Release Notes for Cisco IOS XRv 9000 Routers, IOS XR Release 6.5.3

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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, Throughput, Deployment Model, and Term. This table lists details of Cisco IOS XRv 9000 Router's pool of software licenses or entitlements, arranged according to licensing PIDs.

Table 1: Cisco IOS XRv 9000 Router Licensing PIDs for VRR

PIDs	Description
S-XRV-SUB-RR-1M	Subscription license for virtual Route Reflector (vRR) functionality with one million routes
S-XRV-SUB-RR-4M	Subscription license for virtual Route Reflector (vRR) functionality with scale upto four million routes
S-XRV-SUB-RR-10M	Subscription license for virtual Route Reflector (vRR) scale upgrade from four to ten million routes
S-XRV-SUB-RR-20M	Subscription license for virtual Route Reflector (vRR) scale upgrade from 10 to 20 million routes

PIDs	Description
S-XRV-SUB-XTC	Billing PID for SBP XRV9K -SR-PCE (XTC) RTU

Table 2: Cisco IOS XRv 9000 Router Licensing PIDs for VPE

PIDs	Description
S-XRV-SUB-RTU	IOS XRv 9000 license for one virtual router instantiation
S-XRV-B-SUB-1G	IOS XRv 9000 1G throughput license for IP MPLS base package
S-XRV-P-SUB-1G	IOS XRv 9000 1G throughput license for IP MPLS premium package
S-XRV-L3-B-SUB-1G	IOS XRv 9000 1G throughput license for IP MPLS L3VPN base package
S-XRV-L3-P-SUB-1G	IOS XRv 9000 1G throughput license for IP MPLS L3VPN premium package
S-XRV-L2-B-SUB-1G	Billing PID for subscribtion XRV9K - L2 Base 1G
S-XRV-L2-P-SUB-1G	Billing PID for subscribtion XRV9K - L2 Premium 1G
S-XRV-LI-SUB-RTU	IOS XRv 9000 Advance software license for Lawful Intercept
S-XRV-HQOS-SUB-1G	IOS XRv 9000 1G Advance software license for HQoS
S-XR-BNG-PRO	Billing PID for subscription XRv9K - BNG PRO
S-XR-BNG-8K	Billing PID for subscription XRv9K -BNG 8000 session
S-XR-BNG-ADV-8K	Billing PID for subscription XRv9K - BNG ADV 8000 session
S-XR-SESSION-8K	Billing PID for subscription XRv9K - BNG 8000 session
S-XR-BNG-256K	Billing PID for subscription XRv9K - BNG 256K session
S-XR-BNG-ADV-256K	Billing PID for subscription XRV9K -BNG ADV 256K session
S-XR-BNG-512K	Billing PID for subscription XRV9K - BNG 512K session
S-XR-BNG-ADV-512K	Billing PID for subscription XRV9K -BNG ADV 512K session
S-XR-BNG-1M	Billing PID for subscription XRV9K -BNG 1M session
S-XR-BNG-ADV-1M	Billing PID for subscription XRV9K - BNG ADV 1M session

Table 3: Cisco IOS XRv 9000 Router UCS M5 Based vRR Appliance PIDS

PID	Description
XRV9000-APLN-ROUT	IOS XRv 9000 M5 Appliance with preloaded IOS-XR functionality with 20 million route scale

PID	Description
S-XRV-ROUTE-T4	IOS XRv 9000 vRR scale upgrade license from 20 million up to 70 million

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

Software Features Introduced in Cisco IOS XR Software Release

There are no new software features introduced in this release.

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 4: Support Matrix for Hypervisor Versions

Cisco IOS XR Version	VMWare ESXi	Kernel Based Virtual Machine (KVM)
	version 6.5, 6.7, and later	Linux KVM based on • Red Hat Enterprise Linux 7, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, and 8.0 • Ubuntu 14.04.03 LTS • CentOS 7, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, and 7.7 • Openstack 10

Virtual Machines

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

Table 5: VM Requirement for VMware Environment

Parameters	Supported
VMware ESXi	Version 6.5, 6.7, 7.0 and later
Virtual CPU cores	1 socket with a minimum of 2 cores **Note** For production environment minimum of 4 cores is recommended.
Virtual Machine memory size	

Parameters	Supported
Virtual Machine hard disk size	
Virtual Interfaces	E1000 VMXNET3 for traffic interfaces only
Physical NICs	For pass-through: • Intel i350 Quad Port 1Gb Adapter • Intel Dual Port 10 GbE Ethernet X520 Server Adapter • Intel 4 port 10GE Fortville **Note** PCI passthrough only. SRIOV is not supported. **Note** • Intel Forville has a lower forwarding capability (for high throughput applications in vPE profiles) when compared with Intel 82599 10GE Controller. Cisco UCS Virtual Interface Card (VIC) 1225 **Note** If you are configuring LLDP on Cisco IOS XRv 9000, then you must first disable LLDP in the Cisco UCS VIC 1225 via Cisco Integrated Management Controller (CIMC).
Number of interfaces	Minimum of 4 NICs where: • 1 for management • 2 are reserved • 1 for traffic Maximum of 11 NICs where: • 1 for management • 2 are reserved • 8 for traffic
Default video, SCSI controller set	Required SCSI controller not required for IDE disk.
Virtual CD/DVD drive installed	Virtual CD/DVD is required when installing the Cisco IOS XRv 9000 Router on the VM using ISO template.
IDE hard disk	Single IDE hard disk **Note** Multiple hard disk drives on a VM are not supported.

Note The maximum traffic performance with pass-through NIC interfaces in ESXi is lower than the performance that can be achieved in KVM environments. This is because it is not possible to configure 1G huge-pages in the ESXi hypervisor (as of VMware ESXi 6.0).

Table 6: VM Requirement for KVM Environment

Parameters	**Supported**
KVM versions	• Linux KVM based on Red Hat Enterprise Linux 7, 7.1, 7.2, 7.3 and 7.4 • Ubuntu 14.04.03 LTS Server 64 Bits • Openstack Release 5 (Icehouse), Openstack Juno/Icehouse (RHEL 7), Kilo (RHEL 7.1), Liberty (RHEL 7.2), Openstack 10 (Newton) • CentOS 7, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, and 7.7
Virtual CPU cores	1 socket with minimum of 2 cores.
Virtual Machine memory size	
Virtual Machine hard disk size	
Virtual Interfaces	E1000, VirtIO and VMXNET3 for traffic interfaces only
Physical NICs	For pass-through: • Intel i350 Quad Port 1Gb Adapter • Intel Dual Port 10 GbE Ethernet X520 Server Adapter • Intel 4 port 10GE Fortville **Note** PCI passthrough only. SRIOV is not support. **Note** • Intel Forville has a lower forwarding capability (for high throughput applications in vPE profiles) when compared with Intel 82599 10GE Controller. Cisco UCS Virtual Interface Card (VIC) 1225 **Note** If you are configuring LLDP on Cisco IOS XRv 9000, then you must first disable LLDP in the Cisco UCS VIC 1225 via Cisco Integrated Management Controller (CIMC).

Parameters	Supported
Number of interfaces	Minimum of 4 NICs where: • 1 is for management • 2 are reserved • 1 is for traffic Maximum of 11 NICs where: • 1 is for management • 2 are reserved • 8 is for traffic
Virtual CD/DVD drive installed	Virtual CD/DVD drive is required for ISO installation

Note In the Cisco IOS XRv 9000 Router, some CPU cores are dedicated to the control plane while others are dedicated to the data plane. Each data plane's core runs a single thread that performs packet forwarding. To achieve maximum performance, these threads constantly look for data packets to process. As a result, the OS records that these cores run at 100% utilization. This is expected behavior and not an indication that packet forwarding has reached its threshold limit.

Server

The server must support:

- Intel Westmere or later CPU versions with clock frequency of 2.0GHz for instances with Gigabit or paravirtualized interfaces
- Intel Ivy Bridge or later CPU versions for instances with 10Gb or higher interfaces
- Intel CPU must support the **sse4_2** capability flag. This can be checked in KVM by looking for the **sse4_2** flag in the flags section of */proc/cpuinfo*. For example:

```
cat /proc/cpuinfo | grep sse4_2
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr
 sse sse2 ss syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon nopl xtopology tsc_reliable nonstop_tsc
 aperfmperf pni pclmulqdq vmx ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c
rdrand hypervisor lahf_lm ida arat epb pln pts dtherm tpr_shadow vnmi ept vpid fsgsbase smep
```

Note To use passthrough interfaces in KVM, you must set the option **intel_iommu=on** command in the grub configuration.

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 7: Cisco IOS XR Technologies Supported on the Cisco IOS XRv 9000 Router

Feature	See the Following Documentation	Introduced in Release
• 6PE, 6VPE	• 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
• Bi-directional Policing and Marking	• 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
• Bi-directional Forwarding Detection	• 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	• 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
• Early Fast Discard	• Early Fast discard	Release 5.4.0
• IPv4 Routing • IPv6 Routing • OSPF • ISIS	• Cisco ASR 9000 Series Aggregation Services Router Routing Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router Routing Command Reference	Release 5.4.0
• IPv4 and IPv6 ACL	• 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
• IPv4 L3VPN • 6PE, 6VPE	• 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
• Lawful Intercept	• Implementing Lawful Intercept • Cisco ASR 9000 Series Aggregation Services Router System Security Command Reference	Release 5.4.0
• LDP	• Cisco ASR 9000 Series Aggregation Services Router MPLS Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router MPLS Command Reference	Release 5.4.0
• LPTS	• Cisco ASR 9000 Series Aggregation Services Router IP Addresses and Services Configuration Guide • LPTS Commands	Release 5.4.0
• MPLS	• Cisco ASR 9000 Series Aggregation Services Router MPLS Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router MPLS Command Reference	Release 5.4.0
• MP-BGP, EBGP PE-CE	• Cisco ASR 9000 Series Aggregation Services Router Routing Configuration Guide • Cisco ASR 9000 Series Aggregation Services Router Routing Command Reference	Release 5.4.0
• Netconf Yang support	• System Management Configuration Guide for Cisco ASR 9000 Series Routers • Network Time Protocol (NTP) Commands	Release 5.4.0
• Smart Licensing	• Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guid • Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference	Release 5.4.0

Feature	See the Following Documentation	Introduced in Release
• SNMP support	• 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
• Strict Unicast IPv4 and IPv6 Reverse Path Forwarding (uRPF)	• 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
• The Two-Way Active Measurement Protocol (TWAMP)	• 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
• 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
• 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
• 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 . Severity-1 caveats are the most critical caveats; severity-2 caveats are less critical.

Cisco IOS XR Caveats

Caveats Specific to the

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.

Communications, Services, and Additional Information

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- To submit a service request, visit Cisco Support.
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit Cisco Marketplace.
- To obtain general networking, training, and certification titles, visit Cisco Press.
- 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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