

a. No trademark or patent rights held by Affirmer are waived, abandoned, surrendered, licensed or otherwise affected by this document.
b. Affirmer offers the Work as-is and makes no representations or warranties of any kind concerning the Work, express, implied, statutory or otherwise, including without limitation warranties of title, merchantability, fitness for a particular purpose, non infringement, or the absence of latent or other defects, accuracy, or the present or absence of errors, whether or not discoverable, all to the greatest extent permissible under applicable law.
c. Affirmer disclaims responsibility for clearing rights of other persons that may apply to the Work or any use thereof, including without limitation any person's Copyright and Related Rights in the Work. Further, Affirmer disclaims responsibility for obtaining any necessary consents, permissions or other rights required for any use of the Work.
d. Affirmer understands and acknowledges that Creative Commons is not a party to this document and has no duty or obligation with respect to this CC0 or use of the Work.

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity
authorized to submit on behalf of
the copyright owner. For the purposes of this definition, "submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive,
no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
(except as stated in this section) patent license to make, have made,
use, offer to sell, sell, import, and otherwise transfer the Work,
where such license applies only to those patent claims licensable
by such Contributor that are necessarily infringed by their
Contribution(s) alone or by combination of their Contribution(s)
with the Work to which such Contribution(s) was submitted. If You
institute patent litigation against any entity (including a
cross-claim or counterclaim in a lawsuit)
alleging that the Work
or a Contribution incorporated within the Work constitutes direct
or contributory patent infringement, then any patent licenses
granted to You under this License for that Work shall terminate
as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the
Work or Derivative Works thereof in any medium, with or without
modifications, and in Source or Object form, provided that You

meet the following conditions:

(a) You must give any other recipients of the Work or
Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices
stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works
that You distribute, all copyright, patent, trademark, and
attribution notices from the Source form of the Work,
excluding those notices
that do not pertain to any part of
the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must
include a readable copy of the attribution notices contained
within such NOTICE file, excluding those notices that do not
pertain to any part of the Derivative Works, in at least one
of the following places: within a NOTICE text file distributed
as part of the Derivative Works; within the Source form or
documentation, if provided along with the Derivative Works; or,
within a display generated by the Derivative Works, if and
wherever such third-party notices normally appear. The contents
of the NOTICE file are for informational purposes only and
do not modify the License. You may add Your own attribution
notices within Derivative Works that You distribute, alongside
or as an addendum to the NOTICE text from the Work, provided
that such additional attribution notices cannot be construed
as modifying the License.

You may add Your own copyright statement to Your modifications and
may provide additional or different license terms and conditions
for use, reproduction, or distribution of Your modifications, or
for any such Derivative Works as a whole, provided Your use,
reproduction, and distribution of the Work otherwise complies with
the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise,
any Contribution intentionally submitted for inclusion in the Work
by You to the Licensor shall be under the terms and conditions of
this License, without any additional terms or conditions.
Notwithstanding the above, nothing herein shall supersede or modify
the terms of any separate license agreement you may have
executed
with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate

comment syntax for the file format. We also recommend that a
file or class name and description of purpose be included on the
same "printed page"
as the copyright notice for easier
identification within third-party archives.


```
; NOTE: Assertions have been autogenerated by utils/update_test_checks.py UTC_ARGS: --function-signature --
scrub-attributes
; RUN: opt -S -passes=argpromotion < %s | FileCheck %s
; Test that we only promote arguments when the caller/callee have compatible
; function attrubtes.

target triple = "x86_64-unknown-linux-gnu"

; This should promote
define internal fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #0 {
; CHECK-LABEL: define {{[^@]+}}@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]], <8 x i64> [[ARG1_VAL:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    store <8 x i64> [[ARG1_VAL]], <8 x i64>* [[ARG]]
; CHECK-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x i64>* %arg) #0 {
; CHECK-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer512
;
 CHECK-SAME: (<8 x i64>* [[ARG:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
```

```
; CHECK-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; CHECK-NEXT:    call void @llvm.memset.p0i8.i64(i8* align 32 [[TMP3]], i8 0, i64 32, i1 false)
; CHECK-NEXT:    [[TMP_VAL:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]]
; CHECK-NEXT:    call fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x
i64>* [[TMP2]], <8 x i64> [[TMP_VAL]])
; CHECK-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 32
; CHECK-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; CHECK-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8
 x i64>* %tmp2, <8 x i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should promote
define internal fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #1 {
; CHECK-LABEL: define {{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]], <8 x i64> [[ARG1_VAL:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    store <8 x i64> [[ARG1_VAL]], <8 x i64>* [[ARG]]
; CHECK-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %arg) #1 {
; CHECK-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]]
 = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; CHECK-NEXT:    call void @llvm.memset.p0i8.i64(i8* align 32 [[TMP3]], i8 0, i64 32, i1 false)
; CHECK-NEXT:    [[TMP_VAL:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]]
; CHECK-NEXT:    call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x
```

```
i64>* [[TMP2]], <8 x i64> [[TMP_VAL]])
; CHECK-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 32
; CHECK-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; CHECK-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>*
 %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should promote
define internal fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #1 {
; CHECK-LABEL: define {{[^@]+}}@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]], <8 x i64> [[ARG1_VAL:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    store <8 x i64> [[ARG1_VAL]], <8 x i64>* [[ARG]]
; CHECK-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* %arg) #0 {
; CHECK-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP3:%.*]]
 = bitcast <8 x i64>* [[TMP]] to i8*
; CHECK-NEXT:    call void @llvm.memset.p0i8.i64(i8* align 32 [[TMP3]], i8 0, i64 32, i1 false)
; CHECK-NEXT:    [[TMP_VAL:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]]
; CHECK-NEXT:    call fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x
i64>* [[TMP2]], <8 x i64> [[TMP_VAL]])
; CHECK-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 32
; CHECK-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; CHECK-NEXT:    ret void
```

```
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should promote
define internal
 fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* %arg, <8 x i64>*
readonly %arg1) #0 {
; CHECK-LABEL: define {{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]], <8 x i64> [[ARG1_VAL:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    store <8 x i64> [[ARG1_VAL]], <8 x i64>* [[ARG]]
; CHECK-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* %arg) #1 {
; CHECK-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer512
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; CHECK-NEXT:    call void @llvm.memset.p0i8.i64(i8* align 32 [[TMP3]], i8 0,
 i64 32, i1 false)
; CHECK-NEXT:    [[TMP_VAL:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]]
; CHECK-NEXT:    call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x
i64>* [[TMP2]], <8 x i64> [[TMP_VAL]])
; CHECK-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 32
; CHECK-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; CHECK-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
```

```
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should not promote
define internal fastcc void @callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %arg,
<8 x i64>* readonly %arg1)
 #1 {
; CHECK-LABEL: define {{[^@]+}}@callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]], <8 x i64>* readonly [[ARG1:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]]
; CHECK-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]]
; CHECK-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %arg) #2 {
; CHECK-LABEL: define {{[^@]+}}@avx512_legal256_prefer256_call_avx512_legal512_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; CHECK-NEXT:    call void @llvm.memset.p0i8.i64(i8* align 32 [[TMP3]], i8 0, i64 32, i1 false)
; CHECK-NEXT:    call fastcc
 void @callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* [[TMP2]], <8 x i64>*
[[TMP]])
; CHECK-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 32
; CHECK-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; CHECK-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
```

```
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should not promote
define internal fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #2 {
; CHECK-LABEL: define {{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256
; CHECK-SAME: (<8
 x i64>* [[ARG:%.*]], <8 x i64>* readonly [[ARG1:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]]
; CHECK-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]]
; CHECK-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* %arg) #1 {
; CHECK-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal256_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; CHECK-NEXT:    call void @llvm.memset.p0i8.i64(i8* align 32 [[TMP3]], i8 0, i64 32, i1 false)
; CHECK-NEXT:    call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x
i64>* [[TMP2]], <8 x i64>* [[TMP]])
; CHECK-NEXT:
    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 32
; CHECK-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; CHECK-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}
```

```
; This should promote
define internal fastcc void @callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* %arg, <8
x i64>* readonly %arg1) #3 {
; CHECK-LABEL: define {{[^@]+}}@callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]], <8 x i64> [[ARG1_VAL:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    store <8 x i64> [[ARG1_VAL]], <8 x i64>* [[ARG]]
;
 CHECK-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* %arg) #4 {
; CHECK-LABEL: define {{[^@]+}}@avx2_legal256_prefer256_call_avx2_legal512_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; CHECK-NEXT:    call void @llvm.memset.p0i8.i64(i8* align 32 [[TMP3]], i8 0, i64 32, i1 false)
; CHECK-NEXT:    [[TMP_VAL:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]]
; CHECK-NEXT:    call fastcc void @callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>*
[[TMP2]], <8 x i64> [[TMP_VAL]])
; CHECK-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 32
; CHECK-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
;
 CHECK-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* %tmp2, <8 x i64>*
%tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should promote
define internal fastcc void @callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* %arg, <8
x i64>* readonly %arg1) #4 {
```

```
; CHECK-LABEL: define {{[^@]+}}@callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]], <8 x i64> [[ARG1_VAL:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    store <8 x i64> [[ARG1_VAL]], <8 x i64>* [[ARG]]
; CHECK-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void
 @avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* %arg) #3 {
; CHECK-LABEL: define {{[^@]+}}@avx2_legal512_prefer256_call_avx2_legal256_prefer256
; CHECK-SAME: (<8 x i64>* [[ARG:%.*]])
; CHECK-NEXT:  bb:
; CHECK-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; CHECK-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; CHECK-NEXT:    call void @llvm.memset.p0i8.i64(i8* align 32 [[TMP3]], i8 0, i64 32, i1 false)
; CHECK-NEXT:    [[TMP_VAL:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]]
; CHECK-NEXT:    call fastcc void @callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>*
[[TMP2]], <8 x i64> [[TMP_VAL]])
; CHECK-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 32
; CHECK-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; CHECK-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
  call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* %tmp2, <8 x i64>*
%tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; If the arguments are scalar, its ok to promote.
define internal i32 @scalar_callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(i32* %X, i32*
%Y) #2 {
; CHECK-LABEL: define
{{[^@]+}}@scalar_callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256
; CHECK-SAME: (i32 [[X_VAL:%.*]], i32 [[Y_VAL:%.*]])
; CHECK-NEXT:    [[C:%.*]] = add i32 [[X_VAL]], [[Y_VAL]]
; CHECK-NEXT:    ret i32 [[C]]
```

```
;
 %A = load i32, i32* %X
 %B = load i32, i32* %Y
 %C = add i32 %A, %B
 ret i32 %C
}

define i32 @scalar_avx512_legal256_prefer256_call_avx512_legal512_prefer256(i32* %B) #2 {
; CHECK-LABEL: define {{[^@]+}}@scalar_avx512_legal256_prefer256_call_avx512_legal512_prefer256
;
 CHECK-SAME: (i32* [[B:%.*]])
; CHECK-NEXT:    [[A:%.*]] = alloca i32
; CHECK-NEXT:    store i32 1, i32* [[A]]
; CHECK-NEXT:    [[A_VAL:%.*]] = load i32, i32* [[A]]
; CHECK-NEXT:    [[B_VAL:%.*]] = load i32, i32* [[B]]
; CHECK-NEXT:    [[C:%.*]] = call i32
@scalar_callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(i32 [[A_VAL]], i32 [[B_VAL]])
; CHECK-NEXT:    ret i32 [[C]]
;
 %A = alloca i32
 store i32 1, i32* %A
 %C = call i32 @scalar_callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(i32* %A, i32* %B)
 ret i32 %C
}

; If the arguments are scalar, its ok to promote.
define internal i32 @scalar_callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(i32* %X, i32*
%Y) #2 {
; CHECK-LABEL: define
{{[^@]+}}@scalar_callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256
; CHECK-SAME: (i32 [[X_VAL:%.*]], i32 [[Y_VAL:%.*]])
; CHECK-NEXT:    [[C:%.*]] = add i32 [[X_VAL]], [[Y_VAL]]
; CHECK-NEXT:    ret i32 [[C]]
;
 %A = load i32, i32* %X
 %B = load
 i32, i32* %Y
 %C = add i32 %A, %B
 ret i32 %C
}

define i32 @scalar_avx512_legal512_prefer256_call_avx512_legal256_prefer256(i32* %B) #2 {
; CHECK-LABEL: define {{[^@]+}}@scalar_avx512_legal512_prefer256_call_avx512_legal256_prefer256
; CHECK-SAME: (i32* [[B:%.*]])
; CHECK-NEXT:    [[A:%.*]] = alloca i32
; CHECK-NEXT:    store i32 1, i32* [[A]]
; CHECK-NEXT:    [[A_VAL:%.*]] = load i32, i32* [[A]]
; CHECK-NEXT:    [[B_VAL:%.*]] = load i32, i32* [[B]]
```

```
; CHECK-NEXT:    [[C:%.*]] = call i32
@scalar_callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(i32 [[A_VAL]], i32 [[B_VAL]])
; CHECK-NEXT:    ret i32 [[C]]
;
 %A = alloca i32
 store i32 1, i32* %A
 %C = call i32 @scalar_callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(i32* %A, i32* %B)
 ret i32 %C
}

; Function Attrs: argmemonly nounwind
declare void @llvm.memset.p0i8.i64(i8* nocapture writeonly, i8, i64, i1) #5

attributes #0 = { inlinehint norecurse nounwind uwtable "target-features"="+avx512vl" "min-legal-vector-
width"="512"
 "prefer-vector-width"="512" }
attributes #1 = { inlinehint norecurse nounwind uwtable "target-features"="+avx512vl" "min-legal-vector-
width"="512" "prefer-vector-width"="256" }
attributes #2 = { inlinehint norecurse nounwind uwtable "target-features"="+avx512vl" "min-legal-vector-
width"="256" "prefer-vector-width"="256" }
attributes #3 = { inlinehint norecurse nounwind uwtable "target-features"="+avx2" "min-legal-vector-width"="512"
"prefer-vector-width"="256" }
attributes #4 = { inlinehint norecurse nounwind uwtable "target-features"="+avx2" "min-legal-vector-width"="256"
"prefer-vector-width"="256" }
attributes #5 = { argmemonly nounwind }
; NOTE: Assertions have been autogenerated by utils/update_test_checks.py UTC_ARGS: --include-generated-
funcs
; RUN: opt -S -verify -iroutliner -ir-outlining-no-cost < %s | FileCheck %s

; This test checks that debug info is recognized as able to be extracted along
; with the other instructions, but is not included in the consolidated function.

define void @function1() !dbg !6 {
entry:
 %a = alloca i32, align 4, !dbg !17
 call void @llvm.dbg.value(metadata i32* %a, metadata !9, metadata !DIExpression()), !dbg !17
 %b = alloca i32, align 4, !dbg !18
 call void @llvm.dbg.value(metadata i32* %b, metadata !11, metadata !DIExpression()), !dbg !18
 %c = alloca i32, align 4, !dbg !19
 call void @llvm.dbg.value(metadata i32* %c, metadata !12, metadata !DIExpression()), !dbg !19
 store i32 2, i32* %a, align 4, !dbg !20
 store i32 3, i32* %b, align 4, !dbg !21
 store i32 4, i32* %c, align 4, !dbg !22
 %al = load i32, i32* %a, align 4, !dbg !23
 call void @llvm.dbg.value(metadata i32 %al,
 metadata !13, metadata !DIExpression()), !dbg !23
 %bl = load i32, i32* %b, align 4, !dbg !24
 call void @llvm.dbg.value(metadata i32 %bl, metadata !15, metadata !DIExpression()), !dbg !24
```

```
 %cl = load i32, i32* %c, align 4, !dbg !25
 call void @llvm.dbg.value(metadata i32 %cl, metadata !16, metadata !DIExpression()), !dbg !25
 ret void, !dbg !26
}

define void @function2() !dbg !27 {
entry:
 %a = alloca i32, align 4, !dbg !35
 call void @llvm.dbg.value(metadata i32* %a, metadata !29, metadata !DIExpression()), !dbg !35
 %b = alloca i32, align 4, !dbg !36
 call void @llvm.dbg.value(metadata i32* %b, metadata !30, metadata !DIExpression()), !dbg !36
 %c = alloca i32, align 4, !dbg !37
 call void @llvm.dbg.value(metadata i32* %c, metadata !31, metadata !DIExpression()), !dbg !37
 store i32 2, i32* %a, align 4, !dbg !38
 store i32 3, i32* %b, align 4, !dbg !39
 store i32 4, i32* %c, align 4, !dbg !40
 %al = load i32, i32* %a, align 4, !dbg !41
 call void @llvm.dbg.value(metadata
 i32 %al, metadata !32, metadata !DIExpression()), !dbg !41
 %bl = load i32, i32* %b, align 4, !dbg !42
 call void @llvm.dbg.value(metadata i32 %bl, metadata !33, metadata !DIExpression()), !dbg !42
 %cl = load i32, i32* %c, align 4, !dbg !43
 call void @llvm.dbg.value(metadata i32 %cl, metadata !34, metadata !DIExpression()), !dbg !43
 ret void, !dbg !44
}


; Function Attrs: nounwind readnone speculatable willreturn
declare void @llvm.dbg.value(metadata, metadata, metadata) #0

attributes #0 = { nounwind readnone speculatable willreturn }

!llvm.dbg.cu = !{!0}
!llvm.debugify = !{!3, !4}
!llvm.module.flags = !{!5}

!0 = distinct !DICompileUnit(language: DW_LANG_C, file: !1, producer: "debugify", isOptimized: true,
runtimeVersion: 0, emissionKind: FullDebug, enums: !2)
!1 = !DIFile(filename: "legal-debug.ll", directory: "/")
!2 = !{}
!3 = !{i32 20}
!4 = !{i32 12}
!5 = !{i32 2, !"Debug Info Version", i32 3}
!6 = distinct !DISubprogram(name: "function1", linkageName: "function1",
 scope: null, file: !1, line: 1, type: !7, scopeLine: 1, spFlags: DISPFlagDefinition | DISPFlagOptimized, unit: !0,
retainedNodes: !8)
!7 = !DISubroutineType(types: !2)
!8 = !{!9, !11, !12, !13, !15, !16}
```

```
!9 = !DILocalVariable(name: "1", scope: !6, file: !1, line: 1, type: !10)
!10 = !DIBasicType(name: "ty64", size: 64, encoding: DW_ATE_unsigned)
!11 = !DILocalVariable(name: "2", scope: !6, file: !1, line: 2, type: !10)
!12 = !DILocalVariable(name: "3", scope: !6, file: !1, line: 3, type: !10)
!13 = !DILocalVariable(name: "4", scope: !6, file: !1, line: 7, type: !14)
!14 = !DIBasicType(name: "ty32", size: 32, encoding: DW_ATE_unsigned)
!15 = !DILocalVariable(name: "5", scope: !6, file: !1, line: 8, type: !14)
!16 = !DILocalVariable(name: "6", scope: !6, file: !1, line: 9, type: !14)
!17 = !DILocation(line: 1, column: 1, scope: !6)
!18 = !DILocation(line: 2, column: 1, scope: !6)
!19 = !DILocation(line: 3, column: 1, scope: !6)
!20 = !DILocation(line: 4, column: 1, scope: !6)
!21
 = !DILocation(line: 5, column: 1, scope: !6)
!22 = !DILocation(line: 6, column: 1, scope: !6)
!23 = !DILocation(line: 7, column: 1, scope: !6)
!24 = !DILocation(line: 8, column: 1, scope: !6)
!25 = !DILocation(line: 9, column: 1, scope: !6)
!26 = !DILocation(line: 10, column: 1, scope: !6)
!27 = distinct !DISubprogram(name: "function2", linkageName: "function2", scope: null, file: !1, line: 11, type: !7,
scopeLine: 11, spFlags: DISPFlagDefinition | DISPFlagOptimized, unit: !0, retainedNodes: !28)
!28 = !{!29, !30, !31, !32, !33, !34}
!29 = !DILocalVariable(name: "7", scope: !27, file: !1, line: 11, type: !10)
!30 = !DILocalVariable(name: "8", scope: !27, file: !1, line: 12, type: !10)
!31 = !DILocalVariable(name: "9", scope: !27, file: !1, line: 13, type: !10)
!32 = !DILocalVariable(name: "10", scope: !27, file: !1, line: 17, type: !14)
!33 = !DILocalVariable(name: "11", scope: !27, file: !1, line: 18, type: !14)
!34 = !DILocalVariable(name: "12", scope: !27, file: !1, line: 19, type:
 !14)
!35 = !DILocation(line: 11, column: 1, scope: !27)
!36 = !DILocation(line: 12, column: 1, scope: !27)
!37 = !DILocation(line: 13, column: 1, scope: !27)
!38 = !DILocation(line: 14, column: 1, scope: !27)
!39 = !DILocation(line: 15, column: 1, scope: !27)
!40 = !DILocation(line: 16, column: 1, scope: !27)
!41 = !DILocation(line: 17, column: 1, scope: !27)
!42 = !DILocation(line: 18, column: 1, scope: !27)
!43 = !DILocation(line: 19, column: 1, scope: !27)
!44 = !DILocation(line: 20, column: 1, scope: !27)
; CHECK-LABEL: @function1(
; CHECK-NEXT:  entry:
; CHECK-NEXT:    [[A:%.*]] = alloca i32, align 4, !dbg [[DBG17:![0-9]+]]
; CHECK-NEXT:    call void @llvm.dbg.value(metadata i32* [[A]], metadata [[META9:![0-9]+]], metadata
!DIExpression()), !dbg [[DBG17]]
; CHECK-NEXT:    [[B:%.*]] = alloca i32, align 4, !dbg [[DBG18:![0-9]+]]
; CHECK-NEXT:    call void @llvm.dbg.value(metadata i32* [[B]], metadata [[META11:![0-9]+]], metadata
!DIExpression()), !dbg [[DBG18]]
; CHECK-NEXT:    [[C:%.*]]
```

 = alloca i32, align 4, !dbg [[DBG19:![0-9]+]]
; CHECK-NEXT: call void @llvm.dbg.value(metadata i32* [[C]], metadata [[META12:![0-9]+]], metadata !DIExpression()), !dbg [[DBG19]]
; CHECK-NEXT: call void @outlined_ir_func_0(i32* [[A]], i32* [[B]], i32* [[C]]), !dbg [[DBG20:![0-9]+]]
; CHECK-NEXT: ret void, !dbg [[DBG21:![0-9]+]]
;
;
; CHECK-LABEL: @function2(
; CHECK-NEXT: entry:
; CHECK-NEXT: [[A:%.*]] = alloca i32, align 4, !dbg [[DBG30:![0-9]+]]
; CHECK-NEXT: call void @llvm.dbg.value(metadata i32* [[A]], metadata [[META24:![0-9]+]], metadata !DIExpression()), !dbg [[DBG30]]
; CHECK-NEXT: [[B:%.*]] = alloca i32, align 4, !dbg [[DBG31:![0-9]+]]
; CHECK-NEXT: call void @llvm.dbg.value(metadata i32* [[B]], metadata [[META25:![0-9]+]], metadata !DIExpression()), !dbg [[DBG31]]
; CHECK-NEXT: [[C:%.*]] = alloca i32, align 4, !dbg [[DBG32:![0-9]+]]
; CHECK-NEXT: call void @llvm.dbg.value(metadata i32* [[C]], metadata [[META26:![0-9]+]], metadata !DIExpression()),
 !dbg [[DBG32]]
; CHECK-NEXT: call void @outlined_ir_func_0(i32* [[A]], i32* [[B]], i32* [[C]]), !dbg [[DBG33:![0-9]+]]
; CHECK-NEXT: ret void, !dbg [[DBG34:![0-9]+]]
;
;
; CHECK: @outlined_ir_func_0(i32* [[TMP0:%.*]], i32* [[TMP1:%.*]], i32* [[TMP2:%.*]])
; CHECK: entry_to_outline:
; CHECK-NEXT: store i32 2, i32* [[TMP0]], align 4
; CHECK-NEXT: store i32 3, i32* [[TMP1]], align 4
; CHECK-NEXT: store i32 4, i32* [[TMP2]], align 4
; CHECK-NEXT: [[AL:%.*]] = load i32, i32* [[TMP0]], align 4
; CHECK-NEXT: [[BL:%.*]] = load i32, i32* [[TMP1]], align 4
; CHECK-NEXT: [[CL:%.*]] = load i32, i32* [[TMP2]], align 4
; CHECK-NEXT: br label [[ENTRY_AFTER_OUTLINE_EXITSTUB:%.*]]
;
==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work
includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must
include a readable copy of the attribution notices contained
within such NOTICE file, excluding those notices that do not
pertain to any part of the Derivative Works, in at least one
of the following places: within a NOTICE text file distributed
as part of the Derivative Works; within the Source form or
documentation, if provided along with the Derivative Works; or,
within a display generated by the Derivative Works, if and
wherever such third-party notices normally appear. The contents
of the NOTICE file are for informational purposes only and
do not modify the License. You may add Your own attribution
notices within Derivative Works that You distribute, alongside
or as an addendum to the NOTICE text from the Work, provided
that such additional
attribution notices cannot be construed
as modifying the License.

You may add Your own copyright statement to Your modifications and
may provide additional or different license terms and conditions
for use, reproduction, or distribution of Your modifications, or
for any such Derivative Works as a whole, provided Your use,
reproduction, and distribution of the Work otherwise complies with
the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise,
any Contribution intentionally submitted for inclusion in the Work
by You to the Licensor shall be under the terms and conditions of
this License, without any additional terms or conditions.
Notwithstanding the above, nothing herein shall supersede or modify
the terms of any separate license agreement you may have executed
with Licensor regarding such Contributions.

6. Trademarks. This License
does not grant permission to use the trade
names, trademarks, service marks, or product names of the Licensor,
except as required for reasonable and customary use in describing the
origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or
agreed to in writing, Licensor provides the Work (and each
Contributor provides its Contributions) on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or
implied, including, without limitation, any warranties or conditions
of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A

PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license terms. All such code will be identified clearly using at least one of two mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or `LICENSE` file at the top containing the specific license and restrictions which apply to that software, or
2) It will contain specific license and restriction terms at the top of every file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==

The software contained in this directory tree is dual licensed under both the University of Illinois "BSD-Like" license and the MIT license. As a user of this code you may choose to use it under either license. As a contributor, you agree to allow your code to be used under both.

Full text of the relevant licenses is included below.

==

University of Illinois/NCSA
Open Source License

Developed by:
Threading Runtimes Team
Intel Corporation
http://www.intel.com

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal with the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimers.

* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimers in the documentation and/or other materials provided with the distribution.

* Neither the names of Intel Corporation Threading Runtimes Team nor the names of its contributors may be used to endorse or promote products derived from
this Software without specific prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.

==

Permission is hereby granted, free of charge, to any person obtaining a copy

of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software,
 and to permit persons to whom the Software is
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
AUTHORS OR COPYRIGHT HOLDERS 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.
IMath is Copyright 2002-2009 Michael J. Fromberger
You may use it subject to the following Licensing Terms:

Permission is hereby granted, free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal in
the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished to do
so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all
copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
AUTHORS OR COPYRIGHT HOLDERS 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.
; RUN: llc -march=hexagon -hexagon-hvx-widen=32 < %s | FileCheck %s

; Truncating a type-to-be-widenened to a legal type (v8i8).
; Check that this compiles successfully.
; CHECK-LABEL: f0:
; CHECK: dealloc_return

target datalayout = "e-m:e-p:32:32:32-a:0-n16:32-i64:64:64-i32:32:32-i16:16:16-i1:8:8-f32:32:32-f64:64:64-v32:32:32-v64:64:64-v512:512:512-v1024:1024:1024-v2048:2048:2048"
target triple = "hexagon"

```
define dllexport void @f0(i8* %a0) local_unnamed_addr #0 {
b0:
 %v0 = load i8, i8* undef, align 1
 %v1 = zext i8 %v0 to i16
 %v2 = add i16 0, %v1
 %v3 = icmp sgt i16 %v2, 1
 %v4 = select i1 %v3, i16 %v2, i16 1
 %v5 = udiv i16 -32768, %v4
 %v6 = zext i16 %v5 to i32
 %v7 = insertelement <8 x i32> undef, i32 %v6, i32 0
 %v8 = shufflevector <8 x i32> %v7, <8 x i32> undef, <8 x i32> zeroinitializer
 %v9 = load <8 x i16>, <8 x i16>* undef, align 2
 %v10 = sext <8 x i16> %v9 to <8 x i32>
 %v11 = mul nsw <8 x i32> %v8, %v10
 %v12 = add nsw <8 x i32> %v11, <i32 16384, i32 16384,
 i32 16384, i32 16384, i32 16384, i32 16384, i32 16384, i32 16384>
 %v13 = lshr <8 x i32> %v12, <i32 15, i32 15, i32 15, i32 15, i32 15, i32 15, i32 15, i32 15>
 %v14 = trunc <8 x i32> %v13 to <8 x i8>
 %v15 = getelementptr inbounds i8, i8* %a0, i32 undef
 %v16 = bitcast i8* %v15 to <8 x i8>*
 store <8 x i8> %v14, <8 x i8>* %v16, align 1
 ret void
}

attributes #0 = { "target-features"="+hvx,+hvx-length128b" }
; NOTE: Assertions have been autogenerated by utils/update_test_checks.py UTC_ARGS: --function-signature --
check-attributes --check-globals
; RUN: opt -attributor -enable-new-pm=0 -attributor-manifest-internal  -attributor-max-iterations-verify -attributor-
annotate-decl-cs -attributor-max-iterations=3 -S < %s | FileCheck %s --check-
prefixes=CHECK,NOT_CGSCC_NPM,NOT_CGSCC_OPM,NOT_TUNIT_NPM,IS__TUNIT____,IS________OP
M,IS__TUNIT_OPM
; RUN: opt -aa-pipeline=basic-aa -passes=attributor -attributor-manifest-internal  -attributor-max-iterations-verify -
attributor-annotate-decl-cs -attributor-max-iterations=3 -S < %s | FileCheck %s --check-
prefixes=CHECK,NOT_CGSCC_OPM,NOT_CGSCC_NPM,NOT_TUNIT_OPM,IS__TUNIT____,IS________NP
M,IS__TUNIT_NPM
; RUN: opt -attributor-cgscc -enable-new-pm=0 -attributor-manifest-internal  -attributor-annotate-decl-cs -S < %s |
FileCheck %s --check-
prefixes=CHECK,NOT_TUNIT_NPM,NOT_TUNIT_OPM,NOT_CGSCC_NPM,IS__CGSCC____,IS________OP
M,IS__CGSCC_OPM
; RUN: opt -aa-pipeline=basic-aa
 -passes=attributor-cgscc -attributor-manifest-internal  -attributor-annotate-decl-cs -S < %s | FileCheck %s --check-
prefixes=CHECK,NOT_TUNIT_NPM,NOT_TUNIT_OPM,NOT_CGSCC_OPM,IS__CGSCC____,IS________NP
M,IS__CGSCC_NPM
; Test that we only promote arguments when the caller/callee have compatible
; function attrubtes.

target triple = "x86_64-unknown-linux-gnu"
```

```
; This should promote
define internal fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #0 {
;
; IS________OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________OPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512
; IS________OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64)
[[ARG:%.*]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[ARG1:%.*]])
#[[ATTR0:[0-9]+]] {
; IS________OPM-NEXT:
 bb:
; IS________OPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________OPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________OPM-NEXT:    ret void
;
; IS________NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________NPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512
; IS________NPM-SAME: (<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64
dereferenceable(64) [[ARG:%.*]], <8 x i64> [[TMP0:%.*]]) #[[ATTR0:[0-9]+]] {
; IS________NPM-NEXT:  bb:
; IS________NPM-NEXT:    [[ARG1_PRIV:%.*]] = alloca <8 x i64>, align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP0]], <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________NPM-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>,
 <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x i64>* %arg) #0 {
;
; IS__TUNIT_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer512
; IS__TUNIT_OPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR0]] {
; IS__TUNIT_OPM-NEXT:  bb:
; IS__TUNIT_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6:[0-9]+]]
; IS__TUNIT_OPM-NEXT:    call fastcc void
```

@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8
 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR7:[0-9]+]]
; IS__TUNIT_OPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_OPM-NEXT: store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_OPM-NEXT: ret void
;
; IS__TUNIT_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer512
; IS__TUNIT_NPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR0]] {
; IS__TUNIT_NPM-NEXT: bb:
; IS__TUNIT_NPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_NPM-NEXT: call void @llvm.memset.p0i8.i64(i8*
 nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5:[0-9]+]]
; IS__TUNIT_NPM-NEXT: [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__TUNIT_NPM-NEXT: call fastcc void
@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6:[0-9]+]]
; IS__TUNIT_NPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_NPM-NEXT: store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_NPM-NEXT: ret void
;
; IS__CGSCC_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer512
; IS__CGSCC_OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64) [[ARG:%.*]])
 #[[ATTR0]] {
; IS__CGSCC_OPM-NEXT: bb:
; IS__CGSCC_OPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_OPM-NEXT: call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6:[0-9]+]]
; IS__CGSCC_OPM-NEXT: call fastcc void
@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR7:[0-9]+]]
; IS__CGSCC_OPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_OPM-NEXT: store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_OPM-NEXT: ret void
;
; IS__CGSCC_NPM: Function Attrs:
 argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer512
; IS__CGSCC_NPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)

```
[[ARG:%.*]]) #[[ATTR0]] {
; IS__CGSCC_NPM-NEXT:  bb:
; IS__CGSCC_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5:[0-9]+]]
; IS__CGSCC_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__CGSCC_NPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x i64>* noalias nocapture nofree
noundef nonnull writeonly
 align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6:[0-9]+]]
; IS__CGSCC_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_NPM-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer512(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should promote
define internal fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #1 {
;
; IS________OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________OPM-LABEL:
 define {{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256
; IS________OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64)
[[ARG:%.*]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[ARG1:%.*]])
#[[ATTR1:[0-9]+]] {
; IS________OPM-NEXT:  bb:
; IS________OPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________OPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________OPM-NEXT:    ret void
;
; IS________NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________NPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256
; IS________NPM-SAME: (<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64
dereferenceable(64) [[ARG:%.*]], <8 x i64> [[TMP0:%.*]]) #[[ATTR1:[0-9]+]] {
```

```
; IS________NPM-NEXT:  bb:
; IS________NPM-NEXT:    [[ARG1_PRIV:%.*]]
 = alloca <8 x i64>, align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP0]], <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________NPM-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %arg) #1 {
;
; IS__TUNIT_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer256
; IS__TUNIT_OPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR1]] {
; IS__TUNIT_OPM-NEXT:  bb:
; IS__TUNIT_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP3:%.*]]
 = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__TUNIT_OPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly
align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__TUNIT_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_OPM-NEXT:    ret void
;
; IS__TUNIT_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer256
; IS__TUNIT_NPM-SAME: (<8 x i64>* nocapture nofree
 writeonly [[ARG:%.*]]) #[[ATTR1]] {
; IS__TUNIT_NPM-NEXT:  bb:
; IS__TUNIT_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__TUNIT_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__TUNIT_NPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* noalias nocapture nofree
noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
```

```
; IS__TUNIT_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_NPM-NEXT:    ret void
;
; IS__CGSCC_OPM:
 Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer256
; IS__CGSCC_OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)
[[ARG:%.*]]) #[[ATTR1]] {
; IS__CGSCC_OPM-NEXT:  bb:
; IS__CGSCC_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__CGSCC_OPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef
 nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__CGSCC_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_OPM-NEXT:    ret void
;
; IS__CGSCC_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer256
; IS__CGSCC_NPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)
[[ARG:%.*]]) #[[ATTR1]] {
; IS__CGSCC_NPM-NEXT:  bb:
; IS__CGSCC_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64
 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__CGSCC_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__CGSCC_NPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* noalias nocapture nofree
noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
; IS__CGSCC_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_NPM-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %tmp2, <8 x
```

```
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

;
 This should promote
define internal fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #1 {
;
; IS________OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________OPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256
; IS________OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64)
[[ARG:%.*]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[ARG1:%.*]])
#[[ATTR1]] {
; IS________OPM-NEXT:  bb:
; IS________OPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________OPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________OPM-NEXT:    ret void
;
; IS________NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________NPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256
;
 IS________NPM-SAME: (<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64
dereferenceable(64) [[ARG:%.*]], <8 x i64> [[TMP0:%.*]]) #[[ATTR1]] {
; IS________NPM-NEXT:  bb:
; IS________NPM-NEXT:    [[ARG1_PRIV:%.*]] = alloca <8 x i64>, align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP0]], <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________NPM-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* %arg) #0 {
;
; IS__TUNIT_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer256
; IS__TUNIT_OPM-SAME:
 (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR0]] {
; IS__TUNIT_OPM-NEXT:  bb:
```

; IS__TUNIT_OPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_OPM-NEXT: call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__TUNIT_OPM-NEXT: call fastcc void
@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly
align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__TUNIT_OPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_OPM-NEXT: store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_OPM-NEXT:
    ret void
;
; IS__TUNIT_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer256
; IS__TUNIT_NPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR0]] {
; IS__TUNIT_NPM-NEXT: bb:
; IS__TUNIT_NPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_NPM-NEXT: call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__TUNIT_NPM-NEXT: [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__TUNIT_NPM-NEXT: call fastcc void
@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* noalias nocapture nofree
noundef nonnull writeonly
 align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
; IS__TUNIT_NPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_NPM-NEXT: store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_NPM-NEXT: ret void
;
; IS__CGSCC_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer256
; IS__CGSCC_OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)
[[ARG:%.*]]) #[[ATTR0]] {
; IS__CGSCC_OPM-NEXT: bb:
; IS__CGSCC_OPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_OPM-NEXT: call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64
 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__CGSCC_OPM-NEXT: call fastcc void
@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly
align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__CGSCC_OPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64

```
; IS__CGSCC_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_OPM-NEXT:    ret void
;
; IS__CGSCC_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer512_call_avx512_legal512_prefer256
; IS__CGSCC_NPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)
[[ARG:%.*]]) #[[ATTR0]] {
; IS__CGSCC_NPM-NEXT:  bb:
; IS__CGSCC_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP2:%.*]]
 = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__CGSCC_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__CGSCC_NPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* noalias nocapture nofree
noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
; IS__CGSCC_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_NPM-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align
 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer512_call_avx512_legal512_prefer256(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should promote
define internal fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #0 {
;
; IS________OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________OPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512
; IS________OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64)
[[ARG:%.*]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[ARG1:%.*]])
#[[ATTR0]] {
; IS________OPM-NEXT:  bb:
; IS________OPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________OPM-NEXT:
```

```
  store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________OPM-NEXT:    ret void
;
; IS________NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________NPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512
; IS________NPM-SAME: (<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64
dereferenceable(64) [[ARG:%.*]], <8 x i64> [[TMP0:%.*]]) #[[ATTR0]] {
; IS________NPM-NEXT:  bb:
; IS________NPM-NEXT:    [[ARG1_PRIV:%.*]] = alloca <8 x i64>, align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP0]], <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________NPM-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8
 x i64>* %arg) #1 {
;
; IS__TUNIT_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer512
; IS__TUNIT_OPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR1]] {
; IS__TUNIT_OPM-NEXT:  bb:
; IS__TUNIT_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__TUNIT_OPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>*
 nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__TUNIT_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_OPM-NEXT:    ret void
;
; IS__TUNIT_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer512
; IS__TUNIT_NPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR1]] {
; IS__TUNIT_NPM-NEXT:  bb:
; IS__TUNIT_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
```

```
; IS__TUNIT_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef
 false) #[[ATTR5]]
; IS__TUNIT_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__TUNIT_NPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* noalias nocapture nofree
noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
; IS__TUNIT_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_NPM-NEXT:    ret void
;
; IS__CGSCC_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer512
; IS__CGSCC_OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)
[[ARG:%.*]]) #[[ATTR1]] {
; IS__CGSCC_OPM-NEXT:  bb:
; IS__CGSCC_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:
 [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__CGSCC_OPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly
align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__CGSCC_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_OPM-NEXT:    ret void
;
; IS__CGSCC_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal512_prefer512
;
 IS__CGSCC_NPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)
[[ARG:%.*]]) #[[ATTR1]] {
; IS__CGSCC_NPM-NEXT:  bb:
; IS__CGSCC_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__CGSCC_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__CGSCC_NPM-NEXT:    call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* noalias nocapture nofree
noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
; IS__CGSCC_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
;
```

```
 IS__CGSCC_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_NPM-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal512_prefer512(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should not promote
define internal fastcc void @callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %arg,
<8 x i64>* readonly %arg1) #1 {
;
; IS________OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________OPM-LABEL: define
{{[^@]+}}@callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256
; IS________OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly
 align 64 dereferenceable(64) [[ARG:%.*]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64
dereferenceable(64) [[ARG1:%.*]]) #[[ATTR1]] {
; IS________OPM-NEXT:  bb:
; IS________OPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________OPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________OPM-NEXT:    ret void
;
; IS________NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________NPM-LABEL: define
{{[^@]+}}@callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256
; IS________NPM-SAME: (<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64
dereferenceable(64) [[ARG:%.*]], <8 x i64>* noalias nocapture nofree noundef nonnull readonly align 64
dereferenceable(64) [[ARG1:%.*]]) #[[ATTR1]] {
; IS________NPM-NEXT:  bb:
; IS________NPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP]],
 <8 x i64>* [[ARG]], align 64
; IS________NPM-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}
```

```
define void @avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %arg) #2 {
;
; IS__TUNIT_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_OPM-LABEL: define {{[^@]+}}@avx512_legal256_prefer256_call_avx512_legal512_prefer256
; IS__TUNIT_OPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR2:[0-9]+]] {
; IS__TUNIT_OPM-NEXT:  bb:
; IS__TUNIT_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__TUNIT_OPM-NEXT:
   call fastcc void @callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* nocapture
nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef
nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__TUNIT_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_OPM-NEXT:    ret void
;
; IS__TUNIT_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_NPM-LABEL: define {{[^@]+}}@avx512_legal256_prefer256_call_avx512_legal512_prefer256
; IS__TUNIT_NPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR2:[0-9]+]] {
; IS__TUNIT_NPM-NEXT:  bb:
; IS__TUNIT_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP3:%.*]] = bitcast
 <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__TUNIT_NPM-NEXT:    call fastcc void
@callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* noalias nocapture nofree
noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* noalias nocapture nofree noundef
nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR6]]
; IS__TUNIT_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_NPM-NEXT:    ret void
;
; IS__CGSCC_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_OPM-LABEL: define {{[^@]+}}@avx512_legal256_prefer256_call_avx512_legal512_prefer256
; IS__CGSCC_OPM-SAME: (<8 x i64>* nocapture nofree
 noundef nonnull writeonly align 2 dereferenceable(64) [[ARG:%.*]]) #[[ATTR2:[0-9]+]] {
; IS__CGSCC_OPM-NEXT:  bb:
; IS__CGSCC_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__CGSCC_OPM-NEXT:    call fastcc void
```

```
@callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__CGSCC_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_OPM-NEXT:
    ret void
;
; IS__CGSCC_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_NPM-LABEL: define {{[^@]+}}@avx512_legal256_prefer256_call_avx512_legal512_prefer256
; IS__CGSCC_NPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64) [[ARG:%.*]]) #[[ATTR2:[0-9]+]] {
; IS__CGSCC_NPM-NEXT:  bb:
; IS__CGSCC_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__CGSCC_NPM-NEXT:    call fastcc void
@callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64)
 [[TMP2]], <8 x i64>* noalias nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[TMP]])
#[[ATTR6]]
; IS__CGSCC_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_NPM-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal256_prefer256_call_avx512_legal512_prefer256(<8 x i64>* %tmp2, <8 x i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should not promote
define internal fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* %arg, <8 x i64>* readonly %arg1) #2 {
;
; IS________OPM: Function Attrs: argmemonly inlinehint nofree norecurse
 nosync nounwind willreturn uwtable
; IS________OPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256
; IS________OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64)
```

[[ARG:%.*]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[ARG1:%.*]])
#[[ATTR2:[0-9]+]] {
; IS________OPM-NEXT: bb:
; IS________OPM-NEXT: [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________OPM-NEXT: store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________OPM-NEXT: ret void
;
; IS________NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________NPM-LABEL: define
{{[^@]+}}@callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256
; IS________NPM-SAME: (<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64
dereferenceable(64) [[ARG:%.*]], <8 x i64>* noalias nocapture nofree noundef nonnull readonly
 align 64 dereferenceable(64) [[ARG1:%.*]]) #[[ATTR2:[0-9]+]] {
; IS________NPM-NEXT: bb:
; IS________NPM-NEXT: [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________NPM-NEXT: store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________NPM-NEXT: ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* %arg) #1 {
;
; IS__TUNIT_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal256_prefer256
; IS__TUNIT_OPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR1]] {
; IS__TUNIT_OPM-NEXT: bb:
; IS__TUNIT_OPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]]
 to i8*
; IS__TUNIT_OPM-NEXT: call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__TUNIT_OPM-NEXT: call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly
align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__TUNIT_OPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_OPM-NEXT: store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_OPM-NEXT: ret void
;
; IS__TUNIT_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal256_prefer256
; IS__TUNIT_NPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR1]]

{
; IS__TUNIT_NPM-NEXT: bb:
; IS__TUNIT_NPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_NPM-NEXT: call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__TUNIT_NPM-NEXT: call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* noalias nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR6]]
; IS__TUNIT_NPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_NPM-NEXT: store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_NPM-NEXT: ret void
;
; IS__CGSCC_OPM: Function Attrs: argmemonly
inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_OPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal256_prefer256
; IS__CGSCC_OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64) [[ARG:%.*]]) #[[ATTR1]] {
; IS__CGSCC_OPM-NEXT: bb:
; IS__CGSCC_OPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_OPM-NEXT: call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__CGSCC_OPM-NEXT: call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64)
[[TMP]]) #[[ATTR7]]
; IS__CGSCC_OPM-NEXT: [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_OPM-NEXT: store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_OPM-NEXT: ret void
;
; IS__CGSCC_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_NPM-LABEL: define {{[^@]+}}@avx512_legal512_prefer256_call_avx512_legal256_prefer256
; IS__CGSCC_NPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64) [[ARG:%.*]]) #[[ATTR1]] {
; IS__CGSCC_NPM-NEXT: bb:
; IS__CGSCC_NPM-NEXT: [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT: [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT: [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_NPM-NEXT: call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
;
IS__CGSCC_NPM-NEXT: call fastcc void
@callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* noalias nocapture nofree

```
noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* noalias nocapture nofree noundef
nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR6]]
; IS__CGSCC_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_NPM-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx512_legal512_prefer256_call_avx512_legal256_prefer256(<8 x i64>* %tmp2, <8 x
i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should promote
define internal fastcc
 void @callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* %arg, <8 x i64>* readonly
%arg1) #3 {
;
; IS________OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________OPM-LABEL: define {{[^@]+}}@callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256
; IS________OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64)
[[ARG:%.*]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[ARG1:%.*]])
#[[ATTR3:[0-9]+]] {
; IS________OPM-NEXT:  bb:
; IS________OPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________OPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________OPM-NEXT:    ret void
;
; IS________NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________NPM-LABEL: define {{[^@]+}}@callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256
; IS________NPM-SAME:
 (<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[ARG:%.*]], <8 x
i64> [[TMP0:%.*]]) #[[ATTR3:[0-9]+]] {
; IS________NPM-NEXT:  bb:
; IS________NPM-NEXT:    [[ARG1_PRIV:%.*]] = alloca <8 x i64>, align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP0]], <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________NPM-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
```

```
 ret void
}

define void @avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* %arg) #4 {
;
; IS__TUNIT_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_OPM-LABEL: define {{[^@]+}}@avx2_legal256_prefer256_call_avx2_legal512_prefer256
; IS__TUNIT_OPM-SAME: (<8 x i64>* nocapture nofree writeonly
 [[ARG:%.*]]) #[[ATTR4:[0-9]+]] {
; IS__TUNIT_OPM-NEXT:  bb:
; IS__TUNIT_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__TUNIT_OPM-NEXT:    call fastcc void
@callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* nocapture nofree noundef nonnull
writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64
dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__TUNIT_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_OPM-NEXT:    ret void
;
; IS__TUNIT_NPM: Function
 Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_NPM-LABEL: define {{[^@]+}}@avx2_legal256_prefer256_call_avx2_legal512_prefer256
; IS__TUNIT_NPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR3]] {
; IS__TUNIT_NPM-NEXT:  bb:
; IS__TUNIT_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__TUNIT_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__TUNIT_NPM-NEXT:    call fastcc void
@callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* noalias nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]])
 #[[ATTR6]]
; IS__TUNIT_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_NPM-NEXT:    ret void
;
; IS__CGSCC_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_OPM-LABEL: define {{[^@]+}}@avx2_legal256_prefer256_call_avx2_legal512_prefer256
; IS__CGSCC_OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)
[[ARG:%.*]]) #[[ATTR4:[0-9]+]] {
; IS__CGSCC_OPM-NEXT:  bb:
; IS__CGSCC_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
```

```
; IS__CGSCC_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__CGSCC_OPM-NEXT:
    call fastcc void @callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* nocapture nofree
noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull
readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__CGSCC_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_OPM-NEXT:    ret void
;
; IS__CGSCC_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_NPM-LABEL: define {{[^@]+}}@avx2_legal256_prefer256_call_avx2_legal512_prefer256
; IS__CGSCC_NPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64)
[[ARG:%.*]]) #[[ATTR3]] {
; IS__CGSCC_NPM-NEXT:  bb:
; IS__CGSCC_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:
    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__CGSCC_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
; IS__CGSCC_NPM-NEXT:    call fastcc void
@callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8 x i64>* noalias nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
; IS__CGSCC_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_NPM-NEXT:    ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx2_legal256_prefer256_call_avx2_legal512_prefer256(<8
 x i64>* %tmp2, <8 x i64>* %tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; This should promote
define internal fastcc void @callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* %arg, <8
x i64>* readonly %arg1) #4 {
;
; IS________OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
```

```
; IS________OPM-LABEL: define {{[^@]+}}@callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256
; IS________OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64)
[[ARG:%.*]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[ARG1:%.*]])
#[[ATTR4:[0-9]+]] {
; IS________OPM-NEXT:  bb:
; IS________OPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1]], align 64
; IS________OPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align
 64
; IS________OPM-NEXT:    ret void
;
; IS________NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS________NPM-LABEL: define {{[^@]+}}@callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256
; IS________NPM-SAME: (<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64
dereferenceable(64) [[ARG:%.*]], <8 x i64> [[TMP0:%.*]]) #[[ATTR3]] {
; IS________NPM-NEXT:  bb:
; IS________NPM-NEXT:    [[ARG1_PRIV:%.*]] = alloca <8 x i64>, align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP0]], <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    [[TMP:%.*]] = load <8 x i64>, <8 x i64>* [[ARG1_PRIV]], align 64
; IS________NPM-NEXT:    store <8 x i64> [[TMP]], <8 x i64>* [[ARG]], align 64
; IS________NPM-NEXT:    ret void
;
bb:
 %tmp = load <8 x i64>, <8 x i64>* %arg1
 store <8 x i64> %tmp, <8 x i64>* %arg
 ret void
}

define void @avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* %arg) #3 {
;
; IS__TUNIT_OPM:
 Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_OPM-LABEL: define {{[^@]+}}@avx2_legal512_prefer256_call_avx2_legal256_prefer256
; IS__TUNIT_OPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR3]] {
; IS__TUNIT_OPM-NEXT:  bb:
; IS__TUNIT_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly
align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__TUNIT_OPM-NEXT:    call fastcc void
@callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* nocapture nofree noundef nonnull
writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64
dereferenceable(64) [[TMP]])
 #[[ATTR7]]
; IS__TUNIT_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_OPM-NEXT:    ret void
;
```

```
; IS__TUNIT_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__TUNIT_NPM-LABEL: define {{[^@]+}}@avx2_legal512_prefer256_call_avx2_legal256_prefer256
; IS__TUNIT_NPM-SAME: (<8 x i64>* nocapture nofree writeonly [[ARG:%.*]]) #[[ATTR3]] {
; IS__TUNIT_NPM-NEXT:  bb:
; IS__TUNIT_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__TUNIT_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__TUNIT_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__TUNIT_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>*
 [[TMP]], align 64
; IS__TUNIT_NPM-NEXT:    call fastcc void
@callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* noalias nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
; IS__TUNIT_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__TUNIT_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__TUNIT_NPM-NEXT:    ret void
;
; IS__CGSCC_OPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_OPM-LABEL: define {{[^@]+}}@avx2_legal512_prefer256_call_avx2_legal256_prefer256
; IS__CGSCC_OPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly align 2 dereferenceable(64) [[ARG:%.*]]) #[[ATTR3]] {
; IS__CGSCC_OPM-NEXT:  bb:
; IS__CGSCC_OPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_OPM-NEXT:    [[TMP3:%.*]] = bitcast <8
 x i64>* [[TMP]] to i8*
; IS__CGSCC_OPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR6]]
; IS__CGSCC_OPM-NEXT:    call fastcc void
@callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* nocapture nofree noundef nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64>* nocapture nofree noundef nonnull readonly align 64 dereferenceable(64) [[TMP]]) #[[ATTR7]]
; IS__CGSCC_OPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_OPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_OPM-NEXT:    ret void
;
; IS__CGSCC_NPM: Function Attrs: argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable
; IS__CGSCC_NPM-LABEL: define {{[^@]+}}@avx2_legal512_prefer256_call_avx2_legal256_prefer256
; IS__CGSCC_NPM-SAME: (<8 x i64>* nocapture nofree noundef nonnull writeonly
 align 2 dereferenceable(64) [[ARG:%.*]]) #[[ATTR3]] {
; IS__CGSCC_NPM-NEXT:  bb:
; IS__CGSCC_NPM-NEXT:    [[TMP:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP2:%.*]] = alloca <8 x i64>, align 32
; IS__CGSCC_NPM-NEXT:    [[TMP3:%.*]] = bitcast <8 x i64>* [[TMP]] to i8*
; IS__CGSCC_NPM-NEXT:    call void @llvm.memset.p0i8.i64(i8* nocapture nofree noundef nonnull writeonly align 32 dereferenceable(64) [[TMP3]], i8 noundef 0, i64 noundef 32, i1 noundef false) #[[ATTR5]]
; IS__CGSCC_NPM-NEXT:    [[TMP0:%.*]] = load <8 x i64>, <8 x i64>* [[TMP]], align 64
```

```
; IS__CGSCC_NPM-NEXT:    call fastcc void
@callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* noalias nocapture nofree noundef
nonnull writeonly align 64 dereferenceable(64) [[TMP2]], <8 x i64> [[TMP0]]) #[[ATTR6]]
; IS__CGSCC_NPM-NEXT:    [[TMP4:%.*]] = load <8 x i64>, <8 x i64>* [[TMP2]], align 64
; IS__CGSCC_NPM-NEXT:    store <8 x i64> [[TMP4]], <8 x i64>* [[ARG]], align 2
; IS__CGSCC_NPM-NEXT:
  ret void
;
bb:
 %tmp = alloca <8 x i64>, align 32
 %tmp2 = alloca <8 x i64>, align 32
 %tmp3 = bitcast <8 x i64>* %tmp to i8*
 call void @llvm.memset.p0i8.i64(i8* align 32 %tmp3, i8 0, i64 32, i1 false)
 call fastcc void @callee_avx2_legal512_prefer256_call_avx2_legal256_prefer256(<8 x i64>* %tmp2, <8 x i64>*
%tmp)
 %tmp4 = load <8 x i64>, <8 x i64>* %tmp2, align 32
 store <8 x i64> %tmp4, <8 x i64>* %arg, align 2
 ret void
}

; Function Attrs: argmemonly nounwind
declare void @llvm.memset.p0i8.i64(i8* nocapture writeonly, i8, i64, i1) #5

attributes #0 = { inlinehint norecurse nounwind uwtable "target-features"="+avx512vl" "min-legal-vector-
width"="512" "prefer-vector-width"="512" }
attributes #1 = { inlinehint norecurse nounwind uwtable "target-features"="+avx512vl" "min-legal-vector-
width"="512" "prefer-vector-width"="256" }
attributes #2 = { inlinehint norecurse nounwind uwtable "target-features"="+avx512vl" "min-legal-vector-
width"="256" "prefer-vector-width"="256" }
attributes
 #3 = { inlinehint norecurse nounwind uwtable "target-features"="+avx2" "min-legal-vector-width"="512" "prefer-
vector-width"="256" }
attributes #4 = { inlinehint norecurse nounwind uwtable "target-features"="+avx2" "min-legal-vector-width"="256"
"prefer-vector-width"="256" }
attributes #5 = { argmemonly nounwind }
;.
; IS__TUNIT_OPM: attributes #[[ATTR0]] = { argmemonly inlinehint nofree norecurse nosync nounwind
willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="512" "target-features"="+avx512vl" }
; IS__TUNIT_OPM: attributes #[[ATTR1]] = { argmemonly inlinehint nofree norecurse nosync nounwind
willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="256" "target-features"="+avx512vl" }
; IS__TUNIT_OPM: attributes #[[ATTR2]] = { argmemonly inlinehint nofree norecurse nosync nounwind
willreturn uwtable "min-legal-vector-width"="256" "prefer-vector-width"="256" "target-features"="+avx512vl" }
; IS__TUNIT_OPM: attributes #[[ATTR3]] = { argmemonly
 inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-
width"="256" "target-features"="+avx2" }
; IS__TUNIT_OPM: attributes #[[ATTR4]] = { argmemonly inlinehint nofree norecurse nosync nounwind
willreturn uwtable "min-legal-vector-width"="256" "prefer-vector-width"="256" "target-features"="+avx2" }
; IS__TUNIT_OPM: attributes #[[ATTR5:[0-9]+]] = { argmemonly nocallback nofree nounwind willreturn
```

writeonly }
; IS__TUNIT_OPM: attributes #[[ATTR6]] = { willreturn writeonly }
; IS__TUNIT_OPM: attributes #[[ATTR7]] = { nofree nosync nounwind willreturn }
;.
; IS__TUNIT_NPM: attributes #[[ATTR0]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="512" "target-features"="+avx512vl" }
; IS__TUNIT_NPM: attributes #[[ATTR1]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="256"
"target-features"="+avx512vl" }
; IS__TUNIT_NPM: attributes #[[ATTR2]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="256" "prefer-vector-width"="256" "target-features"="+avx512vl" }
; IS__TUNIT_NPM: attributes #[[ATTR3]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="256" "target-features"="+avx2" }
; IS__TUNIT_NPM: attributes #[[ATTR4:[0-9]+]] = { argmemonly nocallback nofree nounwind willreturn writeonly }
; IS__TUNIT_NPM: attributes #[[ATTR5]] = { willreturn writeonly }
; IS__TUNIT_NPM: attributes #[[ATTR6]] = { nofree nosync nounwind willreturn }
;.
; IS__CGSCC_OPM: attributes #[[ATTR0]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="512" "target-features"="+avx512vl" }
; IS__CGSCC_OPM: attributes #[[ATTR1]] = { argmemonly inlinehint nofree norecurse nosync
nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="256" "target-features"="+avx512vl" }
; IS__CGSCC_OPM: attributes #[[ATTR2]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="256" "prefer-vector-width"="256" "target-features"="+avx512vl" }
; IS__CGSCC_OPM: attributes #[[ATTR3]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="256" "target-features"="+avx2" }
; IS__CGSCC_OPM: attributes #[[ATTR4]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="256" "prefer-vector-width"="256" "target-features"="+avx2" }
; IS__CGSCC_OPM: attributes #[[ATTR5:[0-9]+]] = { argmemonly nocallback nofree nounwind willreturn writeonly }
; IS__CGSCC_OPM: attributes #[[ATTR6]] = { willreturn writeonly }
; IS__CGSCC_OPM: attributes #[[ATTR7]] = { nounwind willreturn }
;.
; IS__CGSCC_NPM: attributes
#[[ATTR0]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="512" "target-features"="+avx512vl" }
; IS__CGSCC_NPM: attributes #[[ATTR1]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="256" "target-features"="+avx512vl" }
; IS__CGSCC_NPM: attributes #[[ATTR2]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="256" "prefer-vector-width"="256" "target-features"="+avx512vl" }
; IS__CGSCC_NPM: attributes #[[ATTR3]] = { argmemonly inlinehint nofree norecurse nosync nounwind willreturn uwtable "min-legal-vector-width"="512" "prefer-vector-width"="256" "target-features"="+avx2" }
; IS__CGSCC_NPM: attributes #[[ATTR4:[0-9]+]] = { argmemonly nocallback nofree nounwind willreturn writeonly }
; IS__CGSCC_NPM: attributes #[[ATTR5]] = { willreturn writeonly }
; IS__CGSCC_NPM:

attributes #[[ATTR6]] = { nounwind willreturn }
;.
; NOTE: Assertions have been autogenerated by utils/update_analyze_test_checks.py
; RUN: opt < %s -passes="print<cost-model>" 2>&1 -disable-output -mtriple=x86_64-apple-macosx10.8.0 -mattr=+avx2 | FileCheck %s --check-prefixes=VEC256,AVX
; RUN: opt < %s -passes="print<cost-model>" 2>&1 -disable-output -mtriple=x86_64-apple-macosx10.8.0 -mattr=+avx512vl,+prefer-256-bit | FileCheck %s --check-prefixes=VEC256,AVX512VL256
; RUN: opt < %s -passes="print<cost-model>" 2>&1 -disable-output -mtriple=x86_64-apple-macosx10.8.0 -mattr=+avx512vl,-prefer-256-bit | FileCheck %s --check-prefixes=AVX512VL512
; RUN: opt < %s -passes="print<cost-model>" 2>&1 -disable-output -mtriple=x86_64-apple-macosx10.8.0 -mattr=+avx512vl,+avx512bw,+avx512dq,+prefer-256-bit | FileCheck %s --check-prefixes=VEC256,SKX256
; RUN: opt < %s -passes="print<cost-model>" 2>&1 -disable-output -mtriple=x86_64-apple-macosx10.8.0 -mattr=+avx512vl,+avx512bw,+avx512dq,-prefer-256-bit | FileCheck %s --check-prefixes=SKX512

define
void @zext256() "min-legal-vector-width"="256" {
; AVX-LABEL: 'zext256'
; AVX-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %A = zext <8 x i16> undef to <8 x i64>
; AVX-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %B = zext <8 x i32> undef to <8 x i64>
; AVX-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %C = zext <16 x i8> undef to <16 x i32>
; AVX-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %D = zext <16 x i16> undef to <16 x i32>
; AVX-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %E = zext <32 x i8> undef to <32 x i16>
; AVX-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; AVX512VL256-LABEL: 'zext256'
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %A = zext <8 x i16> undef to <8 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %B = zext <8 x i32> undef to <8 x i64>
; AVX512VL256-NEXT: Cost
Model: Found an estimated cost of 2 for instruction: %C = zext <16 x i8> undef to <16 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %D = zext <16 x i16> undef to <16 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %E = zext <32 x i8> undef to <32 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; AVX512VL512-LABEL: 'zext256'
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = zext <8 x i16> undef to <8 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = zext <8 x i32> undef to <8 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = zext <16 x i8> undef to <16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = zext <16 x i16> undef to <16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction:

```
 %E = zext <32 x i8> undef to <32 x i16>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX256-LABEL: 'zext256'
; SKX256-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %A = zext <8 x i16> undef to <8 x
i64>
; SKX256-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %B = zext <8 x i32> undef to <8 x
i64>
; SKX256-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %C = zext <16 x i8> undef to <16 x
i32>
; SKX256-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %D = zext <16 x i16> undef to <16 x
i32>
; SKX256-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %E = zext <32 x i8> undef to <32 x
i16>
; SKX256-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX512-LABEL: 'zext256'
; SKX512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %A = zext <8 x i16> undef to <8 x
i64>
; SKX512-NEXT:  Cost Model: Found an estimated
 cost of 1 for instruction: %B = zext <8 x i32> undef to <8 x i64>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %C = zext <16 x i8> undef to <16 x
i32>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %D = zext <16 x i16> undef to <16 x
i32>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %E = zext <32 x i8> undef to <32 x
i16>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
 %A = zext <8 x i16> undef to <8 x i64>
 %B = zext <8 x i32> undef to <8 x i64>
 %C = zext <16 x i8> undef to <16 x i32>
 %D = zext <16 x i16> undef to <16 x i32>
 %E = zext <32 x i8> undef to <32 x i16>
 ret void
}

define void @zext512() "min-legal-vector-width"="512" {
; AVX-LABEL: 'zext512'
; AVX-NEXT:  Cost Model: Found an estimated cost of 4 for instruction: %A = zext <8 x i16> undef to <8 x i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 5 for instruction: %B = zext <8 x i32>
 undef to <8 x i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 4 for instruction: %C = zext <16 x i8> undef to <16 x i32>
; AVX-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %D = zext <16 x i16> undef to <16 x
i32>
; AVX-NEXT:  Cost Model: Found an estimated cost of 5 for instruction: %E = zext <32 x i8> undef to <32 x i16>
; AVX-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
```

; AVX512VL256-LABEL: 'zext512'
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = zext <8 x i16> undef to <8 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = zext <8 x i32> undef to <8 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = zext <16 x i8> undef to <16 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = zext <16 x i16> undef to <16 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost
 of 3 for instruction: %E = zext <32 x i8> undef to <32 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; AVX512VL512-LABEL: 'zext512'
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = zext <8 x i16> undef to <8 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = zext <8 x i32> undef to <8 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = zext <16 x i8> undef to <16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = zext <16 x i16> undef to <16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %E = zext <32 x i8> undef to <32 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX256-LABEL: 'zext512'
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = zext <8 x i16> undef to <8
 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = zext <8 x i32> undef to <8 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = zext <16 x i8> undef to <16 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = zext <16 x i16> undef to <16 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %E = zext <32 x i8> undef to <32 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX512-LABEL: 'zext512'
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = zext <8 x i16> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = zext <8 x i32> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = zext <16 x i8> undef to <16 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = zext <16

```
 x i16> undef to <16 x i32>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %E = zext <32 x i8> undef to <32 x
i16>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
 %A = zext <8 x i16> undef to <8 x i64>
 %B = zext <8 x i32> undef to <8 x i64>
 %C = zext <16 x i8> undef to <16 x i32>
 %D = zext <16 x i16> undef to <16 x i32>
 %E = zext <32 x i8> undef to <32 x i16>
 ret void
}

define void @sext256() "min-legal-vector-width"="256" {
; AVX-LABEL: 'sext256'
; AVX-NEXT:  Cost Model: Found an estimated cost of 4 for instruction: %A = sext <8 x i8> undef to <8 x i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 4 for instruction: %B = sext <8 x i16> undef to <8 x i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 5 for instruction: %C = sext <8 x i32> undef to <8 x i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 4 for instruction: %D = sext <16 x i8> undef to <16 x i32>
; AVX-NEXT:  Cost Model: Found
 an estimated cost of 3 for instruction: %E = sext <16 x i16> undef to <16 x i32>
; AVX-NEXT:  Cost Model: Found an estimated cost of 5 for instruction: %F = sext <32 x i8> undef to <32 x i16>
; AVX-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; AVX512VL256-LABEL: 'sext256'
; AVX512VL256-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %A = sext <8 x i8> undef to <8
x i64>
; AVX512VL256-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %B = sext <8 x i16> undef to
<8 x i64>
; AVX512VL256-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %C = sext <8 x i32> undef to
<8 x i64>
; AVX512VL256-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %D = sext <16 x i8> undef to
<16 x i32>
; AVX512VL256-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %E = sext <16 x i16> undef to
<16 x i32>
; AVX512VL256-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %F = sext <32 x i8> undef
 to <32 x i16>
; AVX512VL256-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; AVX512VL512-LABEL: 'sext256'
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %A = sext <8 x i8> undef to <8
x i64>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %B = sext <8 x i16> undef to
<8 x i64>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %C = sext <8 x i32> undef to
<8 x i64>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %D = sext <16 x i8> undef to
<16 x i32>
```

; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %E = sext <16 x i16> undef to <16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %F = sext <32 x i8> undef to <32 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX256-LABEL: 'sext256'
; SKX256-NEXT: Cost Model: Found an
 estimated cost of 2 for instruction: %A = sext <8 x i8> undef to <8 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %B = sext <8 x i16> undef to <8 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %C = sext <8 x i32> undef to <8 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %D = sext <16 x i8> undef to <16 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %E = sext <16 x i16> undef to <16 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %F = sext <32 x i8> undef to <32 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX512-LABEL: 'sext256'
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = sext <8 x i8> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = sext <8 x i16> undef to <8 x i64>
; SKX512-NEXT: Cost
 Model: Found an estimated cost of 1 for instruction: %C = sext <8 x i32> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = sext <16 x i8> undef to <16 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %E = sext <16 x i16> undef to <16 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %F = sext <32 x i8> undef to <32 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
 %A = sext <8 x i8> undef to <8 x i64>
 %B = sext <8 x i16> undef to <8 x i64>
 %C = sext <8 x i32> undef to <8 x i64>
 %D = sext <16 x i8> undef to <16 x i32>
 %E = sext <16 x i16> undef to <16 x i32>
 %F = sext <32 x i8> undef to <32 x i16>
 ret void
}

define void @sext512() "min-legal-vector-width"="512" {
; AVX-LABEL: 'sext512'
; AVX-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %A = sext <8 x i8> undef to <8 x i64>
; AVX-NEXT: Cost Model: Found

an estimated cost of 4 for instruction: %B = sext <8 x i16> undef to <8 x i64>
; AVX-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %C = sext <8 x i32> undef to <8 x i64>
; AVX-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %D = sext <16 x i8> undef to <16 x i32>
; AVX-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %E = sext <16 x i16> undef to <16 x i32>
; AVX-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %F = sext <32 x i8> undef to <32 x i16>
; AVX-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; AVX512VL256-LABEL: 'sext512'
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = sext <8 x i8> undef to <8
x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = sext <8 x i16> undef to
<8 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = sext <8 x i32> undef to
<8 x i64>
; AVX512VL256-NEXT:
Cost Model: Found an estimated cost of 1 for instruction: %D = sext <16 x i8> undef to <16 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %E = sext <16 x i16> undef to
<16 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %F = sext <32 x i8> undef to
<32 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; AVX512VL512-LABEL: 'sext512'
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = sext <8 x i8> undef to <8
x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = sext <8 x i16> undef to
<8 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = sext <8 x i32> undef to
<8 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = sext <16 x i8> undef to
<16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost
of 1 for instruction: %E = sext <16 x i16> undef to <16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %F = sext <32 x i8> undef to
<32 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX256-LABEL: 'sext512'
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = sext <8 x i8> undef to <8 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = sext <8 x i16> undef to <8 x
i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = sext <8 x i32> undef to <8 x
i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = sext <16 x i8> undef to <16 x
i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %E = sext <16 x i16> undef to <16 x
i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %F = sext <32 x i8> undef to <32 x

i16>
; SKX256-NEXT: Cost
 Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX512-LABEL: 'sext512'
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = sext <8 x i8> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %B = sext <8 x i16> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %C = sext <8 x i32> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %D = sext <16 x i8> undef to <16 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %E = sext <16 x i16> undef to <16 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %F = sext <32 x i8> undef to <32 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
 %A = sext <8 x i8> undef to <8 x i64>
 %B = sext <8 x i16> undef to <8 x i64>
 %C = sext <8 x i32> undef to <8 x i64>
 %D = sext <16 x i8>
 undef to <16 x i32>
 %E = sext <16 x i16> undef to <16 x i32>
 %F = sext <32 x i8> undef to <32 x i16>
 ret void
}

define void @trunc256() "min-legal-vector-width"="256" {
; VEC256-LABEL: 'trunc256'
; VEC256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %A = trunc <8 x i64> undef to <8 x i32>
; VEC256-NEXT: Cost Model: Found an estimated cost of 10 for instruction: %B = trunc <8 x i64> undef to <8 x i16>
; VEC256-NEXT: Cost Model: Found an estimated cost of 8 for instruction: %C = trunc <8 x i64> undef to <8 x i8>
; VEC256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %D = trunc <16 x i32> undef to <16 x i16>
; VEC256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %E = trunc <16 x i32> undef to <16 x i8>
; VEC256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %F = trunc <32 x i16> undef to <32 x i8>
; VEC256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; AVX512VL512-LABEL: 'trunc256'
;
 AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %A = trunc <8 x i64> undef to <8 x i32>

```
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %B = trunc <8 x i64> undef to
<8 x i16>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %C = trunc <8 x i64> undef to
<8 x i8>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %D = trunc <16 x i32> undef
to <16 x i16>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %E = trunc <16 x i32> undef to
<16 x i8>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 8 for instruction: %F = trunc <32 x i16> undef to
<32 x i8>
; AVX512VL512-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
; SKX512-LABEL: 'trunc256'
; SKX512-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %A = trunc <8 x i64> undef to <8 x
i32>
; SKX512-NEXT:  Cost Model: Found an estimated
 cost of 2 for instruction: %B = trunc <8 x i64> undef to <8 x i16>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %C = trunc <8 x i64> undef to <8 x
i8>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %D = trunc <16 x i32> undef to <16 x
i16>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %E = trunc <16 x i32> undef to <16 x
i8>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %F = trunc <32 x i16> undef to <32 x
i8>
; SKX512-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: ret void
;
 %A = trunc <8 x i64> undef to <8 x i32>
 %B = trunc <8 x i64> undef to <8 x i16>
 %C = trunc <8 x i64> undef to <8 x i8>
 %D = trunc <16 x i32> undef to <16 x i16>
 %E = trunc <16 x i32> undef to <16 x i8>
 %F = trunc <32 x i16> undef to <32 x i8>
 ret void
}

define i32 @zext256_vXi1() "min-legal-vector-width"="256" {
; AVX-LABEL: 'zext256_vXi1'
; AVX-NEXT:  Cost Model: Found
 an estimated cost of 1 for instruction: %V2i64 = zext <2 x i1> undef to <2 x i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %V4i64 = zext <4 x i1> undef to <4 x
i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 4 for instruction: %V8i64 = zext <8 x i1> undef to <8 x
i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %V2i32 = zext <2 x i1> undef to <2 x
i32>
; AVX-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %V4i32 = zext <4 x i1> undef to <4 x
i32>
```

; AVX-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V8i32 = zext <8 x i1> undef to <8 x i32>
; AVX-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V16i32 = zext <16 x i1> undef to <16 x i32>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i16 = zext <2 x i1> undef to <2 x i16>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i16 = zext <4 x i1> undef to <4 x i16>
; AVX-NEXT:
Cost Model: Found an estimated cost of 1 for instruction: %V8i16 = zext <8 x i1> undef to <8 x i16>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V16i16 = zext <16 x i1> undef to <16 x i16>
; AVX-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V32i16 = zext <32 x i1> undef to <32 x i16>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i8 = zext <2 x i1> undef to <2 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i8 = zext <4 x i1> undef to <4 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i8 = zext <8 x i1> undef to <8 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V16i8 = zext <16 x i1> undef to <16 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V32i8 = zext <32 x i1> undef to <32 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V64i8 = zext <64 x i1> undef to <64 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; AVX512VL256-LABEL: 'zext256_vXi1'
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i64 = zext <2 x i1> undef to <2 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i64 = zext <4 x i1> undef to <4 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V8i64 = zext <8 x i1> undef to <8 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = zext <2 x i1> undef to <2 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i32 = zext <4 x i1> undef to <4 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = zext <8 x i1> undef to <8 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V16i32 = zext <16 x i1> undef to <16 x i32>
; AVX512VL256-NEXT:
Cost Model: Found an estimated cost of 5 for instruction: %V2i16 = zext <2 x i1> undef to <2 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V4i16 = zext <4 x i1> undef to <4 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V8i16 = zext <8 x i1> undef to <8 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 12 for instruction: %V16i16 = zext <16 x i1> undef to <16 x i16>

; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 24 for instruction: %V32i16 = zext <32 x i1> undef to <32 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 6 for instruction: %V2i8 = zext <2 x i1> undef to <2 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 6 for instruction: %V4i8 = zext <4 x i1> undef to <4 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 6 for instruction: %V8i8 = zext <8 x i1> undef to <8 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated
cost of 12 for instruction: %V16i8 = zext <16 x i1> undef to <16 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 25 for instruction: %V32i8 = zext <32 x i1> undef to <32 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 50 for instruction: %V64i8 = zext <64 x i1> undef to <64 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; AVX512VL512-LABEL: 'zext256_vXi1'
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i64 = zext <2 x i1> undef to <2 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i64 = zext <4 x i1> undef to <4 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i64 = zext <8 x i1> undef to <8 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = zext <2 x i1> undef to <2 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of
2 for instruction: %V4i32 = zext <4 x i1> undef to <4 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = zext <8 x i1> undef to <8 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i32 = zext <16 x i1> undef to <16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V2i16 = zext <2 x i1> undef to <2 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V4i16 = zext <4 x i1> undef to <4 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V8i16 = zext <8 x i1> undef to <8 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V16i16 = zext <16 x i1> undef to <16 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 9 for instruction: %V32i16 = zext <32 x i1> undef to <32 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V2i8
= zext <2 x i1> undef to <2 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V4i8 = zext <4 x i1> undef to <4 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V8i8 = zext <8 x i1> undef to <8 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V16i8 = zext <16 x i1> undef

to <16 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 9 for instruction: %V32i8 = zext <32 x i1> undef to <32 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 19 for instruction: %V64i8 = zext <64 x i1> undef to <64 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; SKX256-LABEL: 'zext256_vXi1'
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i64 = zext <2 x i1> undef to <2 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i64 = zext <4 x i1> undef to <4 x i64>
;
 SKX256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V8i64 = zext <8 x i1> undef to <8 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = zext <2 x i1> undef to <2 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i32 = zext <4 x i1> undef to <4 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = zext <8 x i1> undef to <8 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V16i32 = zext <16 x i1> undef to <16 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i16 = zext <2 x i1> undef to <2 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i16 = zext <4 x i1> undef to <4 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i16 = zext <8 x i1> undef to <8 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction:
 %V16i16 = zext <16 x i1> undef to <16 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V32i16 = zext <32 x i1> undef to <32 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i8 = zext <2 x i1> undef to <2 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i8 = zext <4 x i1> undef to <4 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i8 = zext <8 x i1> undef to <8 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i8 = zext <16 x i1> undef to <16 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V32i8 = zext <32 x i1> undef to <32 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V64i8 = zext <64 x i1> undef to <64 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; SKX512-LABEL: 'zext256_vXi1'

; SKX512-NEXT: Cost
 Model: Found an estimated cost of 2 for instruction: %V2i64 = zext <2 x i1> undef to <2 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i64 = zext <4 x i1> undef to <4 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i64 = zext <8 x i1> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = zext <2 x i1> undef to <2 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i32 = zext <4 x i1> undef to <4 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = zext <8 x i1> undef to <8 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i32 = zext <16 x i1> undef to <16 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i16 = zext <2 x i1> undef to <2 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i16 = zext
 <4 x i1> undef to <4 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i16 = zext <8 x i1> undef to <8 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i16 = zext <16 x i1> undef to <16 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V32i16 = zext <32 x i1> undef to <32 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i8 = zext <2 x i1> undef to <2 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i8 = zext <4 x i1> undef to <4 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i8 = zext <8 x i1> undef to <8 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i8 = zext <16 x i1> undef to <16 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V32i8 = zext <32 x i1> undef to <32 x i8>
; SKX512-NEXT: Cost Model: Found an estimated
 cost of 2 for instruction: %V64i8 = zext <64 x i1> undef to <64 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
 %V2i64 = zext <2 x i1> undef to <2 x i64>
 %V4i64 = zext <4 x i1> undef to <4 x i64>
 %V8i64 = zext <8 x i1> undef to <8 x i64>

 %V2i32 = zext <2 x i1> undef to <2 x i32>
 %V4i32 = zext <4 x i1> undef to <4 x i32>
 %V8i32 = zext <8 x i1> undef to <8 x i32>
 %V16i32 = zext <16 x i1> undef to <16 x i32>

 %V2i16 = zext <2 x i1> undef to <2 x i16>

```
 %V4i16 = zext <4 x i1> undef to <4 x i16>
 %V8i16 = zext <8 x i1> undef to <8 x i16>
 %V16i16 = zext <16 x i1> undef to <16 x i16>
 %V32i16 = zext <32 x i1> undef to <32 x i16>

 %V2i8 = zext <2 x i1> undef to <2 x i8>
 %V4i8 = zext <4 x i1> undef to <4 x i8>
 %V8i8 = zext <8 x i1> undef to <8 x i8>
 %V16i8 = zext <16 x i1> undef to <16 x i8>
 %V32i8 = zext <32 x i1> undef to <32 x i8>
 %V64i8 = zext <64 x i1> undef to <64 x i8>

 ret i32 undef
}

define i32 @sext256_vXi1()
 "min-legal-vector-width"="256" {
; AVX-LABEL: 'sext256_vXi1'
; AVX-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %I64 = sext i1 undef to i64
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %V2i64 = sext <2 x i1> undef to <2 x
i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %V4i64 = sext <4 x i1> undef to <4 x
i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 4 for instruction: %V8i64 = sext <8 x i1> undef to <8 x
i64>
; AVX-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %I32 = sext i1 undef to i32
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = sext <2 x i1> undef to <2 x
i32>
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %V4i32 = sext <4 x i1> undef to <4 x
i32>
; AVX-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %V8i32 = sext <8 x i1> undef to <8 x
i32>
; AVX-NEXT:  Cost Model: Found an estimated cost
 of 4 for instruction: %V16i32 = sext <16 x i1> undef to <16 x i32>
; AVX-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %I16 = sext i1 undef to i16
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %V2i16 = sext <2 x i1> undef to <2 x
i16>
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %V4i16 = sext <4 x i1> undef to <4 x
i16>
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %V8i16 = sext <8 x i1> undef to <8 x
i16>
; AVX-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %V16i16 = sext <16 x i1> undef to <16 x
i16>
; AVX-NEXT:  Cost Model: Found an estimated cost of 3 for instruction: %V32i16 = sext <32 x i1> undef to <32 x
i16>
; AVX-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %I8 = sext i1 undef to i8
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %V2i8 = sext <2 x i1> undef to <2 x i8>
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for
```

 instruction: %V4i8 = sext <4 x i1> undef to <4 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i8 = sext <8 x i1> undef to <8 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i8 = sext <16 x i1> undef to <16 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V32i8 = sext <32 x i1> undef to <32 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V64i8 = sext <64 x i1> undef to <64 x i8>
; AVX-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; AVX512VL256-LABEL: 'sext256_vXi1'
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I64 = sext i1 undef to i64
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i64 = sext <2 x i1> undef to <2 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i64 = sext <4 x i1> undef to <4 x i64>
; AVX512VL256-NEXT:
 Cost Model: Found an estimated cost of 3 for instruction: %V8i64 = sext <8 x i1> undef to <8 x i64>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I32 = sext i1 undef to i32
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i32 = sext <2 x i1> undef to <2 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i32 = sext <4 x i1> undef to <4 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i32 = sext <8 x i1> undef to <8 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V16i32 = sext <16 x i1> undef to <16 x i32>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I16 = sext i1 undef to i16
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V2i16 = sext <2 x i1> undef to <2 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 4 for instruction:
 %V4i16 = sext <4 x i1> undef to <4 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V8i16 = sext <8 x i1> undef to <8 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 10 for instruction: %V16i16 = sext <16 x i1> undef to <16 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 20 for instruction: %V32i16 = sext <32 x i1> undef to <32 x i16>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I8 = sext i1 undef to i8
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V2i8 = sext <2 x i1> undef to <2 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V4i8 = sext <4 x i1> undef to <4 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V8i8 = sext <8 x i1> undef to <8 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 10 for instruction: %V16i8 = sext <16 x i1> undef to <16 x i8>
;

AVX512VL256-NEXT: Cost Model: Found an estimated cost of 21 for instruction: %V32i8 = sext <32 x i1> undef to <32 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 42 for instruction: %V64i8 = sext <64 x i1> undef to <64 x i8>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; AVX512VL512-LABEL: 'sext256_vXi1'
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I64 = sext i1 undef to i64
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i64 = sext <2 x i1> undef to <2 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i64 = sext <4 x i1> undef to <4 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i64 = sext <8 x i1> undef to <8 x i64>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I32 = sext i1 undef to i32
; AVX512VL512-NEXT: Cost Model: Found an estimated
cost of 1 for instruction: %V2i32 = sext <2 x i1> undef to <2 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i32 = sext <4 x i1> undef to <4 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i32 = sext <8 x i1> undef to <8 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V16i32 = sext <16 x i1> undef to <16 x i32>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I16 = sext i1 undef to i16
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V2i16 = sext <2 x i1> undef to <2 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V4i16 = sext <4 x i1> undef to <4 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V8i16 = sext <8 x i1> undef to <8 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V16i16 =
sext <16 x i1> undef to <16 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 7 for instruction: %V32i16 = sext <32 x i1> undef to <32 x i16>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I8 = sext i1 undef to i8
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V2i8 = sext <2 x i1> undef to <2 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V4i8 = sext <4 x i1> undef to <4 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V8i8 = sext <8 x i1> undef to <8 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V16i8 = sext <16 x i1> undef to <16 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 7 for instruction: %V32i8 = sext <32 x i1> undef to <32 x i8>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 15 for instruction: %V64i8 = sext <64 x i1> undef to <64 x i8>
; AVX512VL512-NEXT:

Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; SKX256-LABEL: 'sext256_vXi1'
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I64 = sext i1 undef to i64
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i64 = sext <2 x i1> undef to <2 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i64 = sext <4 x i1> undef to <4 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i64 = sext <8 x i1> undef to <8 x i64>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I32 = sext i1 undef to i32
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i32 = sext <2 x i1> undef to <2 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i32 = sext <4 x i1> undef to <4 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i32 = sext <8 x i1> undef
to <8 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i32 = sext <16 x i1> undef to <16 x i32>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I16 = sext i1 undef to i16
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i16 = sext <2 x i1> undef to <2 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i16 = sext <4 x i1> undef to <4 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i16 = sext <8 x i1> undef to <8 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V16i16 = sext <16 x i1> undef to <16 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V32i16 = sext <32 x i1> undef to <32 x i16>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I8 = sext i1 undef to i8
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i8
= sext <2 x i1> undef to <2 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i8 = sext <4 x i1> undef to <4 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i8 = sext <8 x i1> undef to <8 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V16i8 = sext <16 x i1> undef to <16 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V32i8 = sext <32 x i1> undef to <32 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V64i8 = sext <64 x i1> undef to <64 x i8>
; SKX256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; SKX512-LABEL: 'sext256_vXi1'
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I64 = sext i1 undef to i64
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i64 = sext <2 x i1> undef to <2 x

i64>
; SKX512-NEXT: Cost Model: Found an estimated
 cost of 1 for instruction: %V4i64 = sext <4 x i1> undef to <4 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i64 = sext <8 x i1> undef to <8 x i64>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I32 = sext i1 undef to i32
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i32 = sext <2 x i1> undef to <2 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i32 = sext <4 x i1> undef to <4 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i32 = sext <8 x i1> undef to <8 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V16i32 = sext <16 x i1> undef to <16 x i32>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I16 = sext i1 undef to i16
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i16 = sext <2 x i1> undef to <2 x i16>
; SKX512-NEXT: Cost Model:
 Found an estimated cost of 1 for instruction: %V4i16 = sext <4 x i1> undef to <4 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i16 = sext <8 x i1> undef to <8 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V16i16 = sext <16 x i1> undef to <16 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V32i16 = sext <32 x i1> undef to <32 x i16>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %I8 = sext i1 undef to i8
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i8 = sext <2 x i1> undef to <2 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i8 = sext <4 x i1> undef to <4 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i8 = sext <8 x i1> undef to <8 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V16i8 = sext <16 x i1> undef to <16 x i8>
;
 SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V32i8 = sext <32 x i1> undef to <32 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V64i8 = sext <64 x i1> undef to <64 x i8>
; SKX512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
 %I64 = sext i1 undef to i64
 %V2i64 = sext <2 x i1> undef to <2 x i64>
 %V4i64 = sext <4 x i1> undef to <4 x i64>
 %V8i64 = sext <8 x i1> undef to <8 x i64>

 %I32 = sext i1 undef to i32
 %V2i32 = sext <2 x i1> undef to <2 x i32>

```
 %V4i32 = sext <4 x i1> undef to <4 x i32>
 %V8i32 = sext <8 x i1> undef to <8 x i32>
 %V16i32 = sext <16 x i1> undef to <16 x i32>

 %I16 = sext i1 undef to i16
 %V2i16 = sext <2 x i1> undef to <2 x i16>
 %V4i16 = sext <4 x i1> undef to <4 x i16>
 %V8i16 = sext <8 x i1> undef to <8 x i16>
 %V16i16 = sext <16 x i1> undef to <16 x i16>
 %V32i16 = sext <32 x i1> undef to <32 x i16>

 %I8 = sext i1 undef to i8
 %V2i8 = sext <2
 x i1> undef to <2 x i8>
 %V4i8 = sext <4 x i1> undef to <4 x i8>
 %V8i8 = sext <8 x i1> undef to <8 x i8>
 %V16i8 = sext <16 x i1> undef to <16 x i8>
 %V32i8 = sext <32 x i1> undef to <32 x i8>
 %V64i8 = sext <64 x i1> undef to <64 x i8>

 ret i32 undef
}

define i32 @trunc_vXi1() "min-legal-vector-width"="256" {
; AVX-LABEL: 'trunc_vXi1'
; AVX-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: %V2i64 = trunc <2 x i64> undef to <2 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 4 for instruction: %V4i64 = trunc <4 x i64> undef to <4 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 9 for instruction: %V8i64 = trunc <8 x i64> undef to <8 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 11 for instruction: %V16i64 = trunc <16 x i64> undef to <16 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 23 for instruction: %V32i64 = trunc <32 x i64> undef to <32 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 46 for instruction: %V64i64
 = trunc <64 x i64> undef to <64 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 1 for instruction: %V2i32 = trunc <2 x i32> undef to <2 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 0 for instruction: %V4i32 = trunc <4 x i32> undef to <4 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = trunc <8 x i32> undef to <8 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 8 for instruction: %V16i32 = trunc <16 x i32> undef to <16 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 17 for instruction: %V32i32 = trunc <32 x i32> undef to <32 x i1>
; AVX-NEXT:  Cost Model: Found an estimated cost of 34 for instruction: %V64i32 = trunc <64 x i32> undef to
```

<64 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i16 = trunc <2 x i16> undef to <2 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i16 = trunc <4 x i16> undef to <4 x i1>
; AVX-NEXT: Cost Model: Found an
estimated cost of 0 for instruction: %V8i16 = trunc <8 x i16> undef to <8 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V16i16 = trunc <16 x i16> undef to <16 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 9 for instruction: %V32i16 = trunc <32 x i16> undef to <32 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 18 for instruction: %V64i16 = trunc <64 x i16> undef to <64 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V2i8 = trunc <2 x i8> undef to <2 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V4i8 = trunc <4 x i8> undef to <4 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 1 for instruction: %V8i8 = trunc <8 x i8> undef to <8 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 0 for instruction: %V16i8 = trunc <16 x i8> undef to <16 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 0 for instruction: %V32i8 = trunc <32 x i8> undef to <32 x i1>
;
AVX-NEXT: Cost Model: Found an estimated cost of 0 for instruction: %V64i8 = trunc <64 x i8> undef to <64 x i1>
; AVX-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; AVX512VL256-LABEL: 'trunc_vXi1'
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i64 = trunc <2 x i64> undef to <2 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i64 = trunc <4 x i64> undef to <4 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 9 for instruction: %V8i64 = trunc <8 x i64> undef to <8 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 11 for instruction: %V16i64 = trunc <16 x i64> undef to <16 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 22 for instruction: %V32i64 = trunc <32 x i64> undef to <32 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 44 for instruction: %V64i64 = trunc <64 x i64> undef to <64 x i1>
; AVX512VL256-NEXT:
Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = trunc <2 x i32> undef to <2 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i32 = trunc <4 x i32> undef to <4 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = trunc <8 x i32> undef to <8 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V16i32 = trunc <16 x i32> undef to <16 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 10 for instruction: %V32i32 = trunc <32 x i32> undef to <32 x i1>

; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 20 for instruction: %V64i32 = trunc <64 x i32> undef to <64 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V2i16 = trunc <2 x i16> undef to <2 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V4i16 = trunc <4 x i16> undef to <4 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V8i16 = trunc <8 x i16> undef to <8 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 8 for instruction: %V16i16 = trunc <16 x i16> undef to <16 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 16 for instruction: %V32i16 = trunc <32 x i16> undef to <32 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 32 for instruction: %V64i16 = trunc <64 x i16> undef to <64 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V2i8 = trunc <2 x i8> undef to <2 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V4i8 = trunc <4 x i8> undef to <4 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V8i8 = trunc <8 x i8> undef to <8 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 8 for instruction: %V16i8 = trunc <16 x i8> undef to <16 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 17 for instruction: %V32i8 = trunc <32 x i8> undef to <32 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 34 for instruction: %V64i8 = trunc <64 x i8> undef to <64 x i1>
; AVX512VL256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; AVX512VL512-LABEL: 'trunc_vXi1'
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i64 = trunc <2 x i64> undef to <2 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i64 = trunc <4 x i64> undef to <4 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i64 = trunc <8 x i64> undef to <8 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 11 for instruction: %V16i64 = trunc <16 x i64> undef to <16 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 22 for instruction: %V32i64 = trunc <32 x i64> undef to <32 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 44 for instruction: %V64i64 = trunc <64 x i64> undef to <64 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = trunc <2 x i32> undef to <2 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i32 = trunc <4 x i32> undef to <4 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = trunc <8 x i32> undef to <8 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i32 = trunc <16 x i32>

undef to <16 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V32i32 = trunc <32 x i32> undef to <32 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 8 for instruction: %V64i32 = trunc <64 x i32> undef to <64 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V2i16 = trunc <2 x i16> undef to <2 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction:
 %V4i16 = trunc <4 x i16> undef to <4 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V8i16 = trunc <8 x i16> undef to <8 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V16i16 = trunc <16 x i16> undef to <16 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 7 for instruction: %V32i16 = trunc <32 x i16> undef to <32 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 14 for instruction: %V64i16 = trunc <64 x i16> undef to <64 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V2i8 = trunc <2 x i8> undef to <2 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V4i8 = trunc <4 x i8> undef to <4 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V8i8 = trunc <8 x i8> undef to <8 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 3 for instruction: %V16i8 =
 trunc <16 x i8> undef to <16 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 7 for instruction: %V32i8 = trunc <32 x i8> undef to <32 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 15 for instruction: %V64i8 = trunc <64 x i8> undef to <64 x i1>
; AVX512VL512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; SKX256-LABEL: 'trunc_vXi1'
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i64 = trunc <2 x i64> undef to <2 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i64 = trunc <4 x i64> undef to <4 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 9 for instruction: %V8i64 = trunc <8 x i64> undef to <8 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 11 for instruction: %V16i64 = trunc <16 x i64> undef to <16 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 23 for instruction: %V32i64 = trunc <32 x i64> undef to <32 x i1>
;
 SKX256-NEXT: Cost Model: Found an estimated cost of 47 for instruction: %V64i64 = trunc <64 x i64> undef to <64 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = trunc <2 x i32> undef to <2 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i32 = trunc <4 x i32> undef to <4

x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = trunc <8 x i32> undef to <8 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V16i32 = trunc <16 x i32> undef to <16 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 9 for instruction: %V32i32 = trunc <32 x i32> undef to <32 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 19 for instruction: %V64i32 = trunc <64 x i32> undef to <64 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i16 = trunc <2 x i16> undef to <2 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost
 of 2 for instruction: %V4i16 = trunc <4 x i16> undef to <4 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i16 = trunc <8 x i16> undef to <8 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i16 = trunc <16 x i16> undef to <16 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V32i16 = trunc <32 x i16> undef to <32 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 8 for instruction: %V64i16 = trunc <64 x i16> undef to <64 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i8 = trunc <2 x i8> undef to <2 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i8 = trunc <4 x i8> undef to <4 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i8 = trunc <8 x i8> undef to <8 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i8 = trunc <16 x i8> undef to <16
 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V32i8 = trunc <32 x i8> undef to <32 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V64i8 = trunc <64 x i8> undef to <64 x i1>
; SKX256-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
; SKX512-LABEL: 'trunc_vXi1'
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i64 = trunc <2 x i64> undef to <2 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i64 = trunc <4 x i64> undef to <4 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i64 = trunc <8 x i64> undef to <8 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 11 for instruction: %V16i64 = trunc <16 x i64> undef to <16 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 23 for instruction: %V32i64 = trunc <32 x i64> undef to <32 x i1>
; SKX512-NEXT: Cost Model: Found an estimated

cost of 47 for instruction: %V64i64 = trunc <64 x i64> undef to <64 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i32 = trunc <2 x i32> undef to <2 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i32 = trunc <4 x i32> undef to <4 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i32 = trunc <8 x i32> undef to <8 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i32 = trunc <16 x i32> undef to <16 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 5 for instruction: %V32i32 = trunc <32 x i32> undef to <32 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 11 for instruction: %V64i32 = trunc <64 x i32> undef to <64 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i16 = trunc <2 x i16> undef to <2 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i16 = trunc <4 x i16>
undef to <4 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i16 = trunc <8 x i16> undef to <8 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i16 = trunc <16 x i16> undef to <16 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V32i16 = trunc <32 x i16> undef to <32 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 4 for instruction: %V64i16 = trunc <64 x i16> undef to <64 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V2i8 = trunc <2 x i8> undef to <2 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V4i8 = trunc <4 x i8> undef to <4 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V8i8 = trunc <8 x i8> undef to <8 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V16i8 = trunc <16 x i8> undef to <16 x i1>
; SKX512-NEXT: Cost Model: Found an estimated
cost of 2 for instruction: %V32i8 = trunc <32 x i8> undef to <32 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 2 for instruction: %V64i8 = trunc <64 x i8> undef to <64 x i1>
; SKX512-NEXT: Cost Model: Found an estimated cost of 0 for instruction: ret i32 undef
;
%V2i64 = trunc <2 x i64> undef to <2 x i1>
%V4i64 = trunc <4 x i64> undef to <4 x i1>
%V8i64 = trunc <8 x i64> undef to <8 x i1>
%V16i64 = trunc <16 x i64> undef to <16 x i1>
%V32i64 = trunc <32 x i64> undef to <32 x i1>
%V64i64 = trunc <64 x i64> undef to <64 x i1>

%V2i32 = trunc <2 x i32> undef to <2 x i1>
%V4i32 = trunc <4 x i32> undef to <4 x i1>

```
 %V8i32 = trunc <8 x i32> undef to <8 x i1>
 %V16i32 = trunc <16 x i32> undef to <16 x i1>
 %V32i32 = trunc <32 x i32> undef to <32 x i1>
 %V64i32 = trunc <64 x i32> undef to <64 x i1>

 %V2i16 = trunc <2 x i16> undef to <2 x i1>
 %V4i16 = trunc <4 x i16> undef to <4 x i1>
 %V8i16 = trunc <8 x i16> undef to <8 x i1>
 %V16i16 = trunc
<16 x i16> undef to <16 x i1>
 %V32i16 = trunc <32 x i16> undef to <32 x i1>
 %V64i16 = trunc <64 x i16> undef to <64 x i1>

 %V2i8 = trunc <2 x i8> undef to <2 x i1>
 %V4i8 = trunc <4 x i8> undef to <4 x i1>
 %V8i8 = trunc <8 x i8> undef to <8 x i1>
 %V16i8 = trunc <16 x i8> undef to <16 x i1>
 %V32i8 = trunc <32 x i8> undef to <32 x i1>
 %V64i8 = trunc <64 x i8> undef to <64 x i1>

 ret i32 undef
}
```

==

The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:

==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the
power, direct or indirect, to cause the
direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity
exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications,
including but not limited to software source code, documentation
source, and configuration files.

"Object" form shall mean any form resulting from mechanical
transformation or translation of a Source form, including but
not limited to compiled object code, generated documentation,
and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or
Object form, made available under the License, as indicated by a
copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object
form, that is based on (or derived from) the Work and for which the
editorial revisions, annotations, elaborations, or other modifications
represent, as a whole, an original work of authorship. For the purposes
of this License, Derivative Works shall not include works that remain
separable from, or merely link (or bind by name) to the interfaces of,
the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,

worldwide, non-exclusive, no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work
includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or,

within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a

result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions
of this Software are embedded into an Object form of such source code, you
may redistribute such embedded portions in such Object form without complying
with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled
forms of this Software with
software that is licensed under the GPLv2 ("Combined Software") and if a
court of competent jurisdiction determines that the patent provision (Section
3), the indemnity provision (Section 9) or other Section of the License
conflicts with the conditions of the GPLv2, you may retroactively and
prospectively choose to deem waived or otherwise exclude such Section(s) of
the License, but only in their entirety and only with respect to the Combined
Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license
terms. All such code will be identified clearly using at least one of two
mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or
`LICENSE` file at the top containing the specific
license and restrictions
which apply to that software, or
2) It will contain specific license and restriction terms at the top of every
file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==

The libunwind library is dual licensed under both the University of Illinois
"BSD-Like" license and the MIT license. As a user of this code you may choose
to use it under either license. As a contributor, you agree to allow your code
to be used under both.

Full text of the relevant licenses is included below.

==

University of Illinois/NCSA
Open Source License

```
static_library("BSD-Archive") {
 output_name = "lldbPluginObjectContainerBSDArchive"
 configs += [ "//llvm/utils/gn/build:lldb_code" ]
 deps = [
   "//lldb/source/Core",
   "//lldb/source/Host",
   "//lldb/source/Symbol",
   "//llvm/lib/Support",
 ]
 sources = [ "ObjectContainerBSDArchive.cpp" ]
}
# RUN: llc -O0 -mtriple=m68k -start-after=prologepilog -verify-machineinstrs %s -o - | FileCheck %s

name: is-pcrel-register-operand-legal
body:             |
 bb.0.entry:
   ; CHECK: move.l  (0,%pc,%a0), (%a1)
   ; CHECK: move.l  (%a0), (0,%pc,%a1)

   MOV32jk $a1,  0, $a0, implicit-def $ccr
   MOV32kj 0,  $a1, $a0, implicit-def $ccr
; NOTE: Assertions have been autogenerated by utils/update_llc_test_checks.py
; RUN: llc -mtriple=aarch64-apple-ios %s -o - | FileCheck %s

define <16 x double> @test_sitofp_fixed(<16 x i32> %in) {
; CHECK-LABEL: test_sitofp_fixed:
; CHECK:       ; %bb.0:
; CHECK-NEXT:    sshll2.2d v4, v2, #0
; CHECK-NEXT:    sshll2.2d v5, v0, #0
; CHECK-NEXT:    sshll2.2d v6, v1, #0
; CHECK-NEXT:    sshll2.2d v7, v3, #0
; CHECK-NEXT:    sshll.2d v0, v0, #0
; CHECK-NEXT:    sshll.2d v16, v1, #0
; CHECK-NEXT:    sshll.2d v17, v2, #0
; CHECK-NEXT:    sshll.2d v18, v3, #0
; CHECK-NEXT:    scvtf.2d v1, v5, #6
; CHECK-NEXT:    scvtf.2d v0, v0, #6
```

```
; CHECK-NEXT:    scvtf.2d v3, v6, #6
; CHECK-NEXT:    scvtf.2d v2, v16, #6
; CHECK-NEXT:    scvtf.2d v5, v4, #6
; CHECK-NEXT:    scvtf.2d v4, v17, #6
; CHECK-NEXT:    scvtf.2d v7, v7, #6
; CHECK-NEXT:    scvtf.2d v6, v18, #6
; CHECK-NEXT:    ret

 %flt = sitofp <16 x i32> %in to <16 x double>
 %res = fdiv <16 x double> %flt, <double 64.0, double 64.0, double 64.0,
 double 64.0, double 64.0, double 64.0, double 64.0, double 64.0, double 64.0, double 64.0, double 64.0, double
64.0, double 64.0, double 64.0, double 64.0, double 64.0>
 ret <16 x double> %res
}

; This one is small enough to satisfy isSimple, but still illegally large.
define <4 x double> @test_sitofp_fixed_shortish(<4 x i64> %in) {
; CHECK-LABEL: test_sitofp_fixed_shortish:
; CHECK:       ; %bb.0:
; CHECK-NEXT:    scvtf.2d v0, v0, #6
; CHECK-NEXT:    scvtf.2d v1, v1, #6
; CHECK-NEXT:    ret


 %flt = sitofp <4 x i64> %in to <4 x double>
 %res = fdiv <4 x double> %flt, <double 64.0, double 64.0, double 64.0, double 64.0>
 ret <4 x double> %res
}
```

Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or
Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices
stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works
that You distribute, all copyright, patent, trademark, and
attribution notices from the Source form of the Work,
excluding those notices that do not pertain to any part of
the Derivative Works; and

(d) If the Work
includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must
include a readable copy of the attribution notices contained
within such NOTICE file, excluding those notices that do not
pertain to any part of the Derivative Works, in at least one
of the following places: within a NOTICE text file distributed
as part of the Derivative Works; within the Source form or
documentation, if provided along with the Derivative Works; or,
within a display generated by the Derivative Works, if and
wherever such third-party notices normally appear. The contents
of the NOTICE file are for informational purposes only and
do not modify the License. You may add Your own attribution
notices within Derivative Works that You distribute, alongside
or as an addendum to the NOTICE text from the Work, provided
that such additional
attribution notices cannot be construed
as modifying the License.

You may add Your own copyright statement to Your modifications and
may provide additional or different license terms and conditions
for use, reproduction, or distribution of Your modifications, or
for any such Derivative Works as a whole, provided Your use,
reproduction, and distribution of the Work otherwise complies with
the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise,
any Contribution intentionally submitted for inclusion in the Work
by You to the Licensor shall be under the terms and conditions of
this License, without any additional terms or conditions.
Notwithstanding the above, nothing herein shall supersede or modify
the terms of any separate license agreement you may have executed
with Licensor regarding such Contributions.

6. Trademarks. This License

does not grant permission to use the trade
names, trademarks, service marks, or product names of the Licensor,
except as required for reasonable and customary use in describing the
origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or
agreed to in writing, Licensor provides the Work (and each
Contributor provides its Contributions) on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or
implied, including, without limitation, any warranties or conditions
of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A
PARTICULAR PURPOSE. You are solely responsible for determining the
appropriateness of using or redistributing the Work and assume any
risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory,
whether in tort (including
negligence), contract, or otherwise,
unless required by applicable law (such as deliberate and grossly
negligent acts) or agreed to in writing, shall any Contributor be
liable to You for damages, including any direct, indirect, special,
incidental, or consequential damages of any character arising as a
result of this License or out of the use or inability to use the
Work (including but not limited to damages for loss of goodwill,
work stoppage, computer failure or malfunction, or any and all
other commercial damages or losses), even if such Contributor
has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing
the Work or Derivative Works thereof, You may choose to offer,
and charge a fee for, acceptance of support, warranty, indemnity,
or other liability obligations and/or rights consistent with this
License. However, in accepting such
obligations, You may act only
on Your own behalf and on Your sole responsibility, not on behalf
of any other Contributor, and only if You agree to indemnify,
defend, and hold each Contributor harmless for any liability
incurred by, or claims asserted against, such Contributor by reason
of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following
boilerplate notice, with the fields enclosed by brackets "[]"
replaced with your own identifying information. (Don't include
the brackets!) The text should be enclosed in the appropriate

comment syntax for the file format. We also recommend that a
file or class name and description of purpose be included on the
same "printed page" as the copyright notice for easier
identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions
of this Software are embedded into an Object form of such source code, you
may redistribute such embedded portions in such Object form without complying
with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled
forms of this Software with
software that is licensed under the GPLv2 ("Combined Software") and if a
court of competent jurisdiction determines that the patent provision (Section
3), the indemnity provision (Section 9) or other Section of the License
conflicts with the conditions of the GPLv2, you may retroactively and
prospectively choose to deem waived or otherwise exclude such Section(s) of
the License, but only in their entirety and only with respect to the Combined
Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license
terms. All such code will be identified clearly using at least one of two
mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or
`LICENSE` file at the top containing the specific
license and restrictions
which apply to that software, or
2) It will contain specific license and restriction terms at the top of every

```
 file.
; RUN: opt -mtriple=aarch64-linux-gnu -mattr=+sve -scalarize-masked-mem-intrin -S < %s | FileCheck %s

; Testing that masked gathers operating on scalable vectors that are
; packed in SVE registers are not scalarized.

; CHECK-LABEL: @masked_gather_nxv4i32(
; CHECK: call <vscale x 4 x i32> @llvm.masked.gather.nxv4i32
define <vscale x 4 x i32> @masked_gather_nxv4i32(<vscale x 4 x i32*> %ld, <vscale x 4 x i1> %masks, <vscale x
4 x i32> %passthru) {
 %res = call <vscale x 4 x i32> @llvm.masked.gather.nxv4i32(<vscale x 4 x i32*> %ld, i32 0, <vscale x 4 x i1>
%masks, <vscale x 4 x i32> %passthru)
 ret <vscale x 4 x i32> %res
}

; Testing that masked gathers operating on scalable vectors of FP data
; that is packed in SVE registers are not scalarized.

; CHECK-LABEL: @masked_gather_nxv2f64(
; CHECK: call <vscale x 2 x double> @llvm.masked.gather.nxv2f64
define <vscale x 2 x double> @masked_gather_nxv2f64(<vscale x 2 x double*> %ld, <vscale x 2 x i1> %masks,
<vscale x 2 x double> %passthru)
 {
 %res = call <vscale x 2 x double> @llvm.masked.gather.nxv2f64(<vscale x 2 x double*> %ld, i32 0, <vscale x 2 x
i1> %masks, <vscale x 2 x double> %passthru)
 ret <vscale x 2 x double> %res
}

; Testing that masked gathers operating on scalable vectors of FP data
; that is unpacked in SVE registers are not scalarized.

; CHECK-LABEL: @masked_gather_nxv2f16(
; CHECK: call <vscale x 2 x half> @llvm.masked.gather.nxv2f16
define <vscale x 2 x half> @masked_gather_nxv2f16(<vscale x 2 x half*> %ld, <vscale x 2 x i1> %masks, <vscale
x 2 x half> %passthru) {
 %res = call <vscale x 2 x half> @llvm.masked.gather.nxv2f16(<vscale x 2 x half*> %ld, i32 0, <vscale x 2 x i1>
%masks, <vscale x 2 x half> %passthru)
 ret <vscale x 2 x half> %res
}

; Testing that masked gathers operating on 64-bit fixed vectors are
; scalarized because NEON doesn't have support for masked gather
; instructions.

; CHECK-LABEL: @masked_gather_v2f32(
; CHECK-NOT: @llvm.masked.gather.v2f32(
define <2 x float> @masked_gather_v2f32(<2
```

```
 x float*> %ld, <2 x i1> %masks, <2 x float> %passthru) {
 %res = call <2 x float> @llvm.masked.gather.v2f32(<2 x float*> %ld, i32 0, <2 x i1> %masks, <2 x float>
%passthru)
 ret <2 x float> %res
}

; Testing that masked gathers operating on 128-bit fixed vectors are
; scalarized because NEON doesn't have support for masked gather
; instructions and because we are not targeting fixed width SVE.

; CHECK-LABEL: @masked_gather_v4i32(
; CHECK-NOT: @llvm.masked.gather.v4i32(
define <4 x i32> @masked_gather_v4i32(<4 x i32*> %ld, <4 x i1> %masks, <4 x i32> %passthru) {
 %res = call <4 x i32> @llvm.masked.gather.v4i32(<4 x i32*> %ld, i32 0, <4 x i1> %masks, <4 x i32> %passthru)
 ret <4 x i32> %res
}

declare <vscale x 4 x i32> @llvm.masked.gather.nxv4i32(<vscale x 4 x i32*> %ptrs, i32 %align, <vscale x 4 x i1>
%masks, <vscale x 4 x i32> %passthru)
declare <vscale x 2 x double> @llvm.masked.gather.nxv2f64(<vscale x 2 x double*> %ptrs, i32 %align, <vscale x
2 x i1> %masks, <vscale
 x 2 x double> %passthru)
declare <vscale x 2 x half> @llvm.masked.gather.nxv2f16(<vscale x 2 x half*> %ptrs, i32 %align, <vscale x 2 x
i1> %masks, <vscale x 2 x half> %passthru)
declare <2 x float> @llvm.masked.gather.v2f32(<2 x float*> %ptrs, i32 %align, <2 x i1> %masks, <2 x float>
%passthru)
declare <4 x i32> @llvm.masked.gather.v4i32(<4 x i32*> %ptrs, i32 %align, <4 x i1> %masks, <4 x i32>
%passthru)
! RUN: %python %S/../test_errors.py %s %flang -fopenmp
! OpenMP Version 5.0
! 2.19.4.4 firstprivate Clause
! 2.19.4.5 lastprivate Clause
! 2.19.6.1 copyin Clause
! 2.19.6.2 copyprivate Clause
! If the list item is a polymorphic variable with the allocatable attribute,
! the behavior is unspecified.

subroutine firstprivate()
 class(*), allocatable, save :: x

 !WARNING: If a polymorphic variable with allocatable attribute 'x' is in FIRSTPRIVATE clause, the behavior is
unspecified
 !$omp parallel firstprivate(x)
   call sub()
 !$omp end parallel

end
```

```
subroutine lastprivate()
 class(*), allocatable, save :: x

 !WARNING: If a polymorphic variable with allocatable attribute 'x' is in LASTPRIVATE clause, the behavior is
unspecified
 !$omp do lastprivate(x)
 do i = 1, 10
   call sub()
 enddo
 !$omp end do

end

subroutine copyin()
 class(*), allocatable, save :: x
 !$omp threadprivate(x)

 !WARNING: If a polymorphic variable with allocatable attribute 'x' is in COPYIN clause,
 the behavior is unspecified
 !$omp parallel copyin(x)
   call sub()
 !$omp end parallel

end

subroutine copyprivate()
 class(*), allocatable, save :: x
 !$omp threadprivate(x)

 !WARNING: If a polymorphic variable with allocatable attribute 'x' is in COPYPRIVATE clause, the behavior is
unspecified
 !$omp single copyprivate(x)
   call sub()
 !$omp end single

end
```

```
# People who have agreed to one of the CLAs and can contribute patches.
# The AUTHORS file lists the copyright holders; this file
# lists people.  For example, Google employees are listed here
# but not in AUTHORS, because Google holds the copyright.
#
# Names should be added to this file only after verifying that
# the individual or the individual's organization has agreed to
# the appropriate Contributor License Agreement, found here:
#
# https://developers.google.com/open-source/cla/individual
# https://developers.google.com/open-source/cla/corporate
#
```

The agreement for individuals can be filled out on the web.
#
When adding J Random Contributor's name to this file,
either J's name or J's organization's name should be
added to the AUTHORS file, depending on whether the
individual or corporate CLA was used.
#
Names should be added to this file as:
Name <email address>
#
Please keep the list sorted.

Abhina Sreeskantharajan <abhina.sreeskantharajan@ibm.com>
Albert Pretorius
 <pretoalb@gmail.com>
Alex Steele <steelal123@gmail.com>
Andriy Berestovskyy <berestovskyy@gmail.com>
Arne Beer <arne@twobeer.de>
Billy Robert O'Neal III <billy.oneal@gmail.com> <bion@microsoft.com>
Chris Kennelly <ckennelly@google.com> <ckennelly@ckennelly.com>
Christian Wassermann <christian_wassermann@web.de>
Christopher Seymour <chris.j.seymour@hotmail.com>
Colin Braley <braley.colin@gmail.com>
Cyrille Faucheux <cyrille.faucheux@gmail.com>
Daniel Harvey <danielharvey458@gmail.com>
David Coeurjolly <david.coeurjolly@liris.cnrs.fr>
Deniz Evrenci <denizevrenci@gmail.com>
Dominic Hamon <dma@stripysock.com> <dominic@google.com>
Dominik Czarnota <dominik.b.czarnota@gmail.com>
Dominik Korman <kormandominik@gmail.com>
Donald Aingworth <donalds_junk_mail@yahoo.com>
Eric Backus <eric_backus@alum.mit.edu>
Eric Fiselier <eric@efcs.ca>
Eugene Zhuk <eugene.zhuk@gmail.com>
Evgeny Safronov <division494@gmail.com>
Fanbo Meng <fanbo.meng@ibm.com>
Federico Ficarelli <federico.ficarelli@gmail.com>
Felix
 Homann <linuxaudio@showlabor.de>
Geoffrey Martin-Noble <gcmn@google.com> <gmngeoffrey@gmail.com>
Gerg Szitr <szitar.gergo@gmail.com>
Hannes Hauswedell <h2@fsfe.org>
Ismael Jimenez Martinez <ismael.jimenez.martinez@gmail.com>
Jern-Kuan Leong <jernkuan@gmail.com>
JianXiong Zhou <zhoujianxiong2@gmail.com>
Joao Paulo Magalhaes <joaoppmagalhaes@gmail.com>
John Millikin <jmillikin@stripe.com>
Jordan Williams <jwillikers@protonmail.com>

Jussi Knuuttila <jussi.knuuttila@gmail.com>
Kai Wolf <kai.wolf@gmail.com>
Kaito Udagawa <umireon@gmail.com>
Kishan Kumar <kumar.kishan@outlook.com>
Lei Xu <eddyxu@gmail.com>
Matt Clarkson <mattyclarkson@gmail.com>
Maxim Vafin <maxvafin@gmail.com>
Nick Hutchinson <nshutchinson@gmail.com>
Norman Heino <norman.heino@gmail.com>
Oleksandr Sochka <sasha.sochka@gmail.com>
Ori Livneh <ori.livneh@gmail.com>
Pascal Leroy <phl@google.com>
Paul Redmond <paul.redmond@gmail.com>
Pierre Phaneuf <pphaneuf@google.com>
Radoslav Yovchev <radoslav.tm@gmail.com>
Raul Marin
<rmrodriguez@cartodb.com>
Ray Glover <ray.glover@uk.ibm.com>
Robert Guo <robert.guo@mongodb.com>
Roman Lebedev <lebedev.ri@gmail.com>
Sayan Bhattacharjee <aero.sayan@gmail.com>
Shuo Chen <chenshuo@chenshuo.com>
Steven Wan <wan.yu@ibm.com>
Tobias Schmidt <tobias.schmidt@in.tum.de>
Tobias Ulvgrd <tobias.ulvgard@dirac.se>
Tom Madams <tom.ej.madams@gmail.com> <tmadams@google.com>
Yixuan Qiu <yixuanq@gmail.com>
Yusuke Suzuki <utatane.tea@gmail.com>
Zbigniew Skowron <zbychs@gmail.com>
Min-Yih Hsu <yihshyng223@gmail.com>
==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work

includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional
attribution notices cannot be construed
as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License
does not grant permission to use the trade
names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software

distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license terms. All such code will be identified clearly using at least one of two mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or `LICENSE` file at the top containing the specific license and restrictions which apply to that software, or
2) It will contain specific license and restriction terms at the top of every file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==
University of Illinois/NCSA
Open Source License

Developed by:

LLVM Team

```
; NOTE: Assertions have been autogenerated by utils/update_llc_test_checks.py
; RUN: llc < %s -mtriple=x86_64-linux-android -mattr=+mmx -enable-legalize-types-checking | FileCheck %s
;
; D31946
; Check that we dont end up with the ""LLVM ERROR: Cannot select" error.
; Additionally ensure that the output code actually put fp128 values in SSE registers.

declare fp128 @llvm.fabs.f128(fp128)
declare fp128 @llvm.copysign.f128(fp128, fp128)

define fp128 @TestSelect(fp128 %a, fp128 %b) {
; CHECK-LABEL: TestSelect:
; CHECK:       # %bb.0:
; CHECK-NEXT:    pushq %rbx
; CHECK-NEXT:    .cfi_def_cfa_offset 16
; CHECK-NEXT:    subq $32, %rsp
; CHECK-NEXT:    .cfi_def_cfa_offset 48
; CHECK-NEXT:    .cfi_offset %rbx, -16
; CHECK-NEXT:    movaps %xmm1, {{[-0-9]+}}(%r{{[sb]}}p) # 16-byte Spill
; CHECK-NEXT:    movaps %xmm0, (%rsp) # 16-byte Spill
```

```
; CHECK-NEXT:    callq __gttf2@PLT
; CHECK-NEXT:    movl %eax, %ebx
; CHECK-NEXT:    movaps (%rsp), %xmm0 # 16-byte Reload
; CHECK-NEXT:    movaps {{[-0-9]+}}(%r{{[sb]}}p),
 %xmm1 # 16-byte Reload
; CHECK-NEXT:    callq __subtf3@PLT
; CHECK-NEXT:    testl %ebx, %ebx
; CHECK-NEXT:    jg .LBB0_2
; CHECK-NEXT:  # %bb.1:
; CHECK-NEXT:    xorps %xmm0, %xmm0
; CHECK-NEXT:  .LBB0_2:
; CHECK-NEXT:    addq $32, %rsp
; CHECK-NEXT:    .cfi_def_cfa_offset 16
; CHECK-NEXT:    popq %rbx
; CHECK-NEXT:    .cfi_def_cfa_offset 8
; CHECK-NEXT:    retq
 %cmp = fcmp ogt fp128 %a, %b
 %sub = fsub fp128 %a, %b
 %res = select i1 %cmp, fp128 %sub, fp128 0xL00000000000000000000000000000000
 ret fp128 %res
}

define fp128 @TestFabs(fp128 %a) {
; CHECK-LABEL: TestFabs:
; CHECK:       # %bb.0:
; CHECK-NEXT:    andps {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %xmm0
; CHECK-NEXT:    retq
 %res = call fp128 @llvm.fabs.f128(fp128 %a)
 ret fp128 %res
}

define fp128 @TestCopysign(fp128 %a, fp128 %b) {
; CHECK-LABEL: TestCopysign:
; CHECK:       # %bb.0:
; CHECK-NEXT:    andps {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %xmm1
; CHECK-NEXT:    andps {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %xmm0
; CHECK-NEXT:
    orps %xmm1, %xmm0
; CHECK-NEXT:    retq
 %res = call fp128 @llvm.copysign.f128(fp128 %a, fp128 %b)
 ret fp128 %res
}

define fp128 @TestFneg(fp128 %a) {
; CHECK-LABEL: TestFneg:
; CHECK:       # %bb.0:
; CHECK-NEXT:    pushq %rax
; CHECK-NEXT:    .cfi_def_cfa_offset 16
```

```
; CHECK-NEXT:    movaps %xmm0, %xmm1
; CHECK-NEXT:    callq __multf3@PLT
; CHECK-NEXT:    xorps {{\.?LCPI[0-9]+_[0-9]+}}(%rip), %xmm0
; CHECK-NEXT:    popq %rax
; CHECK-NEXT:    .cfi_def_cfa_offset 8
; CHECK-NEXT:    retq
 %mul = fmul fp128 %a, %a
 %res = fsub fp128 0xL00000000000000008000000000000000, %mul
 ret fp128 %res
}
; RUN: opt %s -inline -S | FileCheck %s

define internal void @innerSmall() "min-legal-vector-width"="128" {
 ret void
}

define internal void @innerLarge() "min-legal-vector-width"="512" {
 ret void
}

define internal void @innerNoAttribute() {
 ret void
}

; We should not add an attribute during inlining. No attribute means unknown.
; Inlining doesn't change the fact that we don't know anything about this
; function.
define void @outerNoAttribute() {
 call void @innerLarge()
 ret void
}

define void @outerConflictingAttributeSmall() "min-legal-vector-width"="128" {
 call void @innerLarge()
 ret void
}

define void @outerConflictingAttributeLarge() "min-legal-vector-width"="512" {
 call void @innerSmall()
 ret void
}

; We should remove the attribute after inlining since the callee's
; vector width requirements are unknown.
define void @outerAttribute() "min-legal-vector-width"="128" {
 call void @innerNoAttribute()
 ret void
}
```

; CHECK: define void @outerNoAttribute() {
; CHECK:
 define void @outerConflictingAttributeSmall() #0
; CHECK: define void @outerConflictingAttributeLarge() #0
; CHECK: define void @outerAttribute() {
; CHECK: attributes #0 = { "min-legal-vector-width"="512" }
----
clang-tidy CERT Files

All clang-tidy files are licensed under the same terms as the rest of the LLVM
project with the following additions:

Any file referencing a CERT Secure Coding guideline:
Please allow this letter to serve as confirmation that open source projects on
http://llvm.org are permitted to link via hypertext to the CERT(R) secure coding
guidelines available at https://www.securecoding.cert.org.

The foregoing is permitted by the Terms of Use as follows:
"Linking to the Service
Because we update many of our Web documents regularly, we would prefer that you
link to our Web pages whenever possible rather than reproduce them. It is not
necessary to request permission to make referential hypertext links to The
Service."
http://www.sei.cmu.edu/legal/ip/index.cfm.

Please allow this letter to also confirm that no formal permission
 is required
to reproduce the title of the content being linked to, nor to reproduce any
de Minimis description of such content.
==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction,
and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by
the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all
other entities that control, are controlled by, or are under common
control with that entity. For the purposes of this definition,
"control" means (i) the
power, direct or indirect, to cause the
direction or management of such entity, whether by contract or
otherwise, or (ii) ownership of fifty percent (50%) or more of the
outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity
exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications,
including but not limited to software source code, documentation
source, and configuration files.

"Object" form shall mean any form resulting from mechanical
transformation or translation of a Source form, including but
not limited to compiled object code, generated documentation,
and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or
Object form, made available under the License, as indicated by a
copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object
form, that is based on (or derived from) the Work and for which the
editorial revisions, annotations, elaborations, or other modifications
represent, as a whole, an original work of authorship. For the purposes
of this License, Derivative Works shall not include works that remain
separable from, or merely link (or bind by name) to the interfaces of,
the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise

designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work

includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software

distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license terms. All such code will be identified clearly using at least one of two mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or `LICENSE` file at the top containing the specific license and restrictions which apply to that software, or
2) It will contain specific license and restriction terms at the top of every file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==

The libclc library is dual licensed under both the University of Illinois "BSD-Like" license and the MIT license. As a user of this code you may choose to use it under either license. As a contributor, you agree to allow your code to be used under both.

Full text of the relevant licenses is included below.

==

```
; RUN: llc -O3 -mtriple=powerpc-unknown-linux-gnu -mcpu=e500 -mattr=spe < %s | FileCheck %s

; PowerPC SPE is a rare in-tree target that has the FP_TO_SINT node marked
; as Legal.

; Verify that fptosi(42.1) isn't simplified when the rounding mode is
; unknown.
; Verify that no gross errors happen.
; CHECK-LABEL: @f20
; COMMON: cfdctsiz
define i32 @f20(double %a) strictfp {
entry:
 %result = call i32 @llvm.experimental.constrained.fptosi.i32.f64(double 42.1,
                                       metadata !"fpexcept.strict")
                                       strictfp
 ret i32 %result
}

@llvm.fp.env = thread_local global i8 zeroinitializer, section "llvm.metadata"
declare i32 @llvm.experimental.constrained.fptosi.i32.f64(double, metadata)
```

DAMAGE.
==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the

editorial revisions, annotations, elaborations, or other modifications
represent, as a whole, an original work of authorship. For the purposes
of this License, Derivative Works shall not include works that remain
separable from, or merely link (or bind by name) to the interfaces of,
the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
(except as stated in this section) patent license to make, have made,
use, offer to sell, sell, import, and otherwise transfer the Work,
where such license applies only to those patent claims licensable
by such Contributor that are necessarily infringed by their
Contribution(s) alone or by combination of their Contribution(s)
with the Work to which such Contribution(s) was submitted. If You
institute patent litigation against any entity (including a
cross-claim or counterclaim in a lawsuit) alleging that the Work
or a Contribution incorporated within the Work constitutes direct
or contributory patent infringement, then any patent licenses
granted to You under this License for that Work shall terminate
as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions.

Notwithstanding the above, nothing herein shall supersede or modify
the terms of any separate license agreement you may have executed
with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license terms. All such code will be identified clearly using at least one of two mechanisms:

1) It will be in a separate directory tree with its own `LICENSE.txt` or
`LICENSE` file at the top containing the specific
license and restrictions
which apply to that software, or
2) It will contain specific license and restriction terms at the top of every
file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==

The libc++abi library is dual licensed under both the University of Illinois
"BSD-Like" license and the MIT license. As a user of this code you may choose
to use it under either license. As a contributor, you agree to allow your code
to be used under both.

Full text of the relevant licenses is included below.

==

University of Illinois/NCSA
Open Source License

Copyright (c) 2009-2019 by the contributors listed in CREDITS.TXT

All rights reserved.

Developed by:

LLVM Team

University of Illinois at Urbana-Champaign

http://llvm.org

Permission
is hereby granted, free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal with
the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished to do
so, subject to the following conditions:

* Redistributions of source code must retain the above copyright notice,
this list of conditions and the following disclaimers.

* Redistributions in binary form must reproduce the above copyright notice,
this list of conditions and the following disclaimers in the

documentation and/or other materials provided with the distribution.

* Neither the names of the LLVM Team, University of Illinois at Urbana-Champaign, nor the names of its contributors may be used to endorse or promote products derived from this Software without specific prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.

==

Copyright (c) 2009-2014 by the contributors listed in CREDITS.TXT

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS 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.

```
add_lldb_library(lldbPluginObjectContainerBSDArchive PLUGIN
 ObjectContainerBSDArchive.cpp

 LINK_LIBS
  lldbCore
  lldbHost
  lldbSymbol
 LINK_COMPONENTS
  Support
 )
```

==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction,
and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by
the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all
other entities that control, are controlled by, or are under common
control with that entity. For the purposes of this definition,
"control" means (i) the
power, direct or indirect, to cause the
direction or management of such entity, whether by contract or
otherwise, or (ii) ownership of fifty percent (50%) or more of the
outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity
exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications,
including but not limited to software source code, documentation
source, and configuration files.

"Object" form shall mean any form resulting from mechanical
transformation or translation of a Source form, including but
not limited to compiled object code, generated documentation,
and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or
Object form, made available under the License, as indicated by a
copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object
form, that is based on (or derived from) the Work and for which the
editorial revisions, annotations, elaborations, or other modifications

represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify

the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license terms. All such code will be identified clearly using at least one of two mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or

`LICENSE` file at the top containing the specific
license and restrictions
which apply to that software, or
2) It will contain specific license and restriction terms at the top of every
file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==
University of Illinois/NCSA
Open Source License

Developed by:

LLVM Team

University of Illinois at Urbana-Champaign

http://llvm.org

Permission is hereby granted, free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal with
the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished
to do
so, subject to the following conditions:

* Redistributions of source code must retain the above copyright notice,
  this list of conditions and the following disclaimers.

* Redistributions in binary form must reproduce the above copyright notice,
  this list of conditions and the following disclaimers in the
  documentation and/or other materials provided with the distribution.

* Neither the names of the LLVM Team, University of Illinois at
  Urbana-Champaign, nor the names of its contributors may be used to
  endorse or promote products derived from this Software without specific
  prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS
FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.

LLVM System Interface Library

Part of the LLVM Project, under the Apache License v2.0 with LLVM Exceptions.
See https://llvm.org/LICENSE.txt for license information.
SPDX-License-Identifier: Apache-2.0 WITH LLVM-exception

==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their

Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf

of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined

Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license
terms. All such code will be identified clearly using at least one of two
mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or
  `LICENSE` file at the top containing the specific
 license and restrictions
  which apply to that software, or
2) It will contain specific license and restriction terms at the top of every
  file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==
University of Illinois/NCSA
Open Source License

Developed by:

   LLVM Team

   University of Illinois at Urbana-Champaign

   http://llvm.org

Permission is hereby granted, free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal with
the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished
 to do
so, subject to the following conditions:

   * Redistributions of source code must retain the above copyright notice,
     this list of conditions and the following disclaimers.

   * Redistributions in binary form must reproduce the above copyright notice,
     this list of conditions and the following disclaimers in the
     documentation and/or other materials provided with the distribution.

   * Neither the names of the LLVM Team, University of Illinois at

Urbana-Champaign, nor the names of its contributors may be used to
endorse or promote products derived from this Software without specific
prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.

==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the
power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but

not limited to compiled object code, generated documentation,
and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or
Object form, made available under the License, as indicated by a
copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object
form, that is based on (or derived from) the Work and for which the
editorial revisions, annotations, elaborations, or other modifications
represent, as a whole, an original work of authorship. For the purposes
of this License, Derivative Works shall not include works that remain
separable from, or merely link (or bind by name) to the interfaces of,
the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
(except as stated in this section) patent license to make, have made,

use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this

License. However, in accepting such
obligations, You may act only
on Your own behalf and on Your sole responsibility, not on behalf
of any other Contributor, and only if You agree to indemnify,
defend, and hold each Contributor harmless for any liability
incurred by, or claims asserted against, such Contributor by reason
of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following
boilerplate notice, with the fields enclosed by brackets "[]"
replaced with your own identifying information. (Don't include
the brackets!) The text should be enclosed in the appropriate
comment syntax for the file format. We also recommend that a
file or class name and description of purpose be included on the
same "printed page" as the copyright notice for easier
identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions
of this Software are embedded into an Object form of such source code, you
may redistribute such embedded portions in such Object form without complying
with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled
forms of this Software with
software that is licensed under the GPLv2 ("Combined Software") and if a
court of competent jurisdiction determines that the patent provision (Section
3), the indemnity provision (Section 9) or other Section of the License

conflicts with the conditions of the GPLv2, you may retroactively and
prospectively choose to deem waived or otherwise exclude such Section(s) of
the License, but only in their entirety and only with respect to the Combined
Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license
terms. All such code will be identified clearly using at least one of two
mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or
  `LICENSE` file at the top containing the specific
 license and restrictions
  which apply to that software, or
2) It will contain specific license and restriction terms at the top of every
  file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==

The software contained in this directory tree is dual licensed under both the
University of Illinois "BSD-Like" license and the MIT license. As a user of
this code you may choose to use it under either license. As a contributor,
you agree to allow your code to be used under both. The full text of the
relevant licenses is included below.

In addition, a license agreement from the copyright/patent holders of the
software contained in this directory tree is included below.

==

University of Illinois/NCSA
Open Source License

Copyright
 (c) 1997-2019 Intel Corporation

All rights reserved.

Developed by:
   OpenMP Runtime Team
   Intel Corporation
   http://www.openmprtl.org

Permission is hereby granted, free of charge, to any person obtaining a copy of
this software and associated documentation files (the "Software"), to deal with

the Software without restriction, including without limitation the rights to
use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies
of the Software, and to permit persons to whom the Software is furnished to do
so, subject to the following conditions:

* Redistributions of source code must retain the above copyright notice,
this list of conditions and the following disclaimers.

* Redistributions in binary form must reproduce the above copyright notice,
this list of conditions and the following disclaimers in the
documentation and/or other materials provided with the distribution.

* Neither the names of Intel Corporation OpenMP Runtime
Team nor the
names of its contributors may be used to endorse or promote products
derived from this Software without specific prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS
FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE
SOFTWARE.

==

Copyright (c) 1997-2019 Intel Corporation

Permission is hereby granted, free of charge, to any person obtaining a copy
of this software and associated documentation files (the "Software"), to deal
in the Software without restriction, including without limitation the rights
to use,
copy, modify, merge, publish, distribute, sublicense, and/or sell
copies of the Software, and to permit persons to whom the Software is
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
AUTHORS OR COPYRIGHT HOLDERS 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.

==

Intel Corporation

Software Grant License Agreement ("Agreement")

Except for the license granted herein to you, Intel Corporation ("Intel")
reserves
all right, title, and interest in and to the Software (defined below).

Definition

"Software" means the code and documentation as well as any original work of authorship, including any modifications or additions to an existing work, that is intentionally submitted by Intel to llvm.org (http://llvm.org) ("LLVM") for inclusion in, or documentation of, any of the products owned or managed by LLVM (the "Work"). For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to LLVM or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, LLVM for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked otherwise.

1. Grant of Copyright License. Subject to the terms and conditions of this Agreement, Intel hereby grants to you and to recipients of the Software distributed by LLVM a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare derivative works of, publicly display, publicly perform, sublicense, and distribute the Software and such derivative works.

2. Grant of Patent License. Subject to the terms and conditions of this Agreement, Intel hereby grants you and to recipients of the Software distributed by LLVM a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by Intel that are necessarily infringed by Intel's Software alone or by combination of the Software with the Work to which such Software was submitted. If any entity institutes patent litigation against Intel or any other entity (including a cross-claim or counterclaim in a lawsuit) alleging that Intel's Software, or the Work to which Intel has contributed constitutes direct or contributory patent infringement, then any patent licenses granted to that entity under this Agreement for the Software or Work shall terminate as of the date such litigation is filed.

Unless required by applicable law or agreed to in writing, the software is

provided on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND,
either express or implied, including, without limitation, any warranties or
conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A
PARTICULAR PURPOSE.

==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction,
and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by
the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all
other entities that control, are controlled by, or are under common
control with that entity. For the purposes of this definition,
"control" means (i) the power, direct or indirect, to cause the
direction or management of such entity, whether by contract or
otherwise, or (ii) ownership of fifty percent (50%) or more of the
outstanding shares, or (iii) beneficial ownership
of such entity.

"You" (or "Your") shall mean an individual or Legal Entity
exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications,
including but not limited to software source code, documentation
source, and configuration files.

"Object" form shall mean any form resulting from mechanical
transformation or translation of a Source form, including but
not limited to compiled object code, generated documentation,
and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or
Object form, made available under the License, as indicated by a
copyright notice that is included in or attached to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object

form, that is based on (or derived from) the Work and for which the
editorial
revisions, annotations, elaborations, or other modifications
represent, as a whole, an original work of authorship. For the purposes
of this License, Derivative Works shall not include works that remain
separable from, or merely link (or bind by name) to the interfaces of,
the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition, "submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
copyright license to reproduce, prepare Derivative Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of
this
License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable
(except as stated in this section) patent license to make, have made,
use, offer to sell, sell, import, and otherwise transfer the Work,
where such license applies only to those patent claims licensable
by such Contributor that are necessarily infringed by their
Contribution(s) alone or by combination of their Contribution(s)
with the Work to which such Contribution(s) was submitted. If You
institute patent litigation against any entity (including a
cross-claim or counterclaim in a lawsuit) alleging that the Work
or a Contribution incorporated within the Work constitutes direct
or contributory patent infringement, then any patent licenses
granted to You under this License for that Work shall terminate

as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions

for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work

by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

==

The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:

==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the
power, direct or indirect, to cause the
direction or management of such entity, whether by contract or

otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be

liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions of this Software are embedded into an Object form of such source code, you may redistribute such embedded portions in such Object form without complying with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled forms of this Software with software that is licensed under the GPLv2 ("Combined Software") and if a court of competent jurisdiction determines that the patent provision (Section 3), the indemnity provision (Section 9) or other Section of the License conflicts with the conditions of the GPLv2, you may retroactively and prospectively choose to deem waived or otherwise exclude such Section(s) of the License, but only in their entirety and only with respect to the Combined Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license terms. All such code will be identified clearly using at least one of two mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or `LICENSE` file at the top containing the specific license and restrictions which apply to that software, or
2) It will contain specific license and restriction terms at the top of every file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==
University of Illinois/NCSA
Open Source License

Developed by:

Polly Team

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal with the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

  * Redistributions of source code must retain
 the above copyright notice,
    this list of conditions and the following disclaimers.

  * Redistributions in binary form must reproduce the above copyright notice,
    this list of conditions and the following disclaimers in the
    documentation and/or other materials provided with the distribution.

  * Neither the names of the Polly Team, copyright holders, nor the names of
    its contributors may be used to endorse or promote products derived from
    this Software without specific prior written permission.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE CONTRIBUTORS OR COPYRIGHT HOLDERS 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 WITH THE SOFTWARE.
==
The LLVM Project is under the Apache License v2.0 with LLVM Exceptions:
==

Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the
 power, direct or indirect, to cause the
 direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity
exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications,
including but not limited to software source code, documentation
source, and configuration files.

"Object" form shall mean any form resulting from mechanical
transformation or translation of a Source form, including but
not limited to compiled object code, generated documentation,
and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or
Object form, made available under the License, as indicated by a
copyright notice that is included in or attached
to the work
(an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object
form, that is based on (or derived from) the Work and for which the
editorial revisions, annotations, elaborations, or other modifications
represent, as a whole, an original work of authorship. For the purposes
of this License, Derivative Works shall not include works that remain
separable from, or merely link (or bind by name) to the interfaces of,
the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including
the original version of the Work and any modifications or additions
to that Work or Derivative Works thereof, that is intentionally
submitted to Licensor for inclusion in the Work by the copyright owner
or by an individual or Legal Entity authorized to submit on behalf of
the copyright owner. For the purposes of this definition,
"submitted"
means any form of electronic, verbal, or written communication sent
to the Licensor or its representatives, including but not limited to
communication on electronic mailing lists, source code control systems,
and issue tracking systems that are managed by, or on behalf of, the
Licensor for the purpose of discussing and improving the Work, but
excluding communication that is conspicuously marked or otherwise
designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity
on behalf of whom a Contribution has been received by Licensor and
subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of
this License, each Contributor hereby grants to You a perpetual,
worldwide, non-exclusive, no-charge, royalty-free, irrevocable

copyright license to reproduce, prepare Derivative
Works of,
publicly display, publicly perform, sublicense, and distribute the
Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work
includes a "NOTICE" text file as part of its
distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and

wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the

Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

---- LLVM Exceptions to the Apache 2.0 License ----

As an exception, if, as a result of your compiling your source code, portions

of this Software are embedded into an Object form of such source code, you
may redistribute such embedded portions in such Object form without complying
with the conditions of Sections 4(a), 4(b) and 4(d) of the License.

In addition, if you combine or link compiled
forms of this Software with
software that is licensed under the GPLv2 ("Combined Software") and if a
court of competent jurisdiction determines that the patent provision (Section
3), the indemnity provision (Section 9) or other Section of the License
conflicts with the conditions of the GPLv2, you may retroactively and
prospectively choose to deem waived or otherwise exclude such Section(s) of
the License, but only in their entirety and only with respect to the Combined
Software.

==
Software from third parties included in the LLVM Project:
==
The LLVM Project contains third party software which is under different license
terms. All such code will be identified clearly using at least one of two
mechanisms:
1) It will be in a separate directory tree with its own `LICENSE.txt` or
`LICENSE` file at the top containing the specific
license and restrictions
which apply to that software, or
2) It will contain specific license and restriction terms at the top of every
file.

==
Legacy LLVM License (https://llvm.org/docs/DeveloperPolicy.html#legacy):
==

The compiler_rt library is dual licensed under both the University of Illinois
"BSD-Like" license and the MIT license. As a user of this code you may choose
to use it under either license. As a contributor, you agree to allow your code
to be used under both.

Full text of the relevant licenses is included below.

==

University of Illinois/NCSA
Open Source License

Copyright (c) 2009-2019 by the contributors listed in CREDITS.TXT

All rights reserved.

Developed by:

```
; RUN: opt -mtriple=aarch64-linux-gnu -mattr=+sve -scalarize-masked-mem-intrin -S < %s | FileCheck %s

; Testing that masked scatters operating on scalable vectors that are
; packed in SVE registers are not scalarized.

; CHECK-LABEL: @masked_scatter_nxv4i32(
; CHECK: call void @llvm.masked.scatter.nxv4i32
define void @masked_scatter_nxv4i32(<vscale x 4 x i32> %data, <vscale x 4 x i32*> %ptrs, <vscale x 4 x i1>
%masks) {
 call void @llvm.masked.scatter.nxv4i32(<vscale x 4 x i32> %data, <vscale x 4 x i32*> %ptrs, i32 0, <vscale x 4 x
i1> %masks)
 ret void
}

; Testing that masked scatters operating on scalable vectors of FP
; data that is packed in SVE registers are not scalarized.

; CHECK-LABEL: @masked_scatter_nxv2f64(
; CHECK: call void @llvm.masked.scatter.nxv2f64
define void @masked_scatter_nxv2f64(<vscale x 2 x double> %data, <vscale x 2 x double*> %ptrs, <vscale x 2 x
i1> %masks) {
 call void @llvm.masked.scatter.nxv2f64(<vscale x 2 x double> %data, <vscale x 2 x double*> %ptrs,
 i32 0, <vscale x 2 x i1> %masks)
 ret void
}

; Testing that masked scatters operating on scalable vectors of FP
; data that is unpacked in SVE registers are not scalarized.

; CHECK-LABEL: @masked_scatter_nxv2f16(
; CHECK: call void @llvm.masked.scatter.nxv2f16
define void @masked_scatter_nxv2f16(<vscale x 2 x half> %data, <vscale x 2 x half*> %ptrs, <vscale x 2 x i1>
%masks) {
 call void @llvm.masked.scatter.nxv2f16(<vscale x 2 x half> %data, <vscale x 2 x half*> %ptrs, i32 0, <vscale x 2
x i1> %masks)
 ret void
}
```

```
; Testing that masked scatters operating on 64-bit fixed vectors are
; scalarized because NEON doesn't have support for masked scatter
; instructions.

; CHECK-LABEL: @masked_scatter_v2f32(
; CHECK-NOT: @llvm.masked.scatter.v2f32(
define void @masked_scatter_v2f32(<2 x float> %data, <2 x float*> %ptrs, <2 x i1> %masks) {
 call void @llvm.masked.scatter.v2f32(<2 x float> %data, <2 x float*> %ptrs, i32 0, <2 x i1> %masks)
 ret void
}

; Testing that masked scatters operating
 on 128-bit fixed vectors are
; scalarized because NEON doesn't have support for masked scatter
; instructions and because we are not targeting fixed width SVE.

; CHECK-LABEL: @masked_scatter_v4i32(
; CHECK-NOT: @llvm.masked.scatter.v4i32(
define void @masked_scatter_v4i32(<4 x i32> %data, <4 x i32*> %ptrs, <4 x i1> %masks) {
 call void @llvm.masked.scatter.v4i32(<4 x i32> %data, <4 x i32*> %ptrs, i32 0, <4 x i1> %masks)
 ret void
}

declare void @llvm.masked.scatter.nxv4i32(<vscale x 4 x i32> %data, <vscale x 4 x i32*> %ptrs, i32 %align,
<vscale x 4 x i1> %masks)
declare void @llvm.masked.scatter.nxv2f64(<vscale x 2 x double> %data, <vscale x 2 x double*> %ptrs, i32
%align, <vscale x 2 x i1> %masks)
declare void @llvm.masked.scatter.nxv2f16(<vscale x 2 x half> %data, <vscale x 2 x half*> %ptrs, i32 %align,
<vscale x 2 x i1> %masks)
declare void @llvm.masked.scatter.v2f32(<2 x float> %data, <2 x float*> %ptrs, i32 %align, <2 x i1> %masks)
declare void @llvm.masked.scatter.v4i32(<4
 x i32> %data, <4 x i32*> %ptrs, i32 %align, <4 x i1> %masks)
; NOTE: Assertions have been autogenerated by utils/update_test_checks.py UTC_ARGS: --include-generated-
funcs
; RUN: opt -S -verify -iroutliner -ir-outlining-no-cost < %s | FileCheck %s

; This test checks that we do outline indirect calls when it is not specified
; that we should not.

declare void @f1(i32*, i32*);
declare void @f2(i32*, i32*);

define void @function1(void()* %func) {
entry:
 %a = alloca i32, align 4
 %b = alloca i32, align 4
 %c = alloca i32, align 4
 store i32 2, i32* %a, align 4
```

```
 store i32 3, i32* %b, align 4
 store i32 4, i32* %c, align 4
 call void %func()
 %al = load i32, i32* %a
 %bl = load i32, i32* %b
 %cl = load i32, i32* %c
 ret void
}

define void @function2(void()* %func) {
entry:
 %a = alloca i32, align 4
 %b = alloca i32, align 4
 %c = alloca i32, align 4
 store i32 2, i32* %a, align 4
 store i32 3, i32* %b, align 4
 store i32 4, i32* %c, align 4
 call void %func()
 %al = load i32, i32* %a
 %bl = load i32, i32* %b
 %cl = load i32, i32*
 %c
 ret void
}
; CHECK-LABEL: @function1(
; CHECK-NEXT:  entry:
; CHECK-NEXT:    [[A:%.*]] = alloca i32, align 4
; CHECK-NEXT:    [[B:%.*]] = alloca i32, align 4
; CHECK-NEXT:    [[C:%.*]] = alloca i32, align 4
; CHECK-NEXT:    call void @outlined_ir_func_0(i32* [[A]], i32* [[B]], i32* [[C]], void ()* [[FUNC:%.*]])
; CHECK-NEXT:    ret void
;
;
; CHECK-LABEL: @function2(
; CHECK-NEXT:  entry:
; CHECK-NEXT:    [[A:%.*]] = alloca i32, align 4
; CHECK-NEXT:    [[B:%.*]] = alloca i32, align 4
; CHECK-NEXT:    [[C:%.*]] = alloca i32, align 4
; CHECK-NEXT:    call void @outlined_ir_func_0(i32* [[A]], i32* [[B]], i32* [[C]], void ()* [[FUNC:%.*]])
; CHECK-NEXT:    ret void
;
;
; CHECK-LABEL: define internal void  @outlined_ir_func_0(
; CHECK-NEXT:  newFuncRoot:
; CHECK-NEXT:    br label [[ENTRY_TO_OUTLINE:%.*]]
; CHECK:       entry_to_outline:
; CHECK-NEXT:    store i32 2, i32* [[TMP0:%.*]], align 4
; CHECK-NEXT:    store i32 3, i32* [[TMP1:%.*]], align 4
```

```
; CHECK-NEXT:    store i32 4, i32*
 [[TMP2:%.*]], align 4
; CHECK-NEXT:    call void [[TMP3:%.*]]()
; CHECK-NEXT:    [[AL:%.*]] = load i32, i32* [[TMP0]], align 4
; CHECK-NEXT:    [[BL:%.*]] = load i32, i32* [[TMP1]], align 4
; CHECK-NEXT:    [[CL:%.*]] = load i32, i32* [[TMP2]], align 4
; CHECK-NEXT:    br label [[ENTRY_AFTER_OUTLINE_EXITSTUB:%.*]]
; CHECK:       entry_after_outline.exitStub:
; CHECK-NEXT:    ret void
;
```

1.22 bcc 0.26.0-iovisor

1.22.1 Available under license :

```
Format: http://www.debian.org/doc/packaging-manuals/copyright-format/1.0/
Upstream-Name: bcc
Source: https://github.com/iovisor/bcc

Files: *
Copyright: 2015 PLUMgrid, Inc.
License: Apache-2.0
                                 Apache License
                           Version 2.0, January 2004
                        http://www.apache.org/licenses/

   TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

   1. Definitions.

      "License" shall mean the terms and conditions for use, reproduction,
      and distribution as defined by Sections 1 through 9 of this document.

      "Licensor" shall mean the copyright owner or entity authorized by
      the copyright owner that is granting the License.

      "Legal Entity" shall mean the union of the acting entity and all
      other entities that control, are controlled by, or are under common
      control with that entity. For the purposes of this definition,
      "control" means (i) the power, direct or indirect, to cause the
      direction or management of such entity, whether by contract or
      otherwise, or (ii) ownership of fifty percent (50%) or more of the
      outstanding shares, or (iii) beneficial ownership
 of such entity.

      "You" (or "Your") shall mean an individual or Legal Entity
      exercising permissions granted by this License.
```

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial
revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License,
each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute
copies of the
Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding
those notices that do not
pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution

notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions

for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the
content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct,
indirect, special,
incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor

has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "{}" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright {yyyy} {name of copyright owner}

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

Valid-License-Identifier: BSD-2-Clause
SPDX-URL: https://spdx.org/licenses/BSD-2-Clause.html
Usage-Guide:
To use the BSD 2-clause "Simplified" License put the following SPDX tag/value pair into a comment according to the placement guidelines in the licensing rules documentation:
SPDX-License-Identifier: BSD-2-Clause
License-Text:

Copyright (c) <year> <owner> . All rights reserved.

Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice,
  this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright
  notice, this list of conditions and the following disclaimer in the
  documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS"
AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING,
 BUT NOT LIMITED TO, THE
IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE
LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR
CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF
SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS
INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE
POSSIBILITY OF SUCH DAMAGE.
LGPL-2.1 OR BSD-2-Clause