Release Notes for Cisco NCS 560 Series Routers, Cisco IOS XR Release 25.1.1

First Published: 2025-03-28

Network Convergence System 560 Series Routers

What's New in Cisco IOS XR Release 25.1.1

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

Software Features Enhanced and Introduced

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

Feature	Description
Segment Routing	
SRv6 policy counters (POL.CP.SL.INT.E)	The network administrators can now monitor and manage network performance, capacity planning, and traffic engineering by reviewing the policy counters (POL.CP.SL.INT.E) in SRv6-TE. The feature introduces these changes: **CLI:** • **show cef ipv6 accounting**
Static SRv6 pseudowire	This feature introduces support for Static Segment Routing over IPv6 (SRv6) Pseudo-wires in the IOSXR platform. This enhancement aims to extend the existing Virtual Private Wire Service (VPWS) capabilities by incorporating SRv6, providing improved flexibility and scalability for service providers.
L2VPN and Ethernet Services	

Feature	Description
EVPN-IRB ND partial suppression mode	You can now manage and minimize Neighbor Discovery (ND) for IPv6 traffic on a network segment by configuring partial suppression mode. You can configure EVPN-IRB ARP and ND proxy full or partial suppression modes for these features: • EVPN-IRB multi-homing • VM Mobility
Layer 2 fast reroute for E-Line services	You can now ensure faster convergence and uninterrupted service by redirecting the traffic using the EVPN pseudowire (PW) in an E-Line configuration when a dual-homing link fails.
Interface and Hardware Component	
Minimum-delay bin	For statistics aggregation, you can now configure a distinct width for the first bin to adjust for large propagation delay. By using this feature, you can avoid wasting several bins that would be empty in some unavoidable situations such as delay due to speed of light limitations. The feature introduces these changes: **CLI:** • The **minimum-delay** keyword is introduced in the **aggregate** command. **YANG Data Models:** New XPaths for • `Cisco-IOS-XR-infra-sla-cfg.yang` • `Cisco-IOS-XR-um-ethernet-sla-cfg.yang` • `Cisco-IOS-XR-infra-sla-oper.yang` (see GitHub, YANG Data Models Navigator)

YANG Data Models Introduced and Enhanced

This release introduces or enhances the following data models. For detailed information about the supported and unsupported sensor paths of all the data models, see the Github repository. To get a comprehensive list of the data models supported in a release, navigate to the Available-Content.md file for the release in the Github repository. The unsupported sensor paths are documented as deviations. For example, `openconfig-acl.yang`provides details about the supported sensor paths, whereas `cisco-xr-openconfig-acl-deviations.yang` provides the unsupported sensor paths for `openconfig-acl.yang` on Cisco IOS XR routers.

You can also view the data model definitions using the YANG Data Models Navigator tool. This GUI-based and easy-to-use tool helps you explore the nuances of the data model and view the dependencies between various containers in the model. You can view the list of models supported across Cisco IOS XR releases and platforms, locate a specific model, view the containers and their respective lists, leaves, and leaf lists presented visually in a tree structure.

To get started with using data models, see the *Programmability Configuration Guide for Cisco NCS 560 Series Routers*.

Feature	Description
Programmability	
Cisco-IOS-XR-infra-sla-cfg.yang	This native yang data model is enhanced to support **BinsMinDelay** and **MinDelayMicroseconds** options under the existing YANG leaf: /cfg/gl/sla/protocols/protocol/profiles/profile/statistics/statistic/aggregation
Cisco-IOS-XR-um-ethernet-sla-cfg.yang	This unified data model is enhanced to support **BinsMinDelay** and **MinDelayMicroseconds** options under the existing YANG leaf: /cfg/gl/sla/protocols/protocol/profiles/profile/statistics/statistic/aggregation
Cisco-IOS-XR-infra-sla-oper.yang	The existing **bin width** leaf in the Cisco native data model reflects the configured minimum delay value.

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.

Hardware	Description

Optics	This release launches these new optics on selective hardware within the product portfolio. For details refer to the Transceiver Module Group (TMG) Compatibility Matrix
	• Multirate GE, FE pluggable optics
	  • ONS-SC-PTP-1510
	  • ONS-SC-PTP-1514

Behavior Changes

- From this release, the default order of authentication methods for SSH clients on Cisco IOS XR routers running Cisco IOS XR SSH is changed to: **public-key**, **keyboard-interactive**, and **password**.

  Prior to this release, the default order was: **public-key**, **password**, and **keyboard-interactive**.

- 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

- Telemetry data collection may timeout due to CPU overload during route churn. In such scenarios, telemetry will resume when the CPU becomes available after the route churn is complete.
- 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

There are no caveats in this release.

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 1: Release 25.1.1 Packages for Cisco NCS 560 Series Router

Composite Package		
Feature Set	**Filename**	**Description**
Cisco IOS XR IP Unicast Routing Core Bundle	ncs560-mini-x-25.1.1.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-r2511.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-r2511.x86_64.rpm	Supports OSPF
Cisco IOS XR Security Package	ncs560-k9sec-1.0.0.0-r2511.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-r2511.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-r2511.x86_64.rpm	Supports Intermediate System to Intermediate System (IS-IS).
Cisco IOS XR USB Boot Package	ncs560-usb_boot-25.1.1.zip	Supports Cisco IOS XR USB Boot Package
Cisco IOS XR MPLS Package	ncs560-mpls-1.0.0.0-r2511.x86_64.rpm ncs560-mpls-te-rsvp-1.0.0.0-r2511.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-r2511.x86_64.rpm	Lawful Intercept
Cisco IOS XR EIGRP Package	ncs560-eigrp-1.0.0.0-r2511.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
Tue Mar 25 22:26:49.123 IST
Cisco IOS XR Software, Version 25.1.1
Copyright (c) 2013-2024 by Cisco Systems, Inc.

Build Information:
 Built By     : swtools
 Built On     : Mon Mar 24 19:09:38 PDT 2025
 Built Host   : iox-ucs-054
 Workspace    : /auto/srcarchive12/prod/25.1.1/ncs560/ws
 Version      : 25.1.1
 Location     : /opt/cisco/XR/packages/
 Label        : 25.1.1

cisco NCS-560 () processor
System uptime is 2 hours 16 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
Tue Mar 25 22:27:19.679 IST

=============================== ================================================
                                        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     1.115     1.115     0.0
--------------------------------------------------------------------------------
A900-IMA8CS1Z-M      IMFPGA                          YES     1.115     1.115     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      1.27      1.27      0.0
                     LIT-SecMCU(A)                   NO      1.27      1.27      0.0
--------------------------------------------------------------------------------
A900-PWR900-D2       LIT-PriMCU(A)                   NO      1.82      1.82      0.0
                     LIT-SecMCU(A)                   NO      1.84      1.84      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
--------------------------------------------------------------------------------
ASR914-F2B-FAN       PSOC(A)                         NO     44.08     44.08      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     0.69      0.69      0.0
                     PRIMARY-BIOS(A)                 YES     0.24      0.24      0.0
                     SATA(A)                         NO      2.30      2.30      0.0
                     SATA_MAR(A)                     NO      1.30      1.30      0.0
                     SATA_MAR_B4(A)                  NO      1.10      1.10      0.0
                     SATA_SMI(A)                     NO      1.10      1.10      0.0
--------------------------------------------------------------------------------
```

N560-4-RSP4-CC	ADM(A)	NO	1.06	1.06	0.0
	IOFPGA(A)	YES	0.69	0.69	0.0
	PRIMARY-BIOS(A)	YES	0.24	0.24	0.0
	SATA(A)	NO	2.30	2.30	0.0
	SATA_MAR(A)	NO	1.30	1.30	0.0
	SATA_MAR_B4(A)	NO	1.10	1.10	0.0
	SATA_SMI(A)	NO	1.10	1.10	0.0
N560-4-RSP4E	ADM(A)	NO	1.06	1.06	0.0
	IOFPGA(A)	YES	0.69	0.69	0.0
	PRIMARY-BIOS(A)	YES	0.24	0.24	0.0
	SATA(A)	NO	2.30	2.30	0.0
	SATA_MAR(A)	NO	1.30	1.30	0.0
	SATA_MAR_B4(A)	NO	1.10	1.10	0.0
	SATA_SMI(A)	NO	1.10	1.10	0.0
N560-4-RSP4E-CC	ADM(A)	NO	1.06	1.06	0.0
	IOFPGA(A)	YES	0.69	0.69	0.0
	PRIMARY-BIOS(A)	YES	0.24	0.24	0.0
	SATA(A)	NO	2.30	2.30	0.0
	SATA_MAR(A)	NO	1.30	1.30	0.0
	SATA_MAR_B4(A)	NO	1.10	1.10	0.0
	SATA_SMI(A)	NO	1.10	1.10	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_BRT_FW_P0	NO	70.130	70.130	0.0
	QDD_100_BRT_FW_P1	NO	70.130	70.130	0.0
	QDD_100_FW_P0	NO	61.23	61.23	0.0
	QDD_100_FW_P1	NO	61.23	61.23	0.0
	QDD_400_ZRP_FW_P0	NO	161.24	161.24	0.0
	QDD_400_ZRP_FW_P1	NO	161.24	161.24	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	0.80	0.80	0.0
	PRIMARY-BIOS(A)	YES	0.24	0.24	0.0
	SATA(A)	NO	2.30	2.30	0.0
	SATA_MAR(A)	NO	1.30	1.30	0.0
	SATA_MAR_B4(A)	NO	1.10	1.10	0.0
	SATA_SMI(A)	NO	1.10	1.10	0.0
N560-RSP4-E	ADM(A)	NO	1.06	1.06	0.0
	IOFPGA(A)	YES	0.80	0.80	0.0
	PRIMARY-BIOS(A)	YES	0.24	0.24	0.0

```
                    SATA(A)                 NO      2.30      2.30      0.0
                    SATA_MAR(A)             NO      1.30      1.30      0.0
                    SATA_MAR_B4(A)          NO      1.10      1.10      0.0
                    SATA_SMI(A)             NO      1.10      1.10      0.0
--------------------------------------------------------------------------------
NCS4200-1T16G-PS    IMFPGA                  YES     1.115     1.115     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     0.02      0.02      0.0
                    PRIMARY-BIOS(A)         YES     0.24      0.24      0.0
                    SATA(A)                 NO      2.30      2.30      0.0
                    SATA_MAR(A)             NO      1.30      1.30      0.0
                    SATA_MAR_B4(A)          NO      1.10      1.10      0.0
                    SATA_SMI(A)             NO      1.10      1.10      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
Tue Mar 25 22:27:14.943 IST

Auto-upgrade:Disabled
                                                                  FPD Versions
                                                                  ==============
Location   Card type             HWver FPD device       ATR Status    Running   Programd
--------------------------------------------------------------------------------------
0/0        A900-IMA8CS1Z-M       0.0   IMFPGA                CURRENT     1.115     1.115
0/1        A900-IMA8CS1Z-M       0.0   IMFPGA                CURRENT     1.115     1.115
0/2        A900-IMA8CS1Z-M       0.0   IMFPGA                CURRENT     1.115     1.115
0/3        A900-IMA8CS1Z-M       0.0   IMFPGA                CURRENT     1.115     1.115
0/4        A900-IMA8Z            0.0   IMFPGA                CURRENT    17.05     17.05
0/5        N560-IMA-8Q/4L        0.0   IMFPGA                CURRENT     1.27      1.27
0/7        N560-IMA-8Q/4L        0.0   IMFPGA                CURRENT     1.27      1.27
0/9        N560-IMA2C            0.0   IMFPGA                CURRENT     6.06      6.06
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
0/12       A900-IMA8CS1Z-M       0.0   IMFPGA                CURRENT     1.115     1.115
0/RP0      N560-RSP4-E           0.0   ADM                   CURRENT     1.06      1.06
0/RP0      N560-RSP4-E           0.0   IOFPGA                CURRENT     0.80      0.80
0/RP0      N560-RSP4-E           0.0   PRIMARY-BIOS          CURRENT     0.24      0.24
0/RP0      N560-RSP4-E           0.0   SATA                  CURRENT     2.30      2.30
0/RP1      N560-RSP4-E           0.0   ADM                   CURRENT     1.06      1.06
0/RP1      N560-RSP4-E           0.0   IOFPGA                CURRENT     0.80      0.80
0/RP1      N560-RSP4-E           0.0   PRIMARY-BIOS          CURRENT     0.24      0.24
0/RP1      N560-RSP4-E           0.0   SATA                  CURRENT     2.30      2.30
0/FT0      A907-FAN-E            1.0   PSOC                  CURRENT     1.65      1.65
```

Important Notes

Licensing

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

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

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

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

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

For software installation and upgrades, refer to the respective upgrade/downgrade docs *.tar* files based on your 560 router varaint.

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_25.1.1.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