Release Notes for Cisco NCS 560 Series Routers, Cisco IOS XR Release 7.9.1

First Published: 2023-04-03

What's New in Cisco IOS XR Release 7.9.1

Cisco IOS XR Release 7.9.1 is a new feature release for Cisco NCS 560 Series routers. For more details on the Cisco IOS XR release model and associated support, see Guidelines for Cisco IOS XR Software.

New in Documentation

This release introduces rich and intuitive ways for you to access YANG data models supported in the Cisco IOS XR software.

Product	Description
Cisco IOS XR Error Messages	Search by release number, error strings, or compare release numbers to view a detailed repository of error messages and descriptions.
Cisco IOS XR MIBs	Select the MIB of your choice from a drop-down to explore an extensive repository of MIB information.
YANG Data Models Navigator	We have launched the tool as an easy reference to view the Data Models (Native, Unified, OpenConfig) supported in IOS XR platforms and releases. You can explore the data model definitions, locate a specific model, and view the containers and their respective lists, leaves, leaf lists, Xpaths, and much more. As we continue to enhance the tool, we would love to hear your feedback. You are welcome to drop us a note here.
Use Case-based Documentation at Learning Labs	You can now quickly explore and experiment on use-cases without setting up any hardware resources with the new Interactive documentation for Cisco 8000 routers on DevNet Learning Labs. Powered by Jupyter, the automated code blocks within the documentation enable you to configure the desired functionality on the routers and retrieve real-time output swiftly. Check out the new interactive documentation here: • End to end 3-stage CLOS Networks for SONiC • Use cases for QoS and Model-driven Telemetry

Software Features Enhanced and Introduced

To learn about features introduced in other Cisco IOS XR releases, select the release from the Documentation Landing Page.

Feature	Description
Licensing	
Support for Flexible Consumption Model on A900-IMA-8Z-L-CC	Support for Flexible Consumption Model (FCM) is now extended to the following Interface Module: • A900-IMA-8Z-L-CC Interface Module
Segment Routing	
SRv6 Services: Services with Remote SIDs from W-LIB	This feature enables an SRv6 headend node to receive and install remote SIDs with Wide (32-bit) functions (Remote W-LIB). The Remote W-LIB is supported for Layer 3 (VPN/BGP global) and Layer 2 EVPN services (ELINE/ELAN). This capability is enabled by default.
SR-TE Explicit Segment Lists with Mix of IPv4 and IPv6 Segments	Explicit segment list can be configured to include IPv6 segments, for example IPv6 adjacency SIDs or IPv6 EPE SIDs. This feature enables use-cases such as Centralized BGP EPE for 6PE in an SR-MPLS Network.
SR-TE Automated Steering Without Service Label	This feature allows traffic to a BGP service route to be steered over an SR-TE policy using the AS principles, and without imposing the service route's prefix label. This feature enables use-cases such as centralized BGP EPE for 6PE in an SR-MPLS network. This feature introduces the following command: • **bgp prefix-path-label ignore**
Interface and Hardware Component	
Transmission of VLAN-Tagged LLDP Packets	With this release, transmitting (Tx) VLAN-tagged LLDP packets on the subinterface is supported. This feature helps to identify unauthorized devices on the network and discover VLANs configured on the network devices. Use the following commands to enable transmission of tagged LLDP packets globally or on each subinterface: • Globally: **lldp subinterface enable** • Each subinterface: **lldp enable**

Feature	Description
Network Synchronization	
PTP Virtual Port Support for CiscoNCS 560 routers	You can now select the best available timing source for your routers by using the PTP Virtual Port feature. This feature allows you to compare, select, and advertise the best clock source between a PTP server and other local timing sources connected to the routers. Vitual Port is an external frequency, phase, and time input interface on a Telecom Boundary Clock (T-BC), and thus participates in the timing source selection.
Assisted Partial Timing Support on NCS 560 routers	Assisted Partial Timing Support (APTS) enables you to select timing and synchronization for mobile backhaul networks. APTS allows for proper distribution of phase and time synchronization in the network.
L2VPN and Ethernet Services	
Call Admission Control for L2VPN P2P Services over Circuit-Style SR-TE Policies	This feature allows you to configure guaranteed bandwidth for Layer 2 P2P services steered over Circuit-Style SR-TE policies. This ensures that a Circuit-Style SR-TE policy has sufficient bandwidth to accommodate a Layer 2 P2P service, while also preventing a L2 P2P service from being steered over a Circuit-Style SR-TE policy when there is insufficient available bandwidth.
Modular QoS	
Additional Routers Supported for ACL with Fragment Match	You can prevent malicious users from staging denial of service (DoS) attacks for non-initial IP by configuring an ACL with fragment match and specifying QoS match actions to rate-limit non-initial fragments for IPv4 traffic.
System Management	
GNSS MIBs Traps support	Global Navigation Satellite System (GNSS) is the satellite system which is used as a timing interface. GNSS receiver picks up signals from this satellite system to recalculate position, velocity and local time to high precision. From this release, you can track GNSS module antenna OC alarm status, status of the GNSS satellite visibility (good or bad), and specify the lock status of GNSS module. This release adds the support for the traps: • ciscoGnssAntennaOCAlarmStatus • ciscoGnssSatelliteVisibilityStatus • ciscoGnssModuleLockStatus
Routing	

Feature	Description
Limiting LSA numbers in a OSPF Link-State Database	The nonself-generated link-state advertisements (LSAs) for a given Open Shortest Path First (OSPF) process is limited to 500000. This protection mechanism prevents routers from receiving many LSAs, preventing CPU failure and memory shortages, and is enabled by default from this release onwards. If you have over 500000 LSAs in your network, configure the **max-lsa**command with the expected LSA scale before upgrading to this release or later This feature modifies the following commands: • **show ospf** to display the maximum number of redistributed prefixes. • **show ospf database database-summary detail** to display the number of LSA counts per router. • **show ospf database database-summary adv-router** router ID to display the router information and the LSAs received from a particular router.
Limiting the Maximum Redistributed Type-3 LSA Prefixes in OSPF	By default, the maximum redistributed Type-3 LSA prefixes for a given OSPF process is now limited to 100000. This mechanism prevents OSPF from redistributing a large number of prefixes as Type-3 LSAs and therefore preventing high CPU utilization and memory shortages. Once the number of redistributed prefixes is reached or exceeds the threshold value, the system log message is generated, and no more prefixes are redistributed.

Hardware Introduced

Note Before you install the Cisco router, you must prepare your site for the installation, for more details on site planning and environmental requirements, see Hardware Installation Guide.

There are no new hardware features introduced in this release.

Behavior Changes

- Prior to Cisco IOS XR Release 7.2.1, a segment of an explicit segment list can be configured as an IPv4 address (representing a Node or a Link) using the **index** *index***address ipv4** *address* command.

  Starting with Cisco IOS XR Release 7.2.1, an IPv4-based segment (representing a Node or a Link) can also be configured with the new **index** *index* **mpls adjacency***address* command. The configuration is stored in NVRAM in the same CLI format used to create it. There is no conversion from the old CLI to the new CLI.

  Starting with Cisco IOS XR Release 7.9.1, the old CLI has been deprecated. Old configurations stored in NVRAM will be rejected at boot-up.

As a result, explicit segment lists with IPv4-based segments using the old CLI must be re-configured using the new CLI.

There are no CLI changes for segments configured as MPLS labels using the **index** *index* **mpls label** *label* command.

- If you are on a release before Cisco IOS XR Release 7.4.1, you can configure SR-ODN with Flexible Algorithm constraints using the **segment-routing traffic-eng on-demand color** *color* **dynamic sid-algorithm** *algorithm-number* command.

  Starting with Cisco IOS XR Release 7.4.1, you can also configure SR-ODN with Flexible Algorithm constraints using the new **segment-routing traffic-eng on-demand color** *color* **constraints segments sid-algorithm** *algorithm-number* command.

  From Cisco IOS XR Release 7.9.1, the **segment-routing traffic-eng on-demand color** *color* **dynamic sid-algorithm** *algorithm-number* command is deprecated. Previous configurations stored in NVRAM will be rejected at boot-up. (Performing In-Service Software Upgrade (ISSU) to Cisco IOS XR Release 7.9.1 will also be rejected.)

  Hence, for Cisco IOS XR Release 7.9.1, you must reconfigure all SR-ODN configurations with Flexible Algorithm constraints that use the on-demand dynamic sid-algorithm with the on-demand constraints command.

Restrictions and Limitations

- The standby RP may get into '`NOT READY`' state intermittently due to some network churn, though the corresponding VM is up and running. But this is a transient state and shows that some data aren't in sync between active and standby due to the network churn. After both active and standby are in sync with respect to all the parameters, then the standby RP comes into '`READY`' state.

Caveats

Table 1: Cisco IOS XR NCS 560 Routers Specific Bugs

Bug ID	Headline
CSCwd99486	BVI 2-pass: MTU fragmentation is not working for L3-L2 BVI traffic

Release Package

This following table lists the Cisco IOS XR Software feature set matrix (packages) with associated filenames.

Visit the Cisco Software Download page to download the Cisco IOS XR software images.

Table 2: Release 7.9.1 Packages for Cisco NCS 560 Series Router

Composite Package		
Feature Set	**Filename**	**Description**
Cisco IOS XR IP Unicast Routing Core Bundle	ncs560-mini-x-7.9.1.iso	Contains base image contents that includes: • Host operating system • System Admin boot image • IOS XR boot image • BGP packages • OS • Admin • Base • Forwarding • Modular Services Card • Routing • SNMP Agent • Alarm Correlation
Cisco IOS XR Manageability Package	ncs560-mgbl-1.0.0.0-r791.x86_64.rpm	Telemetry, Extensible Markup Language (XML), Parser, and HTTP server packages, NETCONF, YANG Models, gRPC.
Cisco IOS XR OSPF package	ncs560-ospf-1.0.0.0-r791.x86_64.rpm	Supports OSPF
Cisco IOS XR Security Package	ncs560-k9sec-1.0.0.0-r791.x86_64.rpm	k9sec is needed for IPsec or MACsec and Dot1x and for basic crypto services such as Decryption, Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key infrastructure (PKI).
Multicast Package	ncs560-mcast-1.0.0.0-r791.x86_64.rpm	Supports Multicast Supports Automatic Multicast Tunneling (AMT), IGMP Multicast Listener Discovery (MLD), Multicast Label Distribution Protocol (MLDP), Multicast Source Discovery Protocol (MSDP) and PIM.

Composite Package		
Feature Set	**Filename**	**Description**
Cisco IOS XR ISIS package	ncs560-isis-1.0.0.0-r791.x86_64.rpm	Supports Intermediate System to Intermediate System (IS-IS).
Cisco IOS XR USB Boot Package	ncs560-usb_boot-7.9.1.zip	Supports Cisco IOS XR USB Boot Package
Cisco IOS XR MPLS Package	ncs560-mpls-1.0.0.0-r791.x86_64.rpm ncs560-mpls-te-rsvp-1.0.0.0-r791.x86_64.rpm	Supports MPLS and MPLS Traffic Engineering (MPLS-TE) RPM. Label Distribution Protocol (LDP), MPLS Forwarding, MPLS Operations, Administration, and Maintenance (OAM), Link Manager Protocol (LMP), Optical User Network Interface (OUNI) and Layer-3 VPN. Cisco IOS XR MPLS-TE and RSVP Package MPLS Traffic Engineering (MPLS-TE) and Resource Reservation Protocol (RSVP).
Cisco IOS XR LI Package	ncs560-li-1.0.0.0-r791.x86_64.rpm	Lawful Intercept
Cisco IOS XR EIGRP Package	ncs560-eigrp-1.0.0.0-r791.x86_64.rpm	(Optional) Includes EIGRP protocol support software

Determine Software Version

Log in to the router and enter the **show version** command.

```
RP/0/RP0/CPU0:Router#show version
Cisco IOS XR Software, Version 7.9.1
Copyright (c) 2013-2023 by Cisco Systems, Inc.

Build Information:
 Built By     : ingunawa
 Built On     : Sun Apr  2 01:12:58 PDT 2023
 Built Host   : iox-ucs-046
 Workspace    : /auto/srcarchive15/prod/7.9.1/ncs560/ws
 Version      : 7.9.1
 Location     : /opt/cisco/XR/packages/
 Label        : 7.9.1

cisco NCS-560 () processor
System uptime is 9 hours 36 minutes
```

Determine Firmware Support

Log in to the router and enter the **show fpd package** command to know the release image.

```
RP/0/RP0/CPU0:Router#show fpd package
================================ ============================================
                                          Field Programmable Device Package
                                 ============================================
                                           Req      SW       Min Req   Min Req
Card Type            FPD Description       Reload   Ver      SW Ver    Board Ver
================== ========================= ====== ======= ======== =========
------------------------------------------------------------------------------
A900-IMA-8Z-L-CC     IMFPGA                  YES     1.50      1.50      0.0
------------------------------------------------------------------------------
A900-IMA8CS1Z-CC     IMFPGA                  YES     1.113     1.113     0.0
------------------------------------------------------------------------------
A900-IMA8CS1Z-M      IMFPGA                  YES     1.113     1.113     0.0
------------------------------------------------------------------------------
A900-IMA8Z           IMFPGA                  YES    17.05     17.05      0.0
------------------------------------------------------------------------------
A900-IMA8Z-CC        IMFPGA                  YES    17.05     17.05      0.0
------------------------------------------------------------------------------
A900-IMA8Z-L         IMFPGA                  YES     1.50      1.50      0.0
------------------------------------------------------------------------------
A900-PWR1200-A       DCA-PriMCU(A)           NO      0.11      0.11      0.0
                     DCA-SecMCU(A)           NO      1.04      1.04      0.0
------------------------------------------------------------------------------
A900-PWR1200-D       LIT-PriMCU(A)           NO      2.04      0.04      0.0
                     LIT-SecMCU(A)           NO      1.27      1.27      0.0
------------------------------------------------------------------------------
A907-FAN-E           PSOC(A)                 NO      1.65      1.65      0.0
                     PSOC(A)                 NO      1.66      1.66      0.4
------------------------------------------------------------------------------
A907-FAN-H           PSOC(A)                 NO      1.65      1.65      0.0
------------------------------------------------------------------------------
N560-4-FAN-H         PSOC(A)                 NO    177.02    177.02      0.0
------------------------------------------------------------------------------
N560-4-FAN-H-CC      PSOC(A)                 NO    177.02    177.02      0.0
------------------------------------------------------------------------------
N560-4-FAN-H-R       PSOC(A)                 NO    177.02    177.02      0.0
------------------------------------------------------------------------------
N560-4-PWR-FAN       PSOC(A)                 NO    177.08    177.08      0.0
------------------------------------------------------------------------------
N560-4-PWR-FAN-CC    PSOC(A)                 NO    177.08    177.08      0.0
------------------------------------------------------------------------------
N560-4-PWR-FAN-R     PSOC(A)                 NO    177.08    177.08      0.0
------------------------------------------------------------------------------
N560-4-RSP4          ADM(A)                  NO      1.06      1.06      0.0
                     IOFPGA(A)               YES     0.67      0.67      0.0
                     PRIMARY-BIOS(A)         YES     0.21      0.21      0.0
                     SATA(A)                 NO      2.10      2.10      0.0
                     SATA_MAR(A)             NO      1.30      1.30      0.0
------------------------------------------------------------------------------
N560-4-RSP4-CC       ADM(A)                  NO      1.06      1.06      0.0
                     IOFPGA(A)               YES     0.67      0.67      0.0
                     PRIMARY-BIOS(A)         YES     0.21      0.21      0.0
                     SATA(A)                 NO      2.10      2.10      0.0
                     SATA_MAR(A)             NO      1.30      1.30      0.0
------------------------------------------------------------------------------
N560-4-RSP4E         ADM(A)                  NO      1.06      1.06      0.0
                     IOFPGA(A)               YES     0.67      0.67      0.0
                     PRIMARY-BIOS(A)         YES     0.21      0.21      0.0
```

```
                    SATA(A)                   NO      2.10      2.10      0.0
                    SATA_MAR(A)               NO      1.30      1.30      0.0
--------------------------------------------------------------------------------
N560-4-RSP4E-CC     ADM(A)                    NO      1.06      1.06      0.0
                    IOFPGA(A)                 YES     0.67      0.67      0.0
                    PRIMARY-BIOS(A)           YES     0.21      0.21      0.0
                    SATA(A)                   NO      2.10      2.10      0.0
                    SATA_MAR(A)               NO      1.30      1.30      0.0
--------------------------------------------------------------------------------
N560-FAN-H          PSOC(A)                   NO      2.02      2.02      0.0
--------------------------------------------------------------------------------
N560-IMA-8Q/4L      IMFPGA                    YES     1.27      1.27      0.0
--------------------------------------------------------------------------------
N560-IMA1W          CFP2-D-DCO                NO     38.27397  38.27397   0.0
                    CFP2-DE-DCO               NO     38.27397  38.27397   0.0
                    CFP2-DET-DCO              NO     38.27397  38.27397   0.0
                    CFP2-DETS-DCO             NO     38.27397  38.27397   0.0
                    CFP2-DS-DCO               NO     38.27397  38.27397   0.0
                    CFP2-DS100-DCO            NO     38.27397  38.27397   0.0
                    IMFPGA                    YES     1.28      1.28      0.0
--------------------------------------------------------------------------------
N560-IMA2C          IMFPGA                    YES     6.06      6.06      0.0
--------------------------------------------------------------------------------
N560-IMA2C-CC       IMFPGA                    YES     6.06      6.06      0.0
--------------------------------------------------------------------------------
N560-IMA2C-DD       IMFPGA                    YES     1.28      1.28      0.0
                    QDD_100_FW_P0             NO     61.23     61.23      0.0
                    QDD_100_FW_P1             NO     61.23     61.23      0.0
--------------------------------------------------------------------------------
N560-IMA2C-L        IMFPGA                    YES     1.28      1.28      0.0
--------------------------------------------------------------------------------
N560-PWR1200-D-E    QCS-PriMCU(A)             NO      1.82      1.82      0.0
                    QCS-SecMCU(A)             NO      1.84      1.84      0.0
--------------------------------------------------------------------------------
N560-RSP4           ADM(A)                    NO      1.06      1.06      0.0
                    IOFPGA(A)                 YES     0.78      0.78      0.0
                    PRIMARY-BIOS(A)           YES     0.21      0.21      0.0
                    SATA(A)                   NO      2.10      2.10      0.0
                    SATA_MAR(A)               NO      1.30      1.30      0.0
--------------------------------------------------------------------------------
N560-RSP4-E         ADM(A)                    NO      1.06      1.06      0.0
                    IOFPGA(A)                 YES     0.78      0.78      0.0
                    PRIMARY-BIOS(A)           YES     0.21      0.21      0.0
                    SATA(A)                   NO      2.10      2.10      0.0
                    SATA_MAR(A)               NO      1.30      1.30      0.0
--------------------------------------------------------------------------------
NCS4200-1T16G-PS    IMFPGA                    YES     1.113     1.113     0.0
--------------------------------------------------------------------------------
NCS4200-2H-PQ       IMFPGA                    YES     6.06      6.06      0.0
--------------------------------------------------------------------------------
NCS4200-8T-PS       IMFPGA                    YES    17.05     17.05      0.0
--------------------------------------------------------------------------------
NCS4216-F2B-FAN     PSOC(A)                   NO     44.08     44.08      0.0
--------------------------------------------------------------------------------
NCS4216-RSP-800     ADM(A)                    NO      1.06      1.06      0.0
                    IOFPGA(A)                 YES     0.01      0.01      0.0
                    PRIMARY-BIOS(A)           YES     0.21      0.21      0.0
                    SATA(A)                   NO      2.10      2.10      0.0
                    SATA_MAR(A)               NO      1.30      1.30      0.0
```

Log in to the router and enter the **show hw-module fpd** command to know the current version.

```
RP/0/RP0/CPU0:Router#show hw-module fpd
Auto-upgrade:Enabled
```

```
                                        FPD Versions
                                        ==============
Location   Card type              HWver FPD device       ATR Status    Running   Programd
-------------------------------------------------------------------------------------------
0/2        A900-IMA8CS1Z-M       0.0   IMFPGA               CURRENT     1.113     1.113
0/4        A900-IMA8CS1Z-M       0.0   IMFPGA               CURRENT     1.113     1.113
0/5        N560-IMA-8Q/4L        0.0   IMFPGA               CURRENT     1.27      1.27
0/7        N560-IMA2C            0.0   IMFPGA               CURRENT     6.06      6.06
0/9        N560-IMA-8Q/4L        0.0   IMFPGA               CURRENT     1.27      1.27
0/10       A900-IMA8Z-L          0.0   IMFPGA               CURRENT     1.50      1.50
0/11       A900-IMA8Z            0.0   IMFPGA               CURRENT    17.05     17.05
0/RP0      N560-RSP4-E           0.0   ADM                  CURRENT     1.06      1.06
0/RP0      N560-RSP4-E           0.0   IOFPGA               CURRENT     0.78      0.78
0/RP0      N560-RSP4-E           0.0   PRIMARY-BIOS         CURRENT     0.21      0.21
0/RP0      N560-RSP4-E           0.0   SATA                 CURRENT     2.10      2.10
0/RP1      N560-RSP4-E           0.0   ADM                  CURRENT     1.06      1.06
0/RP1      N560-RSP4-E           0.0   IOFPGA               CURRENT     0.78      0.78
0/RP1      N560-RSP4-E           0.0   PRIMARY-BIOS         CURRENT     0.21      0.21
0/RP1      N560-RSP4-E           0.0   SATA                 CURRENT     2.10      2.10
0/FT0      A907-FAN-E            1.0   PSOC                 CURRENT     1.65      1.65
0/PM0      A900-PWR1200-A        0.1   DCA-PriMCU           CURRENT     0.13      0.13
0/PM0      A900-PWR1200-A        0.1   DCA-SecMCU           CURRENT     2.03      2.03
0/PM1      A900-PWR1200-A        0.1   DCA-PriMCU           CURRENT     0.13      0.13
0/PM1      A900-PWR1200-A        0.1   DCA-SecMCU           CURRENT     2.03      2.03
```

Important Notes

Supported Transceiver Modules

For more information on the supported transceiver modules, see Transceiver Module Group (TMG) Compatibility Matrix. In the **Begin your Search** search box, enter the keyword NCS560 and click **Enter**.

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).

The upgrade document for Cisco NCS 560 router is available along with the software image in *NCS560_Upgrade_MOP_7.9.1.tar* file.

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.

Cisco IOS XR Error messages

To view, search, compare, and download Cisco IOS XR Error Messages, refer to the Cisco IOS XR Error messages tool.

Cisco IOS XR MIBs

To determine the MIBs supported by platform and release, refer to the Cisco IOS XR MIBs tool.

Related Documentation

The most current Cisco NCS 560 router documentation is located at the following URL:

https://www.cisco.com/c/en/us/td/docs/iosxr/ncs-560-series-routers.html

© 2023 Cisco Systems, Inc. All rights reserved.