Release Notes for Cisco XR 12000 Series Router for Cisco IOS XR Software Release 3.9.1

April 16, 2013

Cisco IOS XR Software Release 3.9.1

Text Part Number OL-22784-01

These release notes describe the features provided in the Cisco IOS XR Software Release 3.9.1 for the Cisco XR 12000 Series Router and are updated as needed.

Note For information on the Cisco XR 12000 Series Router running Cisco IOS XR Software Release 3.9.1, see the "Important Notes" section on page 16.

You can find the most current Cisco IOS XR software documentation at

http://www.cisco.com/en/US/products/ps6342/tsd_products_support_series_home.html

These electronic documents may contain updates and modifications. For more information on obtaining Cisco documentation, see the "Obtaining Documentation and Submitting a Service Request".

For a list of software caveats that apply to Cisco IOS XR Software Release 3.9.1, see the "Caveats" section on page 18. The caveats are updated for every release and are described at www.cisco.com.

We recommend that you view the field notices for this release located at the following URL to see if your software or hardware platforms are affected:

http://www.cisco.com/public/support/tac/fn_index.html

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Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Key Changes from Previous Releases in Cisco IOS XR Release 3.9.1

Cisco IOS XR Software Release 3.9.1 requires a 2-GB Flash Disk as a minimum. Therefore, you must upgrade an existing PCMCIA 1-GB Flash Disk to 2 GB or 4 GB before upgrading to Cisco IOS XR Software Release 3.9.1. For more information, see the "Minimum Flash Disk Requirements When Upgrading to Release 3.9.1" section on page 18.

Contents

These release notes contain the following sections:

Introduction

Cisco IOS XRsoftware is a distributed operating system designed for continuous system operation combined with service flexibility and high performance.

Cisco IOS XR software running on the Cisco XR 12000 Series Router provides the following features and benefits:

- **IP and Routing**—Supports a wide range of IPv4 and IPv6 services and routing protocols; such as Border Gateway Protocol (BGP), Routing Information Protocol (RIPv2), Intermediate System-to-Intermediate System (IS-IS), Open Shortest Path First (OSPF), IP Multicast, Routing Policy Language (RPL), Hot Standby Router Protocol (HSRP), and Virtual Router Redundancy Protocol features (VRRP).
- **BGP Prefix Independent Convergence**—Provides the ability to converge BGP routes within sub seconds instead of multiple seconds. The Forwarding Information Base (FIB) is updated, independent of a prefix, to converge multiple 100K BGP routes with the occurrence of a single failure. This convergence is applicable to both core and edge failures and with or with out MPLS. This fast convergence innovation is unique to Cisco IOS XR software.
- **Multiprotocol Label Switching (MPLS)**—Supports MPLS protocols, including Traffic Engineering (TE), Resource Reservation Protocol (RSVP), Label Distribution Protocol (LDP), Virtual Private LAN Service (VPLS), and Layer 3 Virtual Private Network (L3VPN).

- **Multicast—**Provides comprehensive IP Multicast software including Source Specific Multicast (SSM) and Protocol Independent Multicast (PIM) in Sparse Mode only.
- **Quality of Service (QoS)—**Supports QoS mechanisms including policing, marking, queuing, random and hard traffic dropping, and shaping. Additionally, Cisco IOS XR software also supports modular QoS command-line interface (MQC). MQC is used to configure QoS features.
- **Manageability—**Provides industry-standard management interfaces including modular command-line interface (CLI), Simple Network Management Protocol (SNMP), and native Extensible Markup Language (XML) interfaces. Includes a comprehensive set of Syslog messages.
- **Security—**Provides comprehensive network security features including access control lists (ACLs); routing authentications; Authentication, Authorization, and Accounting (AAA)/Terminal Access Controller Access Control System (TACACS+); Secure Shell (SSH); Management Plane Protection (MPP) for management plane security; and Simple Network Management Protocol version3 (SNMPv3). Control plane protections integrated into line card Application-Specific Integrated Circuits (ASICs) include Generalized TTL Security Mechanism (GTSM), RFC 3682, and Dynamic Control Plane Protection (DCPP).
- **Craft Works Interface (CWI)—**CWI is a client-side application used to configure and manage Cisco routers. Management and configuration features include fault, configuration, security, and inventory, with an emphasis on speed and efficiency. The CWI provides a context-sensitive graphical representation of the objects in a Cisco router, simplifying the process of configuring and managing the router. The CWI allows you to log in to multiple routers and perform management tasks.
- **Availability—**Supports rich availability features such as fault containment, fault tolerance, fast switchover, link aggregation, nonstop routing for ISIS, LDP, BGP, and OSPF, and nonstop forwarding (NSF).
- **Multicast service delivery in SP NGN—**MVPNv4 support carries multicast traffic over an ISP MPLS core network.
- **IPv6 Provider Edge Router support for IPv6 applications**—Delivers IPv6 traffic over an IPv4/MPLS core with IPv6 provider edge router (6PE) support.
- **IPv6 VPN over MPLS (6VPE) support**—Delivers IPv6 VPN over MPLS (IPv6) VPN traffic over an IPv4 or MPLS core with 6VPE support.
- **6VPE over L2TPv3 support**—Delivers IPv6 VPN traffic over L2TPv3 core with 6VPE support. This feature is also available on Cisco IOS software.
- **Enhanced core competencies:**
  - IP fast convergence with Fast Reroute (FRR) support for Intermediate System-to-Intermediate System (IS-IS) and OSPF
  - Path Computation Element (PCE) capability for traffic engineering
- **L2TPv3 Tunneling Mechanism—**Service Providers who do not use MPLS in the core, but want to offer VPN services can use the L2TPv3 tunneling mechanism. This feature support includes IPv4 (VPNv4) and IPv6 (6VPE) VPN services using L2TPv3 encapsulation. The L2TPv3 packet is encapsulated in an IPv4 delivery header and is carried across an IPv4 backbone. VPN prefixes are advertised with BGP labels and resolved over L2TPv3 tunnels. This feature is supported only on the Cisco XR 12000 Series Router.

For more information about new features provided on the Cisco XR 12000 Series Router for Cisco IOS XR Software Release 3.9.1, see the "New Features in Cisco IOS XR Software Release 3.9.1" section on page 15 in this document.

System Requirements

This section describes the system requirements for Cisco IOS XR Software Release 3.9.1 supported on the Cisco XR 12000 Series Router. The system requirements include the following information:

To determine the software versions or levels of your current system, see the "Determining Your Software Version" section on page 13.

Feature Set Table

Cisco IOS XR software is packaged in *feature sets* (also called *software images*). Each feature set contains a specific set of Cisco IOS XR Software Release 3.9.1 features.

Table 1 lists the Cisco IOS XR software feature set matrix (PIE files) and associated filenames available for Cisco IOS XR Software Release 3.9.1, supported on the Cisco XR 12000 Series Router.

Table 1 Cisco XR 12000 Series Router Supported Feature Set (Cisco IOS XR Software Release 3.9.1 PIE Files)

Feature Set	Filename	Description
Composite Package		
Cisco IOS XR IP Unicast Routing Core Bundle	c12k-mini.pie-3.9.1	Contains the required core packages, including OS, Admin, Base, Forwarding, Routing, SNMP Agent, and Alarm Correlation.
Cisco IOS XR IP Unicast Routing Core Bundle	c12k-mini.vm-3.9.1	Contains the required core packages including OS, Admin, Base, Forwarding, and Routing SNMP Agent, and Alarm Correlation.
Optional Individual Packages[1]		
Cisco IOS XR Manageability Package	c12k-mgbl.pie-3.9.1	CORBA[2] agent, XML Parser, and HTTP server packages.
Cisco IOS XR MPLS Package	c12k-mpls.pie-3.9.1	MPLS-TE,[3] LDP, [4]MPLS Forwarding, MPLS OAM,[5] LMP,[6] OUNI,[7] and RSVP.[8]
Cisco IOS XR Multicast Package	c12k-mcast.pie-3.9.1	Multicast Routing Protocols (PIM,[9] MSDP,[10] IGMP,[11] Auto-RP, BSR[12]), Tools (SAP MTrace, MRINFO), and Infrastructure (MRIB,[13] MURIB,[14] MFWD)[15].

Table 1 Cisco XR 12000 Series Router Supported Feature Set (Cisco IOS XR Software Release 3.9.1 PIE Files) (continued)

Feature Set	Filename	Description
Cisco IOS XR Security Package	c12k-k9sec.pie-3.9.1	Support for Encryption, Decryption, IPSec[16], SSH,[17] SSL,[18] and PKI.[19] Software based IPSec support: maximum of 500 tunnels
Cisco IOS XR Standby RP Boot Image	mbiprp-rp.vm-3.9.1	Support for booting the Standby RP on a Cisco XR 12000 Series Router.
Cisco IOS XR FPD Package	c12k-fpd.pie-3.9.1	Firmware for shared port adapters (SPA) and for fixed port line cards supported in Cisco IOS XR.
Cisco IOS XR Diagnostic Package	c12k-diags.pie-3.9.1	Diagnostic utilities for Cisco IOS XR routers.
Cisco IOS XR Documentation Package	c12k-doc.pie-3.9.1	.man pages for Cisco IOS XR software on the Cisco XR 12000 Series Router chassis.

1. Packages are installed individually
2. Common Object Request Broker Architecture
3. MPLS Traffic Engineering
4. Label Distribution Protocol
5. Operations, Administration, and Maintenance
6. Link Manager Protocol
7. Optical User Network Interface
8. Resource Reservation Protocol
9. Protocol Independent Multicast
10. Multicast Source Discovery Protocol
11. Internet Group Management Protocol
12. Bootstrap router
13. Multicast Routing Information Base
14. Multicast-Unicast RIB
15. Multicast forwarding
16. IP Security
17. Secure Shell
18. Secure Socket Layer
19. Physical layer interface module

Table 2 lists the Cisco XR 12000 Series Router TAR files.

Table 2 Cisco XR 12000 Series Router Supported Feature Sets (Cisco IOS XR Software Release 3.9.1 TAR Files)

Feature Set	Filename	Description
Cisco IOS XR IP/MPLS Core Software	XR12000-iosxr-3.9.1.tar	• Cisco IOS XR IP Unicast Routing Core Bundle • Cisco IOS XR Manageability Package • Cisco IOS XR MPLS Package • Cisco IOS XR Multicast Package
Cisco IOS XR IP/MPLS Core Software 3DES	XR12000-iosxr-k9-3.9.1.tar	• Cisco IOS XR IP Unicast Routing Core Bundle • Cisco IOS XR Manageability Package • Cisco IOS XR MPLS Package • Cisco IOS XR Multicast Package • Cisco IOS XR Security Package

Memory Requirements

Caution If you remove the media in which the software image or configuration is stored, the router may become unstable and fail.

The minimum memory requirements for a Cisco XR 12000 Series Router running Cisco IOS XR Software Release 3.9.1 consist of the following:

- 2-GB route memory on performance route processor 2 (PRP-2)

Note 4-GB route memory on PRP-2 is required if it is planned to scale to more than 64K IPsec tunnels per chassis.

- 2-GB or greater ATA flash storage on PRP-2
- 4-GB route memory on performance route processor 3 (PRP-3)
- 2-GB or greater Compact flash storage on PRP-3
- 1-GB line card route memory on all Engine 3 line cards
- 1-GB line card memory on Engine 5-based SPA interface processor (SIP-600)
  - The default route memory on the 12000-SIP-600 is 1GB
- 2-GB line card memory on all Engine 5-based SPA interface processors (SIPs)
  - The default route memory on the 12000-SIP-401, 501, and 601 is 2 GB.

Note The performance route processor 1 (PRP-1) is not supported in production environments.

- 2-GB PCMCIA Flash Disk

Note Cisco IOS XR Software Release 3.9.1 requires a 2-GB Flash Disk as a minimum. Therefore, you must upgrade an existing PCMCIA 1-GB Flash Disk to 2 GB before upgrading to Cisco IOS XR Software Release 3.9.1. For more information, see the "Minimum Flash Disk Requirements When Upgrading to Release 3.9.1" section on page 18.

Hardware Supported

All hardware features are supported on Cisco IOS XR software, subject to the memory requirements specified in the "Memory Requirements" section on page 6.

Table 3 lists the supported hardware components on the Cisco XR 12000 Series Router and the minimum required software versions. For more information, see the "Determining Your Software Version" section on page 13.

Table 3 Cisco XR 12000 Series Router Supported Hardware and Minimum Software Requirements

Component	Part Number	Support from Version
Cisco XR 12000 Series Router Series Router Systems		
Cisco XR 12000 Series 4-slot chassis	XR-12000/4	3.3
Cisco XR 12000 Series 6-slot chassis	XR-12000/6	3.3
Cisco XR 12000 Series 10-slot chassis	XR-12000/10	3.3
Cisco XR 12000 Series 16-slot chassis	XR-12000/16	3.3
Cisco XR 12000 Series Router Chassis Hardware		
4-slot chassis & backplane, 1 Blower, 2 AC	12000/4-AC	3.3
4-slot chassis & backplane, 1 Blower, 2 DC	12000/4-DC	3.3
6-slot chassis & backplane, 2 Alarm, 1 Blower, 2 AC	12000/6-AC	3.3
6-slot chassis & backplane, 2 Alarm, 1 Blower, 2 DC	12000/6-DC	3.3
10-slot chassis & backplane, 2 Alarm, 1 Blower, 2 AC	12000/10-AC	3.3
10-slot chassis & backplane, 2 Alarm, 1 Blower, 2 DC	12000/10-DC	3.3
16-slot chassis & backplane, 2 Alarm, 2 Blower, 3 AC	12000/16-AC3	3.3
16-slot chassis & backplane, 2 Alarm, 2 Blower, 4 DC	12000/16-DC	3.3
16-slot chassis & backplane, 2 Alarm, 2 Blower, 4 AC	12000/16-AC4	3.3
Cisco XR12000 16-slots; 2 Alarms, Advanced 2 Blowers, up to 8 DC	12000E/16-DC	3.8
Cisco XR12000 16-slots; 2 Alarms, Advanced 2 Blowers, up to 8 AC	12000E/16-AC	3.8
Cisco XR 12000 Series Router Fabric Hardware		
Enhanced 20 Gbps Fabric & Alarm card for Cisco 12004	12004E/20	3.6
Enhanced 80 Gbps Fabric & Alarm card for Cisco 12404	12404E/80	3.6

Table 3 Cisco XR 12000 Series Router Supported Hardware and Minimum Software Requirements (continued)

Component	Part Number	Support from Version
Enhanced 30 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12006	12006E/30	3.6
Enhanced 120 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12406	12406E/120	3.6
Enhanced 50 Gbps Fabric (2xCSC and 5xSFC) for Cisco 12010	12010E/50	3.5.2
Enhanced 200 Gbps Fabric (2xCSC and 5xSFC) for Cisco 12410	12410E/200	3.5.2
Enhanced 800 Gbps Fabric (2xCSC and 5xSFC) for Cisco 12810	12810E/800	3.4
Enhanced 80 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12016	12016E/80	3.5.2
Enhanced 320 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12416	12416E/320	3.5.2
Enhanced 1280 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12816	12816E/1280	3.4
80 Gbps Fabric & Alarm card for Cisco 12404	12404/80	3.3
30 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12006	12006/30	3.3
120 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12406	12406/120	3.3
50 Gbps Fabric (2xCSC and 5xSFC) for Cisco 12010	12010/50	3.3
200 Gbps Fabric (2xCSC and 5xSFC) for Cisco 12410	12410/200	3.3
80 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12016	12016/80	3.3
320 Gbps Fabric (2xCSC and 3xSFC) for Cisco 12416	12416/320	3.3
Cisco XR 12000 Series Route Processor Hardware		
Cisco XR 12000 Series Performance Route Processor 2	PRP-2	3.2
Cisco XR 12000 Series Performance Route Processor 3	PRP-3	3.8
Cisco XR 12000 Series 40 GB Hard Drive Option	HD-PRP2-40G	3.2
Cisco XR 12000 Series PRP-3 80G Hard Drive	HD-PRP3	3.8
Cisco XR 12000 Series General Chassis Hardware		
Cisco XR 12000 Series PCMCIA Flash Disk 1 GB	MEM-FD1G	3.2
Cisco XR 12000 Series PCMCIA Flash Disk 2 GB	MEM-FD2G	3.2
Cisco XR 12000 Series PCMCIA Flash Disk 4 GB	MEM-FD4G	3.8
Cisco XR 12000 Series PRP-3 2GB Compact Flash	FLASH-PRP3-2G	3.8
Cisco XR 12000 Series PRP-3 4GB Compact Flash	FLASH-PRP3-4G	3.8
Cisco XR 12000 Series PRP-3 4GB Memory (2X2GB DIMM)	MEM-PRP3-4G	3.8
Cisco XR 12000 Series PRP-3 8GB Memory (2X4GB DIMM)	MEM-PRP3-8G	3.8
Cisco XR 12000 Series SPA Interface Processor Hardware		
Multirate 2.5G IP Services Engine (Modular)	12000-SIP-401	3.3
Multirate 5G IP Services Engine (Modular)	12000-SIP-501	3.3

Table 3 Cisco XR 12000 Series Router Supported Hardware and Minimum Software Requirements (continued)

Component	Part Number	Support from Version
Multirate 10G IP Services Engine (Modular)	12000-SIP-601	3.3
Cisco XR 12000 Series SPA Interface Processor 10G	12000-SIP-600	3.2
Cisco XR 12000 Series Router SONET Interface Modules and SPAs		
Cisco XR 12000 Series 4xOC12c/STM4c POS Intermediate Reach Single-Mode optics	4OC12X/POS-I-SC-B	3.2
Cisco XR 12000 Series 4xOC12c/STM4c POS Short Reach Multi-Mode optics	4OC12X/POS-M-SC-B	3.2
Cisco XR 12000 Series 16xOC3c/STM1c POS Short Reach Multi-Mode optics	16OC3X/POS-M-MJ-B	3.2
Cisco XR 12000 Series 16xOC3c/STM1c POS Intermediate Reach Single-Mode optics	16OC3X/POS-I-LC-B	3.2
Cisco XR 12000 Series 8xOC3c/STM1c POS Short Reach Multi-Mode optics	8OC3X/POS-MM-MJ-B	3.2
Cisco XR 12000 Series 8xOC3c/STM1c POS Intermediate Reach Single-Mode optics	8OC3X/POS-IR-LC-B	3.2
Cisco XR 12000 Series 4xOC3c/STM1c POS Short Reach Multi-Mode optics	4OC3X/POS-MM-MJ-B	3.2
Cisco XR 12000 Series 4xOC3c/STM1c POS Intermediate Reach Single-Mode optics	4OC3X/POS-IR-LC-B	3.2
Cisco XR 12000 Series 4xOC3c/STM1c POS Long Reach Single-Mode optics	4OC3X/POS-LR-LC-B	3.2
Cisco XR 12000 Series 1xOC48c/STM16c POS Short Reach Single-Mode optics	OC48X/POS-SR-SC	3.2
Cisco XR 12000 Series 1xOC48c/STM16c POS Long Reach Single-Mode optics	OC48X/POS-LR-SC	3.2
Cisco XR 12000 Series 4-Port OC-3c/STM-1c ATM ISE Line Card, multimode	4OC3X/ATM-MM-SC	3.4
Cisco XR 12000 Series 4-Port OC-3c/STM-1c ATM ISE Line Card, single-mode	4OC3X/ATM-IR-SC	3.4
Cisco XR 12000 Series 4-port OC-12/STM-4 ATM multimode ISE line card with SC connector	4OC12X/ATM-MM-SC	3.4
Cisco XR 12000 Series 4-port OC-12/STM-4 ATM single-mode, intermediate-reach ISE line card with SC Connector	4OC12X/ATM-IR-SC	3.4
Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter with VSR Optics	SPA-OC192POS-VSR	3.3
Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter with LR Optics	SPA-OC192POS-LR	3.2
Cisco 1-Port OC-192c/STM-64c POS/RPR Shared Port Adapter with XFP Optics	SPA-OC192POS-XFP	3.2
2-Port OC-48/STM16 POS/RPR Shared Port Adapters	SPA-2XOC48POS/RPR	3.3

Table 3 Cisco XR 12000 Series Router Supported Hardware and Minimum Software Requirements (continued)

Component	Part Number	Support from Version
1-Port Channelized OC-12/DS0 Shared Port Adapters	SPA-1XCHOC12/DS0	3.5
1-Port Channelized STM-1/OC-3 to DS0 Shared Port Adapter	SPA-1XCHSTM1/OC3	3.5
1-Port OC-48c/STM-16 POS/RPR Shared Port Adapter	SPA-1XOC48POS/RPR	3.5
2-Port OC-12c/STM-4 POS Shared Port Adapter	SPA-2XOC12-POS	3.5
4-Port OC-12c/STM-4 POS Shared Port Adapter	SPA-4XOC12-POS	3.5
4-Port OC-3c/STM-1 POS Shared Port Adapter	SPA-4XOC3-POS-V2	3.5
8-Port OC-12c/STM-4 POS Shared Port Adapter	SPA-8XOC12-POS	3.5
8-Port OC-3c/STM-1 POS Shared Port Adapter	SPA-8XOC3-POS	3.5
Cisco 8-Port Channelized T1/E1 Shared Port Adapter	SPA-8XCHT1/E1	3.6
Cisco 1-Port Channelized OC-48/DS3 Optical Packet Processor Shared Port Adapter	SPA-1XCHOC48/DS3	3.6
1-Port Clear Channel OC-3 ATM SPA	SPA-1XOC3-ATM-V2	3.7
3-Port Clear Channel OC-3 ATM SPA	SPA-3XOC3-ATM-V2	3.7
1-Port Clear Channel OC-12 ATM SPA	SPA-1XOC12-ATM-V2	3.7
2-Port Channelized T3/E3 ATM CEoP SPA	SPA-2CHT3-CE-ATM	3.7
Ethernet Interface Modules and SPAs		
Cisco XR 12000 Series 4xGE with SFP optics	4GE-SFP-LC	3.2
Cisco 5-Port Gigabit Ethernet Shared Port Adapter, Version 2	SPA-5X1GE-V2	3.4
Cisco 8-Port Gigabit Ethernet Shared Port Adapter, Version 2	SPA-8X1GE-V2	3.4
Cisco 8-Port 10BASE-T/100BASE-TX Fast Ethernet Shared Port Adapter, Version 2	SPA-8X1FE-TX-V2	3.4
Cisco 8-Port 100BASE-TX Fast Ethernet Shared Port Adapter	SPA-8XFE-TX	3.3
Cisco 10-Port Gigabit Ethernet Shared Port Adapter, Version 2	SPA-10X1GE-V2	3.4
Cisco 1-Port Ten Gigabit Ethernet Shared Port Adapter, Version 2	SPA-1X10GE-L-V2	3.4
Cisco 5-Port Gigabit Ethernet Shared Port Adapter with SFP optics	SPA-5X1GE	3.2
Cisco 10-Port Gigabit Ethernet Shared Port Adapter with SFP optics	SPA-10X1GE	3.2
Cisco 1-Port 10 Gigabit Ethernet Shared Port Adapter with XFP optics	SPA-1XTENGE-XFP	3.2
Cisco 2-Port Gigabit Ethernet Shared Port Adapter, Version 2	SPA-2X1GE-V2	3.4.1
Cisco XR 12000 Series Router T3 and E3 Interface Modules and SPAs		
2-port Channelized T3 to DS0 Shared Port Adapter	SPA-2XCT3/DS0	3.3
4-port Channelized T3 to DS0 Shared Port Adapter	SPA-4XCT3/DS0	3.3
2-port Clear Channel T3/E3 Shared Port Adapter	SPA-2XT3/E3	3.3
4-port Clear Channel T3/E3 Shared Port Adapter	SPA-4XT3/E3	3.3
Cisco XR 12000 Series Router Channelized Line Cards		
Cisco 1-Port Channelized OC-48 line card	CHOC48/DS3-SR-SC	3.6

Table 3 Cisco XR 12000 Series Router Supported Hardware and Minimum Software Requirements (continued)

Component	Part Number	Support from Version
Cisco 1-Port Channelized OC-12 line card	CHOC12/DS1-SR-SC	3.8
Cisco 4-Port Channelized OC-12 line card	4CHOC12/DS3-I-SCB	3.8

Software Compatibility

Cisco IOS XR Software Release 3.9.1 is compatible with the following Cisco XR 12000 Series Router systems:

- Cisco XR 12004 Router
- Cisco XR 12006 Router
- Cisco XR 12010 Router
- Cisco XR 12016 Router
- Cisco XR 12404 Router
- Cisco XR 12406 Router
- Cisco XR 12410 Router
- Cisco XR 12416 Router
- Cisco XR 12810 Router
- Cisco XR 12816 Router

The following chassis are supported for an existing installed base:

- Cisco 12008 Router
- Cisco 12010 Router
- Cisco 12012 Router

Note If you are running Cisco IOS XR software on a Cisco XR120xx system with SIP 600, 401, 501, or 601, you must upgrade the fabric. For ROMMON, MBUS, and Fabric Downloader versions, see the "Other Firmware Support" section on page 11.

Other Firmware Support

The Cisco XR 12000 Series Router supports the following firmware code:

- Line cards (LCs)

  For Engine 3 line card:

  - Maintenance Bus (MBUS) Agent Software-RAM version 04.06, ROM version 04.06
  - ROM Monitor version 17.1
  - Fabric Downloader - RAM version 8.0, ROM version 8.0 (The ROM version will be the same as the RAM version if upgraded.)

For Engine 5 line card:

- Maintenance Bus (MBUS) Agent Software-RAM version 04.06, ROM version 04.06
- ROM Monitor version 17.1
- Fabric Downloader - RAM version 6.1, ROM version 4.7 (The ROM version will be the same as the RAM version if upgraded.)

- Route processors (RPs)

  For Performance Route Processor 2 (PRP-2):

  - Maintenance Bus (MBUS) Agent Software-RAM version 04.06, ROM version 04.06
  - ROM Monitor version 1.24

  For Performance Route Processor 3 (PRP-3):

  - Maintenance Bus (MBUS) Agent Software-RAM version 04.06, ROM version 04.06
  - ROM Monitor version 1.4.0

Minimum Firmware Requirement

- After completing an RMA the newly-received linecard may not have appropriate IOS XR firmware installed.

  Depending on the type of firmware that needs upgrading the symptoms can vary as follows:

  - ROMMON needs updating — the linecard will not boot up
  - MBUS needs updating — the linecard may fail to boot or keeps reloading
  - Fabric Loader needs updating — the linecard will take long time to boot
  - FPD needs updating — the linecard experiences packet corruption / drop

Note The FPD PIE has to be installed in order to upgrade to the latest FPD image. Refer to the Upgrading FPD on Cisco IOS XR Software chapter of the *Cisco IOS XR System Management Command Reference for the Cisco XR 12000 Router* online.

RMA Card Firmware Upgrade Procedure:

To upgrade the fabric-downloader, ROMMON, Mbus, and current field-programmable device (FPD) image package on a single RMA linecard or on all modules installed in a router, use the **upgrade all** command in administration EXEC mode.

upgrade all location {*node-id* | **all**} [**force**]

Where **location** *node-id* specifies that all all firmware images (ROM, MBUS, Fabric Downloader and FPD) will be upgraded on the physical location of the line card received through RMA defined by the *node-id* argument. The *node-id* argument is entered in the rack/slot/module notation.

The **upgrade all location all** command upgrades all all firmware images (ROM, MBUS, Fabric Downloader and FPD) on all line cards (LCs) that are installed in the router.

For an RMA linecard firmware upgrade you'll want to use the **upgrade all location** *node-id* command.

The optional **force** parameter skips the version check and forces an upgrade.

- The list of minimum supported firmware versions is available online in this matrix:

  http://www.cisco.com/web/Cisco_IOS_XR_Software/pdf/XR12000SoftwareFirmwareCompatibilityMatrix.pdf

- Links to PDF copies of the IOS XR Firmware Upgrade Guides are available online here:

  http://www.cisco.com/web/Cisco_IOS_XR_Software/index.html

  Here's the link to the Cisco Systems IOS XR Firmware Upgrade Guide For CRS-1 and XR12000:

  http://www.cisco.com/web/Cisco_IOS_XR_Software/pdf/IOSXRFirmwareUpgradeGuide.pdf

- Refer to the Hardware Redundancy and Node Administration Commands on Cisco IOS XR Software chapter of the Cisco IOS XR System Management Command Reference for the Cisco XR 12000 Router for the **upgrade all** command syntax:

  http://www.cisco.com/en/US/docs/routers/xr12000/software/xr12k_r3.9/system_management/command/reference/yr39xr12k_chapter7.html

Requirement of Cisco IOS Image Level and Boot Helper Version for Migration

If you are migrating from Cisco IOS to Cisco IOS XR software on the Cisco XR 12000 Series Router, you must have the following minimum Cisco IOS image level and Boothelper version to support Release 3.9.1:

- Cisco IOS image—12.0(32)S
- Cisco IOS Boothelper—12.0(32)S0a

If you have an earlier version of this system, you must upgrade to the minimum supported level before performing a migration. Otherwise, your migration fails. For more information, see the *Migrating from Cisco IOS to* Cisco IOS XR *Software on the Cisco XR 12000 Series Router* document.

Determining Your Software Version

To determine the version of Cisco IOS XR software running on your router, log into the router and enter the **show version** command:

Step 1 Establish a Telnet session with the router.

Step 2 Enter the **show version** command from EXEC mode.

```
RP/0/0/CPU0:PE6_C12406# show version
Cisco IOS XR Software, Version 3.9.1[00]
Copyright (c) 2010 by Cisco Systems, Inc.
ROM: System Bootstrap, Version 12.0(20100127:230559) [skumarss-33s 1.24] RELEASE SOFTWARE
Copyright (c) 1994-2010 by cisco Systems,  Inc.
BOOTFLASH: GS Software (C12KPRP-BOOT-M), Version 12.0(31)S2,  RELEASE SOFTWARE (fc1)

MPLS-CORE-P3 uptime is 1 hour, 17 minutes
System image file is "compactflash:c12k-os-mbi-3.9.1/mbiprp-rp.vm"

cisco 12410/PRP (7457) processor with 3670016K bytes of memory.
7457 processor at 1265Mhz, Revision 1.2

2 Cisco 12000 Series Performance Route Processors
2 Cisco 12000 Series SPA Interface Processor-601/501/401
2 1 Port ISE Packet Over SONET OC-48c/STM-16 Controllers (2 POS)
```

```
2 Cisco 12000 4 Port Gigabit Ethernet Controllers (8 GigabitEthernet)
1 Cisco 12000 Series SPA Interface Processor-600
1 Cisco 12000 4-Port ISE ATM Over SONET OC3/STM-1 Controller (4 ATM)
3 Management Ethernet
12 PLIM_QOS
16 SONET/SDH
12 Packet over SONET/SDH
2 TenGigE
8 FastEthernet
4 T3
4 Serial network interface(s)
4 Asynchronous Transfer Mode
8 GigabitEthernet/IEEE 802.3 interface(s)
1018k bytes of non-volatile configuration memory.
1600M bytes of compact flash card.
1639284k bytes of disk0: (Sector size 512 bytes).
998748k bytes of disk1: (Sector size 512 bytes).
65536k bytes of Flash internal SIMM (Sector size 256k).

Boot device on node 0/1/CPU0 is mem:
Package active on node 0/1/CPU0:
c12k-fpd, V 3.9.1[00], Cisco Systems, at compactflash:c12k-fpd-3.9.1
    Built on Sun May  2 03:35:32 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-diags, V 3.9.1[00], Cisco Systems, at compactflash:c12k-diags-3.9.1
    Built on Sun May  2 03:35:06 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-mcast, V 3.9.1[00], Cisco Systems, at compactflash:c12k-mcast-3.9.1
    Built on Sun May  2 02:42:03 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-mpls, V 3.9.1[00], Cisco Systems, at compactflash:c12k-mpls-3.9.1
    Built on Sun May  2 02:41:44 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-k9sec, V 3.9.1[00], Cisco Systems, at compactflash:c12k-k9sec-3.9.1
    Built on Sun May  2 02:42:33 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-lc, V 3.9.1[00], Cisco Systems, at compactflash:c12k-lc-3.9.1
    Built on Sun May  2 02:49:51 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-fwdg, V 3.9.1[00], Cisco Systems, at compactflash:c12k-fwdg-3.9.1
    Built on Sun May  2 02:48:54 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-admin, V 3.9.1[00], Cisco Systems, at compactflash:c12k-admin-3.9.1
    Built on Sun May  2 02:48:10 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-base, V 3.9.1[00], Cisco Systems, at compactflash:c12k-base-3.9.1
    Built on Sun May  2 02:47:10 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0

c12k-os-mbi, V 3.9.1[00], Cisco Systems, at compactflash:c12k-os-mbi-3.9.1
    Built on Sun May  2 02:43:13 PST 2010
    By sjc-lds-511 in /auto/srcarchive4/production/3.9.1/c12k/workspace for c4.2.1-p0
RP/0/5/CPU0:PE22_C12406#
```

New Features in Cisco IOS XR Software Release 3.9.1

The following sections contain information on new features and enhancements in Cisco IOS XR Software Release 3.9.1:

Note Cisco Session Border Controller (SBC) is not supported on any platform in Cisco IOS XR Software Release 3.9.1. Cisco IOS XR Software Release 3.7 is the last release that supports SBC.

New Software Features Supported on all Platforms

The following new software features in Cisco IOS XR Software Release 3.9.1 are supported on all platforms:

- SSH Remote Command Execution
- Non-default SSM Range

Cisco XR 12000 Series Router-Specific Software Features

The following new software feature was introduced in Cisco IOS XR Software Release 3.9.1 on the Cisco XR 12000 Series Router platform:

- BFD over labelled path 1-hop iBGP

New Hardware Features for the Cisco XR 12000 Series Router

No new hardware features were introduced in Cisco IOS XR Software Release 3.9.1 on the Cisco XR 12000 Series Router.

For detailed information on the shared port adapters (SPAs) and SPA interface processors (SIPs), see the following documents:

- *Cisco XR 12000 Series Router SIP and SPA Hardware Installation Guide*
- *Cisco Interface and Hardware Component Configuration Guide for the Cisco XR 12000 Series Router, Release 3.9*

Note Contact gsr-pm@cisco.com for hardware availability.

Important Notes

- **Default timestamp setting**—The timestamp prompt that precedes console output is enabled by default in Cisco IOS XR Release 3.8. To disable the timestamp prompt, use the **no service timestamp** command. For more information, refer to the *Cisco IOS XR System Management Command Reference for the Cisco XR 12000 Series Router.*
- From Cisco IOS XR Software Release 3.6.0, WRED statements are collapsed in that if different random-detect statements using the same match types (EXP, DSCP, Prec, and so forth) are entered with identical minimum and maximum threshold values, a single configuration line is shown in the output of **show running config**. This reduces the length of the configuration but creates a problem with backward compatibility with previous releases. In such a situation, on rollback, the QoS policy is rejected and must be manually entered again.

  Configuration prior to Cisco IOS XR Software Release 3.6.0:

```
Policy-map wred_example
   Class class-default
        random-detect exp 0 384 packets 484 packets
        random-detect exp 1 384 packets 484 packets
        random-detect exp 2 384 packets 484 packets
        random-detect exp 3 484 packets 584 packets
        random-detect exp 4 484 packets 584 packets
        random-detect discard-class 0 384 packets 484 packets
       random-detect discard-class 1 384 packets 484 packets
       random-detect discard-class 2 484 packets 584 packets
       bandwidth remaining percent 20
```

  Cisco IOS XR Software Release 3.6.0 and later releases:

```
policy-map wred_example
 class class-default
  random-detect exp 0,1,2 384 packets 484 packets
  random-detect exp 3,4 484 packets 584 packets
  random-detect discard-class 0,1 384 packets 484 packets
  random-detect discard-class 2 484 packets 584 packets
  bandwidth remaining percent 20
 !
 end-policy-map
!
end
```

  In Cisco IOS XR Software Release 3.6.0 and later releases, the implicitly assigned QoS class class-default must have at least 1 percent bandwidth made available to it. This can be done either by assigning at least 1 percent explicitly (bandwidth remaining percent 1) or by ensuring that the total bandwidth assigned to all other classes in the policy is a maximum of 99 percent, leaving 1 percent available for the class-default. A QoS policy that does not have any bandwidth for class-default is rejected when upgrading to Cisco IOS XR Software Release 3.6.0 or later releases.
- **Country-specific laws, regulations, and licences—**In certain countries, use of these products may be prohibited and subject to laws, regulations, or licenses, including requirements applicable to the use of the products under telecommunications and other laws and regulations; customers must comply with all such applicable laws in the countries in which they intend to use the products.
- **Migrating from Cisco IOS to** Cisco IOS XR **Software on the Cisco XR 12000 Series Router—**When migrating a Cisco XR 12000 Series Router from Cisco IOS to Cisco IOS XR software, follow the instructions provided in *Migrating from Cisco IOS to* Cisco IOS XR *Software on the Cisco XR 12000 Series Router.*

- **Card, fan controller, and RP removal—**For all card removal and replacement (including fabric cards, line cards, fan controller, and RP) follow the instructions provided by Cisco to avoid impact to traffic. See the*Cisco IOS XR Getting Started Guide for the Cisco XR 12000 Series Router* for procedures.
- **Exceeding Cisco testing—**If you intend to test beyond the combined maximum configuration tested and published by Cisco, contact your Cisco Technical Support representative to discuss how to engineer a large-scale configuration maximum for your purpose.
- **More power required for Cisco SIP line cards (SIP-401/501/600/601) on the Cisco XR 12000 Series Router—**These line cards draw more power than previous generation line cards. Depending on the exact configuration of power entry modules (PEMs) and other cards in the chassis, there may not be enough power available when inserting a new card or removing a PEM. Before you insert a new card or remove a PEM, run the following command in **admin** mode:

```
RP/0/0/CPU0:router# admin
RP/0/0/CPU0:router# show environment power-supply table
48V       Current
R/S/I     Module      (V)           (A)
0/24/*    PEM1         54             4
          PEM2         53             4
0/25/*    PEM1         54             4
          PEM2         53             4

Total Power Supplies:                  3200W
       Redundant Power Supplies:              1600W
       Worst Case Power Used:                  621W
       Current Power Used:                     428W
       Current Redundant Power Available:     1172W
       Current Total Power Available:         2772W
       Worst Case Redundant Power Available:   979W
       Worst Case Total Power Available:      2579W

PID                 Description                                          Watts
---                 -----------                                          -----
GRP-B               Route Processor                                         38
PRP-1               Cisco 12000 Series Performance Route Processor          60
LC-4OC-3-POS-SM     4 Port Packet Over SONET OC-3c/STM-1                    80
4OC3X/POS-MM-MJ-B   4 port ISE OC3                                          90
```

If you plan to insert a new card, locate the entry for the card to be inserted and note the power consumed by it. If this power is less than the figure given in Worst Case Redundant Power Available (the figure is displayed in the **show environment power-supply table** command output), the card can be safely inserted. As long as the Worst Case Redundant Power Available is not zero, a PEM can be powered down for replacement without impact.

Note No alerts are issued if more cards are inserted than the PEMs can support. It is your responsibility to determine your power budget for the chassis before making any changes to it. Exceeding the power budget may result in the PEM being overloaded and cards powering down due to insufficient power being provided.

- **Per-interface Internet Control Message Protocol (ICMP) disable** feature is not supported on the Cisco XR 12000 Series Router.
- **Online Diagnostics is not supported on the Cisco XR 12000 Series Router—**If you execute the **diagnostic** command, an error appears stating that there is no online diagnostics process running on the router.

- The **rp mgmtethernet forwarding** command is not supported on the Cisco XR 12000 Series Router.
- **mpls traffic engineering igp-intact** command—This command must be used only when policy based tunnel selection is configured for all tunnels originating on the device.

Minimum Flash Disk Requirements When Upgrading to Release 3.9.1

Cisco IOS XR Software Release 3.9.1 requires a 2-GB Flash Disk as a minimum. If your Cisco XR 12000 Series Router currently uses a 1-GB Flash Disk, you must upgrade it to 2-GB before upgrading to Cisco IOS XR Software Release 3.9.1. The PCMCIA 1-GB Flash Disk was the default size for the Cisco XR 12000 Series Router running Cisco IOS XR Software Release 3.6 and earlier.

In Cisco IOS XR Software Release 3.6 and later releases, disk partitioning is supported. Partitioning of a 2-GB disk is possible but not required. Partitioning of a 4-GB disk is required.

A 4-GB Flash Disk can be installed instead of the 2-GB for greater disk storage.

To upgrade from a 1-GB flash disk to a 2-GB or greater flash disk, refer to the *Flash Disk Upgrade Tasks* link on the followingCisco XR 12000 Series Router Installation and Upgrade URL:

http://www.cisco.com/en/US/products/ps6342/prod_installation_guides_list.html

Caveats

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

This section contains caveats that are generic to the Cisco IOS XR Release 3.9.1 software and those specific to the Cisco XR 12000 Series Router.

Cisco IOS XR Caveats

The following open caveats apply to Cisco IOS XR Software Release 3.9.1 and are not platform specific:

- **CSCtf93555**

  Basic Description:

  CLI command not authorized to execute during persist time of EEM policy

  Symptom:

  After persist time start for eem policy user, CLI command failed to authorize.

  Conditions:

  When the TACACS server is down, persist time starts for the user credentials which registered for EEM policy. If the EEM policy gets triggered and opens a vty connection and try to execute any CLI while the TACACS server is down, it failed to authorize that command.

  Workaround:

  None.

  Recovery:

  Bring the TACACS server up.

- **CSCte01589**

  Basic Description:

  Unable to execute commands through telnet session

  Symptom:

  First show command after telnet to the router prints incomplete output and then hangs. It does not respond to "ENTER".

  Conditions:

  This happens after multiple VTY sessions being opened and closed at the same time.

  Workaround:

  None.

  Recovery:

  option 1

  Create a new telnet session. FIRST command to execute from this session is "proc restart devc-vty".

  If all the telnet sessions are exhausted, terminate one of the sessions. This frees up a session to use for recovery.

  OR

  option 2

  Connect to the router through a Console or AUX. Recover by executing "proc restart devc-vty" command.

- **CSCtd17516**

  Basic Description:

  CLI over XML Configuration Fails

  Symptom:

  CLI over XML configuration request fails.

  Conditions:

  This happens when

  - CLI command lines in XML request exeeeds 200 lines or more

  AND

  - CLI commands are split internally and it happens to be split in middle of sub-mode.

  Workaround:

  - No need to use CLI over XML for config commands that already support XML natively.

  - Split the commands into multiple requests so that command lines of each request are less than 200 lines.

  Recovery:

  None.

- **CSCtf72035**

  Basic Description:

  XML query equivalent to "show version | in uptime" is broken

  Symptom:

XML request echoes an error in response.

Conditions:

Perform XML query equivalent to "show version | in uptime".

Workaround:

None, use CLI instead.

Recovery:

None.

- **CSCsy98575**

  Basic Description:

  %SECURITY-LOCALD-3-LWA_ADD_FAIL error when Secret is added for a User

  Symptom:

  When a user tries to configure username and secret, the configuration succeeds, but the following console message is generated, which seems to suggest that the configuration did not succeed:

  "% Failed to commit one or more configuration items. Please issue 'show configuration failed' from this session to view the errors"

  Conditions:

  No specific trigger is identified. This is an issue that has been observed a handful of times over several months.

  Workaround:

  None. Although we get the configuration failure message, operation is successful both on disk and as well as in Sysdb. No Operational Impact of this bug to other parts of this system since it is purely a configuration operation failure.

  Recovery:

  Do not need. Console message only, no functional impact.

- **CSCta71930**

  Basic Description:

  lpts_pa tracebacks after clear cef on line card

  Symptom:

  An error log is printed along with the traceback when a message send to BCDL agent fails.

  Conditions:

  The BCDL agent has gone down thus the message send is failing. This is a very rare scenario and would not happen under normal circumstances.

  Workaround:

  Not required, as BCDL will come up eventually.

  Further Problem Description:

  The error message is just to say that BCDL agent might have gone down. This would not cause an error in lpts as BDCL will eventually come up and the messages will be sent again. The only caveat is that it might be some time before the messages are sent again. The solution would aim to put an upper bound on the resend time by having a retrying mechanism for the same.

- **CSCti67148**

Basic Description:

Optional task-maps not downloaded as part of exec authorization & Service exec tasks received from the TACACS server are not processed during AAA authorization

Symptom:

Command authorization fails:

```
RP/0/RP0/CPU0:router#show int desc
% This command is not authorized
RP/0/RP0/CPU0:router#
```

Conditions:

This happens:

- On a router running IOS XR 3.9.2 or 4.0.0. These are the only 2 versions affected. It did not happen before and it's fixed afterwards.
- Tacacs authorization is enabled.
- Router is supposed to retrieve its list of usergroup/taskgroup/task from the tacacs server through a service exec (optional) task configured on the tacacs server.

The problem with this bug is that the service exec tasks received from the tacacs server are not processed during aaa authorization with tacacs. So the user ends up with no task on the router and no command is authorized. Even though the command is permitted on the tacacs server.

Workaround:

Instead of using wild cards, explicitly name each package to be activated.

Recovery:

The way to make tacacs authorization work in 3.9.2 or 4.0.0 is through a privilege level:

- If privilege level 15 is assigned on the tacacs server, then user will end up with the tasks/commands of the group root-system.
- If privilege level 14 is assigned on the tacacs server, then user will end up with the tasks/commands of the group owner-sdr.
- If a privilege level between 1 and 13 (let's call it X), then we can configure a usergroup 'privX' on the router and the user will inherit the list of tasks of that group. For instance, if we want to have a user with all commands available, we can assign privilege level 13 on the router and configure this usergroup on the router:

```
usergroup priv13
  taskgroup root-system
  taskgroup cisco-support
```

- **CSCti50227**

Basic Description:

Not able to modify RPL and delete prefix-set in a single commit.

Symptom:

When a policy that is attached directly or indirectly to an attach point needs to be modified, a single commit operation cannot be performed when:

- Removing a set or policy referred by another policy that is attached to any attach point directly or indirectly.
- Modifying the policy to remove the reference to the same set or policy that is getting removed.

Workaround:

The commit must be performed in two steps:

1. Modify the policy to remove the reference to the policy or set and then commit.
2. Remove the policy or set and commit.

Caveats Specific to the Cisco XR 12000 Series Router

The following open caveats are specific to the Cisco XR 12000 Series Router:

- **CSCtf95238**

  Basic Description:

  POS Bundle not forwarding traffic after SPA /LC Reload

  Symptom:

  You have more than two members in a bundle. You have bundle max-active links set to 1. This is to ensure the other links are standby links. There is a trigger in the system(shut of the active link, reload of spa of active link, change of priority) so that the standby link has to become active. The other link becomes active but the adjacency has discard mtu set and traffic is not forwarded on this link. But OSPF stays up.

  Conditions:

  The problem occurs only in MPLS adjacency case and doesn't occur with IPv4. An example of the discard mtu set behavior is shown below.

```
RP/0/5/CPU0:ccPE1#sh cef 11.11.11.0 ha ingress detail location 0/1/cPU0
 11.11.11.0/24, version 0, internal 0x40040001 (ptr 0x52d1f0ec) [1], 0x0
 (0x52f58aa8), 0x4500 (0x53cc330c)
 Updated Mar 30 09:22:41.861
 local adjacency point2point
 Prefix Len 24, traffic index 0, precedence routine (0)
 gateway array (0x51d04a04) reference count 30015, flags 0xd00, source lsd (2),
 [10006 type 5 flags 0x101001 (0x526f87e8) ext 0x0 (0x0)]
 LW-LDI[type=5, refc=3, ptr=0x52f58aa8, sh-ldi=0x526f87e8]
 via 10.80.49.2, Bundle-POS1, 5 dependencies, weight 0, class 0 [flags 0x0]
 next hop 10.80.49.2
 local adjacency
 local label 49393      labels imposed {50383}
 ------------------------------------------------
 HW Rewrite 0 Detail :
 ------------------------------------------------
 Rewrite HW Address  : 0x020ce740  (REW)
 packets 102209532  bytes 4701638472
```

  HFA Bits 0x40 gp 0 mtu 5 (Discard MTU) TAG2IP >>>>>>>>>>>>>MTU 5 and so getting discarded

  Workaround:

  toggle back to other member by altering priority

  Recovery:

  shut / no shut of bundle

  shut / no shut of member

  will recover the situation as well.

Example:

```
conf t
int bundle-pos1
shut
commit
no shut
commit
```

- **CSCtg04190**

  Basic Description:

  "set cos" doesn't work for FR -- GE local switching

  Symptom:

  "set cos" doesn't work for FR -- GE local switching

  Conditions:

  QoS Set action for Ethernet traffic - 'set cos' will not work for Ethernet Layer2 Traffic egressing out of the system toward the customer cloud. While issue was raised on Local Switching, it can also be seen in AToM IPIW and L2TPv3 IPIW. This automatically means that any match actions done on the Customer System connected to the Ethernet interface will not work.

  Workaround:

  None. There is no workaround for this issue. If the set-cos policy is configured, it will not work. .

  Recovery:

  Recovery action is not needed here.

- **CSCta86699**

  Basic Description:

  Entity goes missing after RP Failover on the 16 slot c12000

  Symptom:

  Some subentities in the Entity-MIB go missing after RP FO. This condition occurs intermittently on a 16 slot GSR chassis.

  Conditions:

  On an RP failover on the 16 slot C12000 chassis, there is an intermittent condition in which subentities go missing.

  Workaround:

  None.

  Recovery:

  A forced failover or restart of the invmgr process should resolve the condition.

- **CSCtf17283**

  Basic Description:

  FIB_MGR Traceback while removing OSPF process & re-adding OSPF process

  Symptom:

  FIB_MGR Traceback while removing and re-adding OSPF process in scaled setup.

  Conditions:

Removing and re-adding OSPF process in the same commit.

Workaround:

The issue is not seen when some time gap (~3-5 sec) is given between removing and re-adding OSPF process.

- **CSCtg09403**

  Basic Description:

  multilink MTU size is not pushed to member links

  Symptom:

  On a multilink bundle, when MTU is changed under the bundle interface, the value should be automatically pushed to all member links but this does not happen.

  Conditions:

  This applies to changing the MTU value of multilink bundles.

  Workaround:

  Set the MTU on all member links before adding to the bundle. Set the bundle MTU properly at creation time.

  Recovery:

  All member links need to be removed from bundle and then change their their MTU and finally set the MTU on the bundle itself. This will be service impacting.

Upgrading Cisco IOS XR Software

Cisco IOS XR software is installed and activated from modular packages, allowing specific features or software patches to be installed, upgraded, or downgraded without affecting unrelated processes. Software packages can be upgraded or downgraded on all supported card types, or on a single card (node).

Software packages are installed from package installation envelope (PIE) files that contain one or more software components.

The following URL contains links to information about how to upgrade Cisco IOS XR software:

http://www.cisco.com/web/Cisco_IOS_XR_Software/index.html

Note Cisco IOS XR Software Release 3.9.1 requires a 2-GB Flash Disk as a minimum. Therefore, you must upgrade an existing PCMCIA 1-GB Flash Disk to 2 GB before upgrading to Cisco IOS XR Software Release 3.9.1. For more information, see the "Minimum Flash Disk Requirements When Upgrading to Release 3.9.1" section on page 18.

Troubleshooting

For information on troubleshooting Cisco IOS XR software, refer to the *Cisco IOS XR Troubleshooting Guide for the Cisco XR 12000 Series Router* and the *Cisco IOS XR Getting Started Guide for the Cisco XR 12000 Series Router.*

Related Documentation

The most current Cisco XR 12000 Series Router hardware documentation is located at the following URL:

http://www.cisco.com/en/US/products/ps6342/prod_installation_guides_list.html

The Cisco IOS XR software documentation set includes the Cisco IOS XR software configuration guides and command references, as well as a getting started guide. See *About* Cisco IOS XR *Software Documentation for Release 3.9* for a list of Cisco IOS XR Release 3.9.1 software documentation.

The most current Cisco XR 12000 Series Router software documentation is located at the following URL:

http://www.cisco.com/en/US/products/ps6342/tsd_products_support_series_home.html

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html.

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This document is to be used in conjunction with the documents listed in the "Related Documentation" section.