

# Release Notes for Cisco IOS XRd, IOS XR Release 24.1.1

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XRd is a powerful IOS XR virtual platform that supports a wide variety of technology roles such as virtual route reflector (vRR), virtual cell-site router (vCSR), and virtual provider-edge (vPE). It is available in a containerized form-factor enabling both standalone and Kubernetes-based containerized network deployments.

### Cisco IOS XRd Overview

XRd is the latest virtual platform from Cisco that brings the highly scalable, feature-rich, and reliable IOS-XR operating system to containerized network deployments. With XR control plane pedigree shared with the likes of Cisco 8000 and data plane capabilities that are derived from the powerful XRv9000, XRd brings the best of both worlds - enabling high scale control plane use cases such as virtual route-reflector (vRR) and high throughput requirements in virtual provider edge (vPE).

XRd is available in two formats:

- XRd Control Plane
- XRd vRouter

### Licensing

Starting with Cisco IOS XR Release 24.1.1, Smart Licensing Using Policy (SLP) is the default Licensing model. When you upgrade to the Cisco IOS XR Release 24.1.1 release or later, the Smart Licensing Using Policy is enabled by default.

You can migrate your devices to Smart Licensing with Policy model, see *Migrating from Smart Licensing to Smart Licensing Using Policy*, [Smart Licensing Using Policy on Cisco IOS XR Routers](#).

We recommend that you update to the latest version of [SSM On-Prem](#) or [Cisco Smart Licensing Utility](#).



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**Note** SSM On-Prem and CSSM both support SLP devices and SL devices. SLP devices and SL devices can coexist in a network. The Smart Licensing (SL) model is available in releases Cisco IOS XR Release 7.11.1 and earlier.

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### Cisco IOS XRd Licensing Model

The Cisco IOS XRd platform offers two types of licensing schemes. This table lists details of Cisco IOS XRd Router's software licenses or entitlements, arranged according to licensing PIDs.

The Cisco IOS XRd instances are pre-loaded with an evaluation license valid for 90 days. For licenses post the evaluation period, you can purchase the XRd licenses using [Cisco Smart Licensing](#).

**Table 1: Cisco IOS XRd Licensing PIDs**

PIDs	Description
XRD-VR-CP	XRd Control Plane
<ul style="list-style-type: none"> <li>• XRD-VR-CP-DP-ESS</li> <li>• XRD-VR-CP-DP-ADN</li> <li>• XRD-VR-CP-DP-ADV</li> </ul>	XRd vRouter

## What's New in Cisco IOS XR Release 24.1.1

For the complete list of features supported on Cisco IOS XRd until Cisco IOS XR Release 24.1.1, see:

- [Release Notes for Cisco IOS XRd, IOS XR Release 7.11.1](#)
- [Release Notes for Cisco IOS XRd, IOS XR Release 7.10.2](#)
- [Release Notes for Cisco IOS XRd, IOS XR Release 7.10.1](#)
- [Release Notes for Cisco IOS XRd, IOS XR Release 7.9.2](#)
- [Release Notes for Cisco IOS XRd, IOS XR Release 7.9.1](#)
- [Release Notes for Cisco IOS XRd, IOS XR Release 7.8.2](#)
- [Release Notes for Cisco IOS XRd, IOS XR Release 7.8.1](#)
- [Release Notes for Cisco IOS XRd, IOS XR Release 7.7.1](#)

For more details on the Cisco IOS XR release model and associated support, see [Software Lifecycle Support Statement - IOS XR](#).

## Software Features Enhanced and Introduced

Feature	Description
<b>Programmability</b>	
<a href="#">View Inconsistent OpenConfig Configuration</a>	OpenConfig infrastructure now provides an operational data YANG model, <code>Cisco-IOS-XR-yiny-oper</code> , which can be queried to view the inconsistent OpenConfig configuration. See <a href="#">GitHub</a> , <a href="#">YANG Data Models Navigator</a>
<b>Licensing</b>	

Feature	Description
<a href="#">Smart Licensing Using Policy</a>	<p>Cisco Smart Licensing Using Policy (SLP) is an enhancement to the existing Cisco Smart Licensing model. It streamlines the licensing process for Cisco IOS XR products by introducing a more flexible and automated approach. With SLP, you no longer need to register your device during installation, and there is no evaluation license state or period. This simplifies the licensing process and reduces complexity. To use SLP, your devices must establish trust and send the initial license usage report within 90 days.</p> <p>Starting with this release, <b>cslu</b> is the default communication transport mode.</p> <p>The feature introduces these changes:</p> <p><b>YANG Data Models:</b></p> <ul style="list-style-type: none"> <li>• <code>Cisco-IOS-XR-smart-license-cfg.yang</code> (see <a href="#">GitHub</a>, <a href="#">YANG Data Models Navigator</a>)</li> </ul>
<b>Segment Routing</b>	
Compute candidate paths and SR-TE policies with IP exclusion	<p>You can now exclude network resources using their IP addresses and enforce affinity for a group of candidate paths that belong to the same disjoint group. Also, for new services that use Pseudo-wire (PW) over SR-TE policies, you can calculate, customize, and preview candidate paths.</p> <p>Previously, affinity constraints and candidate path disjointness were mutually exclusive.</p> <p>The feature introduces these changes:</p> <p><b>CLI:</b></p> <ul style="list-style-type: none"> <li>• The feature introduces <b>shortest-path</b> and <b>exclude-resources</b> keywords in the <b>segment-routing traffic-eng policy</b> and <b>segment-routing traffic-eng on-demand color</b> commands.</li> </ul> <p><b>YANG Data Models:</b></p> <ul style="list-style-type: none"> <li>• <code>Cisco-IOS-XR-infra-xtc-oper.yang</code></li> <li>• <code>Cisco-IOS-XR-infra-xtc-agent-oper.yang</code></li> <li>• <code>Cisco-IOS-XR-infra-xtc-agent-cfg.yang</code></li> </ul>

## Host Requirements

This section details the host requirements for both XRd Control Plane and XRd vRouter:

**Table 2: XRd Control Plane**

Parameter	Requirement
<b>XRd Control Plane Host</b>	
CPU	x86-64 CPU with at least 2 cores
RAM	4 GB
Linux kernel	Version 4.6 and above
	<b>Note</b> The Linux kernel must install the <i>dummy</i> and <i>nf_tables</i> modules.

Parameter	Requirement
Linux cgroups	Version 1 <b>Note</b> Support for unified hierarchy cgroups is not available.
<b>XRd Control Plane instance on the host</b>	
CPU	1 core
RAM	2 GB
Inotify user instances and watches	4000
<b>XRd Control Plane on AWS EC2 instance</b>	
Instance Type	m5.2xlarge
Number of threads per processor core	1
Minimum Disk Size	8 GB <b>Note</b> A XRd instance requires the minimum disk size of 8 GB, but there may be demand for additional disk space depending on how the node handles core files.
Operating System	Amazon Linux 2 with EKS Optimizations
Kernel Settings	4000 inotify user instances and watches per XRd instance

**Table 3: XRd vRouter**

Parameter	Requirement
<b>XRd vRouter Host</b>	
CPU	x86-64 CPU with at least 4 cores
CPU instruction set	<ul style="list-style-type: none"> <li>• ssse3</li> <li>• sse4.1</li> <li>• sse4.2</li> </ul>
Linux kernel	Version 4.6 and above <b>Note</b> The Linux kernel must install the <i>dummy</i> , <i>vfiopci</i> or <i>igb_uio</i> , and <i>nf_tables</i> modules.
Linux cgroups	version 1 <b>Note</b> Support for unified hierarchy cgroups is not available.
<b>XRd vRouter instance on the host</b>	
CPU	2 isolated

Parameter	Requirement
RAM	5 GB
Hugepages	3 GB <b>Note</b> The XRd vRouter instance must enable Hugepage support with 1GB hugepage size.
Inotify user instances and watches	4000
<b>XRd vRouter on Amazon EC2 Instance</b>	
Instance Types	<ul style="list-style-type: none"> <li>• m5.24xlarge</li> <li>• m5n.24xlarge</li> </ul>
Number of threads per processor core	1
Minimum Disk Size	8 GB <b>Note</b> A XRd instance requires the minimum disk size of 8 GB, but there may be demand for additional disk space depending on how the node handles core files.
Operating System	Amazon Linux 2 with EKS Optimizations
Kernel Settings	<ul style="list-style-type: none"> <li>• 4000 inotify user instances and watches per XRd instance</li> <li>• CPU isolation settings for the required XRd deployments</li> </ul>
Additional Kernel Modules	<ul style="list-style-type: none"> <li>• uio (from Amazon Linux 2)</li> <li>• igb_uio from dpdk-mods package with write combine mode enabled</li> </ul>
Hugepages	3 GB <b>Note</b> The XRd vRouter instance must enable Hugepage support with 1GB hugepage size.




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**Note** For using Docker to run the containers, you need Docker version 18 or above with permission to run Docker containers.

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## Caveats

Table 4: Cisco XRd Router Specific Bugs

Bug ID	Headline
<a href="#">CSCwj07339</a>	The call-home configurations displayed in the show run call-home command are missing in the show running-config command output.

## Other Important Information

### Upgrading Cisco IOS XRd Software

Cisco IOS XRd software is a containerized form-factor deployment that follows the container pattern regarding software upgrades and does not support standard IOS-XR install or upgrade operations. To use the latest XRd software, you can create a new XRd instance with the latest software in place of the previous XRd instance and attach the necessary persistent state to the new XRd instance. The new XRd software may be a different version of IOS-XR or the existing version of IOS-XR with new or bugfix RPMs applied (or a combination of the two). An XRd container image containing new or bugfix RPMs is created from an existing XRd container image using standard container build tools (such as **docker build** or **buildah**) to install the new software packages to the existing **base** image. The **apply-bugfixes** script within the **xrd-tools** repository (<https://github.com/ios-xr/xrd-tools>) is available to achieve this using **docker build**, and you can use it as a template for other container build tools.

### Related Documentation

The most current Cisco IOS XRd documentation is located at the following URL:

<https://www.cisco.com/c/en/us/support/routers/ios-xrd/series.html>

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