



Release Notes for Cisco IOS XRv 9000 Router for Cisco IOS XR Software Release 6.0.0

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Cisco IOS XRv 9000 Router Overview

The Cisco IOS XRv 9000 Router is based on Cisco IOS XR software, so it inherits and shares the wide breadth of routing functionality available on other IOS XR platforms. The IOS XR features available on the Cisco IOS XRv 9000 Router are discussed in *Supported Cisco IOS XR Technologies* section.

When the Cisco IOS XRv 9000 Router virtual IOS XR software is deployed as a VM, the Cisco IOS XR software functions just as if it were deployed on a traditional Cisco IOS XR hardware platform. The Cisco IOS XRv 9000 Router combines Route Processor, Line Card, and virtualized forwarding capabilities into a single, centralized forwarding instance. The Cisco IOS XRv 9000 Router has a fully featured, high speed virtual x86 data plane.

Cisco IOS XRv 9000 Router supports the same look and feel as Cisco ASR 9000 Series Aggregation Services Routers and North-bound APIs. Cisco IOS XRv 9000 Router does not support hardware specific configurations. The configuration commands for control plane and data plane features follow the same syntax as the Cisco ASR 9000 Series Aggregation Services Routers. See [Cisco ASR 9000 Series Aggregation Services Routers command references](#) for more information on configuration commands.

Cisco IOS XRv 9000 Router Licensing Model

The Cisco IOS XRv 9000 Router supports activation using Cisco Smart Licensing. By default the Cisco IOS XRv 9000 Router (without license) is rate limited to 200 Kbps.

For more information on licensing model supported on Cisco IOS XRv 9000 Router, see the *Cisco IOS XRv 9000 Router Smart Licensing* chapter in the [Cisco IOS XRv 9000 Router Installation and Configuration Guide](#).

See [Cisco Smart Software Licensing Overview](#) for more information on Cisco Smart Licensing.

License Ordering Information

The Cisco IOS XRv 9000 Router offers a flexible licensing scheme, with multiple tiers to choose from, such as Scale, and Throughput. This table lists details of Cisco IOS XRv 9000 Router's pool of software licenses or entitlements, arranged according to licensing PIDs.



Note The XRv9000 router only consumes and reports VPE licenses. VRR licenses are not consumed or reported.

Table 1: Cisco IOS XRv 9000 Router UCS M5 Based vRR Appliance PIDs

License PID	Description
R-XRV9000-66-RR	Cisco IOS XRv 9000 software, VRR profile
S-XRV-ROUTE-T4	Preloaded Software Image: IOS XRv 9000 vRR scale upgrade license from 20M up to 70M
XRV9000-APLN-ROUT	IOS XRv 9000 M5 Appliance with preloaded IOS XR functionality with 20 million route scale

Supported MIBs

The following MIBs are supported in this release:

- ENTITY-MIB
- ENTITY-STATE-MIB
- CISCO-ENTITY-ASSET-MIB
- BGP4-MIB
- CISCO-AAA-SERVER-MIB
- CISCO-ACL-MIB
- CISCO-BGP4-MIB
- CISCO-BULK-FILE-MIB
- CISCO-CDP-MIB
- CISCO-CLASS-BASED-QOS-MIB
- CISCO-CONFIG-COPY-MIB
- CISCO-CONFIG-MAN-MIB
- CISCO-CONTEXT-MAPPING-MIB
- CISCO-FTP-CLIENT-MIB
- CISCO-IF-EXTENSION-MIB
- CISCO-PING-MIB
- CISCO-PROCESS-MIB
- CISCO-SYSLOG-MIB
- CISCO-SYSTEM-MIB

- CISCO-TCP-MIB
- CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB
- ETHERLIKE-MIB
- EVENT-MIB
- EXPRESSION-MIB
- IETF-TCP-MIB
- IETF-UDP-MIB
- IF-MIB
- IP-FORWARD-MIB
- IP-MIB
- IPV6-MIB
- IPV6-FORWARD-MIB
- ISIS-MIB
- MPLS-L3VPN-STD-MIB
- MPLS-LDP-GENERIC-STD-MIB
- MPLS-LDP-STD-MIB
- MPLS-LSR-STD-MI
- NOTIFICATION-LOG-MIB
- OSPF-MIB
- OSPF-TRAP-MIB
- OSPFV3-MIB
- RFC1213-MIB
- RFC2011-MIB
- RFC2465-MIB
- SNMP-COMMUNITY-MIB
- SNMP-FRAMEWORK-MIB
- SNMP-NOTIFICATION-MIB
- SNMP-TARGET-MIB
- SNMP-USB-MIB
- SNMPv2-MIB
- SNMP-VACM-MIB
- TCP-MIB

- UDP-MIB
- CISCO-IETF-BFD-MIB
- CISCO-IP-TAP-MIB
- CISCO-TAP2-MIB
- RADIUS-ACC-CLIENT-MIB
- RADIUS-AUTH-CLIENT-MIB
- SNMP-TARGET-MIB

New Features Supported in Release 6.0.0

Cisco IOS XRv 9000 supports these features in release 6.0.0

- Internet Protocol Service Level Agreement (IPSLA)—IPSLA permanent port configuration is supported on a global VRF only. Support for ICMP and MPLS LSP is not available in this release.
- Data Models—Data models are a programmatic and standards-based way of configuring and collecting operational data of a network device, replacing the process of manual configuration. Using Data models, Cisco IOS XR operating system supports the automating of configurations that belong to multiple routers across the network. Data models are written in a standard, industry-defined language, which can define a new configuration and state an existing configuration on a network.

Traditional CLI-based configurations, are proprietary, cumbersome, and highly text-based. Managing automated operations on a large network using CLIs is a challenge.

Cisco IOS XR supports the YANG data modeling language. YANG can be used with the Network Configuration Protocol (Netconf) or with gRPC (google-defined Remote Procedure Calls) to automate programmable network operations. Data models allow administrators to customize settings easily and automatically, without wasting time on manual configuration.

- Telemetry—Streaming telemetry lets users direct data to a configured receiver for analysis and troubleshooting purposes in order to maintain the health of the network. This is achieved by leveraging the capabilities of machine-to-machine communication.

Traditionally, organizations used the pull model to collect data, where a client pulls data from network elements. This pull model, however, does not scale when there is more than one network management station in the network. These traditional techniques do not cater to all the underlying information of the router, and they require manual intervention.

Tuning a network based on real-time data is crucial for seamless operation of the network. Instead of a pull model, using a push model to continuously stream data out of the network in the order of few seconds enhances the operational performance and reduces the troubleshooting time. Data can be pushed out at intervals determined by the administrator, at a cadence as low as 30 seconds. Using sophisticated algorithms, a back-end server can then analyze data received from the Cisco IOS XR operating system. The data can be encoded in JavaScript Object Notation (JSON) or Google Protocol Buffers (GPB). This analysis enables back-end management systems to measure and even predict control-plane and data-plane trends.

A telemetry policy file is used to define the data to be generated and the cadence at which the data is to be streamed. To create a policy file and get started with streaming telemetry data, see the *Create Policy File* section in [Cisco IOS XR Telemetry Configuration Guide](#).

- The minimum virtual machine memory size supported in release 6.0.0 is 8GB with lower route scale limitation.
- Generic routing encapsulation (GRE)—Cisco IOS XRv 9000 supports GRE slowpath in this release. GRE slowpath supports transport of tunnel source router generated IPv4 or IPv6 unicast packets over GRE tunnel to the tunnel destination router using IPv4 GRE encapsulation. At the tunnel source router, only locally generated or injected IPv4 or IPv6 packets (like ping packets

or routing protocol packets), over GRE is supported. Forwarding of packets received from another router, over the GRE tunnel, is not supported. At the tunnel destination router, forwarding of the GRE payload packet to another router is not supported.

Supported GRE features include:

- Point-to-point GRE tunnel
- Unicast traffic over GRE
- Slow-path GRE (Carrying packets generated at tunnel source; terminating payload packets destined for tunnel end-point)
- IPv4 GRE encapsulation including IPv4 payload
- IPv4 GRE encapsulation including IPv6 payload
- OSPF over GRE
- OSPFv3 over GRE
- ISISv4 over GRE
- ISISv6 over GRE
- BGP over GRE
- L3 load balancing of GRE traffic over multiple egress paths (for tunnel destination)
- L3 load balancing of non-GRE traffic over multiple egress GRE tunnels
- GRE interface statistics
- GRE keepalive
- Jumbo frame (1500-9000 bytes) with DPDK version 2.0
- Configuring tunnel MTU
- Maximum 512 GRE tunnel interface
- IP precedence preservation
- Fragmentation (before GRE encapsulation)

The show license Command

To determine the license mode running on the Cisco IOS XRv 9000 router, log in to the router and enter the **show license platform summary** command:

Procedure

- Step 1** Establish a Telnet session with the router.
 - Step 2** Enter **show license platform summary** command from EXEC mode.
-

System Requirements

Hypervisors

A hypervisor enables multiple operating systems to share a single hardware host machine. While each operating system appears to have the dedicated use of the host's processor, memory, and other resources; the hypervisor controls and allocates only needed resources to each operating system and ensures that the operating systems (VMs) do not disrupt each other.

Installation of the Cisco IOS XRv 9000 Router is supported on selected Type 1 (native, bare metal) hypervisors. Installation is not supported on Type 2 (hosted) hypervisors, such as VMware Fusion, VMware Player, or Virtual Box. The following table lists release specific supported hypervisor versions.

Table 2: Support Matrix for Hypervisor Versions

Virtual Machines

Cisco IOS XRv 9000 Router virtual machines must meet the following requirements:

Table 3: VM Requirement for VMware Environment

Parameters	Supported
VMware ESXi version	5.5
Virtual CPU cores required	
Virtual Machine memory size	
Virtual Machine hard disk size	
Supported vNICs	E1000
Physical NICs supported	For pass-through: <ul style="list-style-type: none"> • Intel i350 Quad Port 1Gb Adapter • Intel Dual Port 10 GbE Ethernet X520 Server Adapter • Maximum of 8 NICs
Number of vNICs supported	Minimum of 4 vNICs where: <ul style="list-style-type: none"> • 1 for management • 2 are reserved • 1 for traffic Maximum of 11 vNICs where: <ul style="list-style-type: none"> • 1 for management • 2 are reserved • 8 for traffic

Parameters	Supported
Default video, SCSI controller set	Required
Virtual CD/DVD drive installed	Required
IDE hard disk	Required Single IDE hard disk Note Multiple hard disk drives on a VM are not supported.

Table 4: VM Requirement for KVM Environment

Parameters	Supported
KVM versions	
Virtual CPU cores required	1 socket with minimum of 4 and maximum of 14 cores.
Virtual Machine memory size	
Virtual Machine hard disk size	
Supported vNICs	E1000 and VirtIO
Physical NICs supported	For pass-through: <ul style="list-style-type: none"> • Intel i350 Quad Port 1Gb Adapter • Intel Dual Port 10 GbE Ethernet X520 Server Adapter • Maximum of 8 NICs
Number of vNICs supported	Minimum of 4 vNICs where: <ul style="list-style-type: none"> • 1 is for management • 2 are reserved • 1 is for traffic Maximum of 11 vNICs where: <ul style="list-style-type: none"> • 1 is for management • 2 are reserved • 8 is for traffic
Virtual CD/DVD drive installed	Required for ISO installation

Supported Cisco IOS XR Technologies

Cisco IOS XRv 9000 Router supports selected Cisco IOS XR technologies.

This table lists the major Cisco IOS XR technologies Cisco IOS XRv 9000 supports. Not all features in a given technology may be supported. To verify support for specific features, use [Cisco Feature Navigator](#).

Table 5: Cisco IOS XR Technologies Supported on the Cisco IOS XRv 9000 Router

Feature	See the Following Documentation	Introduced in Release
<ul style="list-style-type: none"> • 6PE, 6VPE 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router MPLS Layer 3 VPN Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router VPN and Ethernet Services Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • Bi-directional Policing and Marking 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router Modular Quality of Service Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router Modular Quality of Service Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • Bi-directional Forwarding Detection 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router Routing Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router Routing Command Reference 	Release 5.4.0
Customize Installation using Golden ISO	Customize Installation using Golden ISO	Release 7.3.1
Cisco IOS XRv 9000 Router Deployment on AWS	<ul style="list-style-type: none"> • Cisco IOS XRv 9000 Router Installation and Configuration Guide 	Release 6.3.1
Create User Profiles and Assign Privileges	System Setup and Software Installation Guide for Cisco ASR 9000 Series Routers	Release 7.1.1
<ul style="list-style-type: none"> • Early Fast Discard 	<ul style="list-style-type: none"> • Early Fast discard 	Release 5.4.0
<ul style="list-style-type: none"> • IPv4 Routing • IPv6 Routing • OSPF • ISIS 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router Routing Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router Routing Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • IPv4 and IPv6 ACL 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router IP Addresses and Services Configuration Guide • Access List Commands 	Release 5.4.0

Feature	See the Following Documentation	Introduced in Release
<ul style="list-style-type: none"> • IPv4 L3VPN • 6PE, 6VPE 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router MPLS Layer 3 VPN Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router VPN and Ethernet Services Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • Lawful Intercept 	<ul style="list-style-type: none"> • Implementing Lawful Intercept • Cisco ASR 9000 Series Aggregation Services Router System Security Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • LDP 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router MPLS Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router MPLS Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • LPTS 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router IP Addresses and Services Configuration Guide • LPTS Commands 	Release 5.4.0
<ul style="list-style-type: none"> • MPLS 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router MPLS Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router MPLS Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • MP-BGP, EBGp PE-CE 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router Routing Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router Routing Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • Netconf Yang support 	<ul style="list-style-type: none"> • System Management Configuration Guide for Cisco ASR 9000 Series Routers • Network Time Protocol (NTP) Commands 	Release 5.4.0
<ul style="list-style-type: none"> • Smart Licensing 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference 	Release 5.4.0

Feature	See the Following Documentation	Introduced in Release
<ul style="list-style-type: none"> • SNMP support 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference 	Release 5.4.0
<ul style="list-style-type: none"> • Strict Unicast IPv4 and IPv6 Reverse Path Forwarding (uRPF) 	<ul style="list-style-type: none"> • Cisco ASR 9000 Series Aggregation Services Router IP Addresses and Services Configuration Guide • IP Addresses and Services Command Reference for Cisco ASR 9000 Series Routers 	Release 5.4.0
<ul style="list-style-type: none"> • The Two-Way Active Measurement Protocol (TWAMP) 	<ul style="list-style-type: none"> • System Monitoring Configuration Guide for Cisco ASR 9000 Series Routers • Cisco ASR 9000 Series Aggregation Services Router System Monitoring Command Reference 	Release 6.0.1
gNMI Bundling of Telemetry Updates	Cisco IOS XRv 9000 Router Installation and Configuration Guide	Release 7.8.1
ORR Support for FlexAlgo	Cisco IOS XRv 9000 Router Installation and Configuration Guide	Release 7.5.1
Generic Route Encapsulation using IPv6	MPLS Layer 3 VPN Configuration Guide	Release 7.3.3
<ul style="list-style-type: none"> • Running High Availability (HA) redundancy application for AWS • QoS on IPv4 Release GRE Tunnels • Increase in BFD scale limit and BFD sessions 	Cisco IOS XRv 9000 Router Installation and Configuration Guide	Release 7.3.3

Feature	See the Following Documentation	Introduced in Release
<ul style="list-style-type: none"> • Enhanced Networking Features with Elastic Network Adapter (ENA) on Amazon EC2 M5 Instances • Updated DPDK Driver Version • Enhanced router performance and scales • ACL Based Forwarding (ABF) • Redirect IPV4 and IPV6 traffic using PBR • Support for IPv6 over SR-MPLS through a GRE Tunnel towards an IPv6 Next Hop device • BFD on GRE Tunnel Interface 	Release Notes for Cisco IOS XRv 9000 Routers, IOS XR Release 7.3.3	Release 7.3.3
<ul style="list-style-type: none"> • SR-PCE: Single PCE scale enhancement • SR-PCE: Stateful North-Bound API for Tree-SID 	Release Notes for Cisco IOS XRv 9000 Routers, IOS XR Release 7.5.1	Release 7.5.1

Caveats

Caveats describe unexpected behavior in Cisco IOS XR Software release. Severity-1 caveats are the most serious caveats; severity-2 caveats are less serious.

Cisco Bug Search Tool

Bug Search Tool (BST), the online successor to Bug Toolkit, is designed to improve the effectiveness in network risk management and device troubleshooting. The tool allows partners and customers to search for software bugs based on product, release, and keyword, and aggregates key data such as bug details, product, and version. The tool has provision to filter bugs based on credentials to provide external and internal bug views for the search input.

Use the BST to view the list of outstanding and resolved bugs in a release.

The BST is available at [Bug Search](#). To search for a specific bug, go to <https://tools.cisco.com/bugsearch/bug/bugid>. For more information on BST, see [Bug Search Help](#).

Search Bugs in BST

Follow these instructions to search for bugs that are specific to software release in BST.

Procedure

- Step 1** Go to <https://tools.cisco.com/bugsearch/>.
Log in to the tool using your Cisco.com user name and password. After successful login, the Bug Search Tool page opens.
- Step 2** To search for release bugs, enter the following parameters in the page:
- Product—Select **Series**, enter in the text box. You can alternately navigate to the product name from the **Select from list** link.
 - Releases—Enter .
 - Show Bugs—Select **Affecting or Fixed in these Releases**.
- Step 3** Press **Enter**.
- Note**
- By default, the search results include bugs with all severity levels and statuses, and bugs that were modified during the life cycle of the bug. After you perform a search, you can filter your search results to meet your search requirements.
 - An initial set of 25 search results is shown in the bottom pane. Drag the scroll bar to display the next set of 25 results. Pagination of search results is not supported.
-

Related Documentation

Production Software Maintenance Updates (SMUs)

A production SMU is a SMU that is formally requested, developed, tested, and released. Production SMUs are intended for use in a live network environment and are formally supported by the Cisco TAC and the relevant development teams. Software bugs identified through software recommendations or Bug Search Tools are not a basis for production SMU requests.

For information on production SMU types, refer the [Production SMU Types](#) section of the [IOS XR Software Maintenance Updates \(SMUs\)](#) guide.

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- To find warranty information for a specific product or product family, access [Cisco Warranty Finder](#).

Cisco Bug Search Tool

[Cisco Bug Search Tool](#) (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.

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