



Release Notes for Cisco NCS 560 Series Routers, Cisco IOS XR Release 7.11.1

First Published: 2023-12-08

Network Convergence System 560 Series Routers

What's New in Cisco IOS XR Release 7.11.1

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
BGP	
Peering Between BGP Routers Within the Same Confederation	<p>You can now enable BGP peering between routers in the sub-autonomous system (AS) within a confederation to advertise specific router updates using iBGP. This capability ensures that the mesh of routers between sub-ASes in a confederation maintains consistent routing tables, ensuring proper network reachability. Enabling this feature helps improve preventing performance reduction and traffic management challenges.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none">• <code>allowconfedas-in</code> <p>YANG Data Model</p> <ul style="list-style-type: none">• New XPath for <code>Cisco-IOS-XR-ipv4-bgp-cfg.yang</code>• <code>Cisco-IOS-XR-um-router-bgp-cfg</code> <p>(see GitHub, YANG Data Models Navigator)</p>

Feature	Description
Virtual Routing Forwarding Next Hop Routing Policy	<p>You can now enable a route policy at the BGP next-hop attach point to limit notifications delivered to BGP for specific prefixes, which equips you with better control over routing decisions, and allows for precise traffic engineering and security compliance for each VRF instance, and helps establish redundant paths specific to each VRF.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <p>Modified Command:</p> <ul style="list-style-type: none"> The nexthop route-policy command is extended to VRF address-family configuration mode. <p>YANG Data Model</p> <ul style="list-style-type: none"> New XPaths for <ul style="list-style-type: none"> <code>Cisco-IOS-XR-ipv4-bgp-cfg.yang</code> <code>Cisco-IOS-XR-um-router-bgp-cfg</code> <p>(see GitHub, YANG Data Models Navigator)</p>
Segment Routing	
Microloop Avoidance for IS-IS with Per-Prefix Filtering	<p>Currently, when SR Microloop Avoidance for IS-IS is enabled, it applies to all prefixes.</p> <p>This feature allows you to selectively allow or deny specific IPv4 or IPv6 prefixes or routes that may cause microloops, which allows for efficient use of hardware resources and ensures overall network stability.</p> <p>This feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> The microloop avoidance segment-routing command is modified with the new route-policy <i>name</i> option for IS-IS. <p>YANG Data Model:</p> <ul style="list-style-type: none"> This feature extends the native <code>Cisco-IOS-XR-um-router-isis-cfg.yang</code> model (see GitHub, YANG Data Models Navigator)

Feature	Description
IS-IS Flexible Algorithm with Exclude Maximum Delay Constraint	<p>This feature enables you to configure topologies that exclude links that have delays over a specific threshold. This is especially critical for high-frequency trading applications, in satellite networks, or wherever there are fluctuations in link delays.</p> <p>This feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> The router isis instance flex-algo algo command is modified with the new maximum-delay value option. <p>YANG Data Model:</p> <ul style="list-style-type: none"> This feature extends the native Cisco-IOS-XR-clns-isis-cfg.yang model (see GitHub, YANG Data Models Navigator)
IS-IS Flexible Algorithm with Exclude Minimum Bandwidth Constraint	<p>Traffic engineering in networks can be optimized by avoiding low-bandwidth links that may not be capable of handling high volumes of traffic.</p> <p>This feature allows you to use Flexible Algorithm to create topologies in your network that explicitly exclude high bandwidth traffic from utilizing links below a specified capacity. This constraint is achieved by introducing a new bandwidth-based metric type within the Flexible Algorithm framework. Links that do not satisfy the constraint are ignored when computing the associated Flexible Algorithm topology.</p> <p>This feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> The router isis instance flex-algo algo command is modified with the new minimum-bandwidth value option. <p>YANG Data Model:</p> <ul style="list-style-type: none"> This feature extends the native Cisco-IOS-XR-clns-isis-cfg.yang model (see GitHub, YANG Data Models Navigator)
SRv6 ESI Filtering	<p>Split Horizon Group (SHG) labels and Ethernet Segment Identifier (ESI) filtering functionalities exist on MPLS underlay networks.</p> <p>This feature introduces ESI filtering functionality to SRv6 underlay networks, using the End.DT2M SRv6 endpoint behavior. This behavior uses the "Arg.FE2" argument for SRv6, which is similar to the SHG label for MPLS.</p> <p>This feature allows nodes to identify BUM traffic based on the advertised ESI and prevent a loop by avoiding re-broadcasting the same traffic back towards the access node.</p> <p>This functionality is enabled by default.</p>

Feature	Description
Two-Way Active Measurement Protocol Light Source Address Filtering	<p>You can now restrict unauthorized users from sending packets to the network and prevent compromising the network security and reliability. For a destination UDP port, you can configure the list of IP addresses that can send Two-Way Active Measurement Protocol (TWAMP)-light packets to responder or querier nodes.</p> <p>In earlier releases, the responder or querier node accepted TWAMP-light packets from all IP addresses.</p> <p>The feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> The querier and responder keywords are introduced in the performance-measurement protocol twamp-light measurement delay command. <p>YANG Data Models:</p> <ul style="list-style-type: none"> <code>Cisco-IOS-XR-um-performance-measurement-cfg.yang</code> <code>Cisco-IOS-XR-perf-meas-oper.yang</code> <p>See (GitHub, Yang Data Models Navigator)</p>
SR Policy Liveness Monitoring on Segment Routing over IPv6 (SRv6)	<p>In segment routing over IPv6 (SRv6), you can now verify end-to-end traffic forwarding over an SR policy candidate path by periodically sending probe messages. Performance monitoring on an SRv6 network enables you to track and monitor traffic flows at a granular level.</p> <p>Earlier releases supported SR policy liveness monitoring over an SR policy candidate path on MPLS.</p>
SRv6 Traffic Accounting	<p>You can now enable the router to record the number of packets and bytes transmitted on a specific egress interface for IPv6 traffic using the SRv6 locator counter.</p> <p>You can use this data to create deterministic data tools to anticipate and plan for future capacity planning solutions.</p> <p>This feature introduces or modifies the following changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> accounting prefixes ipv6 mode per-prefix per-nexthop srv6-locators <p>YANG Data Models:</p> <ul style="list-style-type: none"> <code>Cisco-IOS-XR-accounting-cfg</code> <code>Cisco-IOS-XR-fib-common-oper.yang</code> <p>(see GitHub, YANG Data Models Navigator)</p>

Feature	Description
Maximum Paths Per IS-IS Flexible Algorithm Per Prefix	<p>Previously, you could configure a maximum number of Equal-Cost Multi-path (ECMP) to be set for individual Flex Algorithms.</p> <p>This feature provides additional granularity to the IS-IS Maximum Paths Per-Algorithm feature by allowing you to specify a set of prefixes for Flexible Algorithm.</p> <p>Now you can achieve a balance between path diversity and computational and memory requirements by controlling the number of paths for each specific algorithm and destination prefix combination.</p> <p>This feature introduces these changes:</p> <p>CLI:</p> <ul style="list-style-type: none"> • maximum-paths route-policy <i>name</i> <p>YANG Data Models:</p> <ul style="list-style-type: none"> • This feature extends the native <code>Cisco-IOS-XR-clns-isis-cfg.yang</code> model <p>See GitHub, YANG Data Models Navigator</p>
Modular QoS	
Egress EXP bits Marking Support on Single-Label	<p>With this feature support, you can now mark MPLS EXP bits on single-label scenario.</p> <p>You can now design the QoS for your network based on either single-label or global label. If the directly connected peer router doesn't advertise the explicit-null label, then the router encapsulates the packets with only the global label.</p> <p>Previously, the router was limited to mark MPLS EXP bits with a minimum of two labels. But even with a single EXP marking, you can prioritize certain types of traffic over others based on their importance.</p>
Burst Size for Port-Level Shaper	<p>Introduced in this release on:</p> <p>You can now achieve a predictable and accurate burst size at the link level by configuring port-level shaper burst size, thus ensuring better adherence to traffic SLAs. Also, with the port-level shaper burst size configured in the egress policy maps, the predictability in peak burst ensures that you can configure any next-hop low-capacity device to handle these bursts.</p> <p>Previously, you could configure burst sizes, which impacted traffic flow only at the Virtual Output Queue (VOQ) level but didn't control packet transmission at the link level.</p>

Feature	Description
View Packet Processing and Traffic Management Resources	<p>You can now view the utilization of some packet processing and traffic management resources, such as policer banks and connectors. Insights into their consumption and availability help you prevent or mitigate an Out of Resource (OOR) situation, thus ensuring optimal QoS operations with minimal impact on network performance.</p> <p>The feature introduces the following changes:</p> <p>CLI:</p> <p>show controllers npu resources qos</p> <p>YANG:</p> <ul style="list-style-type: none"> • <code>Cisco-IOS-XR-fretta-bcm-dpa-qos-resources-oper</code> • <code>Cisco-IOS-XR-5500-qos-oper</code> • <code>Cisco-IOS-XR-fretta-bcm-dpa-qos-rate-profile-resources-oper</code> • <code>Cisco-IOS-XR-fretta-bcm-dpa-qos-egq-resources-oper</code> <p>(see GitHub, YANG Data Models Navigator)</p>
Multicast	
EVPN All-Active Multi-homed Multicast Source Behind a BVI	<p>We have enhanced multicast routing efficiency, load balancing, and latency in EVPN topology by optimizing redundancy and enabling support for All-Active (AA) multicast multi-homed sources. The multi-homed multicast data sources are located behind a Bridge-Group Virtual Interface (BVI), while multicast receivers can be in either the core or a bridge domain.</p> <p>This feature introduces the following changes:</p> <ul style="list-style-type: none"> • CLI <ul style="list-style-type: none"> • The ole-collapse-disable keyword is introduced in the hw-module multicast evpn command. • YANG Data Model <ul style="list-style-type: none"> • New leaf evpn-ole-collapse-disable added in <code>Cisco-IOS-XR-fia-hw-profile-cfg.yang</code> (see GitHub, YANG Data Models Navigator).
Programmability	

Feature	Description
Automatic Resynchronization of OpenConfig Configuration	<p>OpenConfig infrastructure can now reapply all the OpenConfig configurations automatically if there are any discrepancies in the running configuration.</p> <p>With this feature, there is no need for manual replacement of the OpenConfig configuration using Netconf or gNMI.</p> <p>The re-sync operation is triggered if the running configurations and the OpenConfig configuration go out of sync after any system event that removes some running configurations from the system. A corresponding system log gets generated to indicate the re-sync status.</p>

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	
<code>openconfig-system.yang</code> Version 0.13.1	This OpenConfig data model is revised from version 0.6.0 to 0.13.1. There are no functional changes between these two versions.
<code>openconfig-vlan.yang</code> Version 3.2.2	This OpenConfig data model is revised from version 3.2.0 to 3.2.2. There are no functional changes between these two versions.
<code>openconfig-mpls-static.yang</code> Version 3.3.0	The OpenConfig data model is revised from version 3.2.2 to 3.3.0. There are no functional changes between these two versions.

Feature	Description
openconfig-lldp.yang	<p>This OpenConfig data model supports streaming model-driven telemetry (MDT) data for the leaves deviated in the previous releases.</p> <p>You can stream cadence-driven telemetry data for the following nodes:</p> <ul style="list-style-type: none"> • Retrieve the counters cleared and the number number of valid TLVs received using last-clear and tlv-accepted leaves • Gather data about LLDP interface counters using frame-in, frame-out, frame-error-in, frame-discard, tlv-discard, tlv-unknown, last-clear, and frame-error-out leaves • Stream operational state data for LLDP neighbors using age and last-update leaves <p>You can stream event-driven telemetry (EDT) data for system-name, system-description, chassis-id, and chassis-id-type leaves.</p>
openconfig-spanning-tree.yang Version 0.3.1	<p>This release introduces support for this OpenConfig data model to define the configuration and operational state data for Spanning Tree Protocol (STP). The protocol creates a spanning tree that can span all routers in the network, it then disables the links that are not part of the spanning tree, leaving a single active path between any two network nodes. Using this data model, you can configure STP for a loop free topology within Ethernet networks, allowing redundancy within the network to deal with link failures.</p> <p>Note The following limitations apply when using this data model:</p> <ul style="list-style-type: none"> • Rapid Spanning Tree Protocol (RSTP), which is an evolution of the original STP that provides faster convergence after a topology change, is not supported in IOS XR and is not configurable using the data model • Streaming telemetry data for the operational state of nodes is not supported • Instances of Multiple Spanning Tree Protocol (MSTP), which creates multiple spanning tree instances for each VLAN is configured using mst-id node. Configuring this node with value 0 is not supported

Feature	Description
openconfig-spanning-tree-types.yang Version 0.4.1	This release introduces support for this OpenConfig data model to define the types related to the openconfig-spanning-tree.yang model. This data model provides a way to consistently manage STP on the devices to increase network reliability and performance by preventing network loops.
Cisco-IOS-XR-um-performance-measurement-cfg.yang	This unified data model is enhanced as follows: <ul style="list-style-type: none"> • New containers <i>allow-querier</i> and <i>allow-responder</i>, to configure the list of IP addresses that can send TWAMP-light packets to responder or querier nodes. • A new container, <i>flow-label</i>, to monitor the liveness of multiple paths for a given segment list.
Cisco-IOS-XR-perf-meas-oper.yang	This native data model is enhanced as follows: <ul style="list-style-type: none"> • New containers, <i>allowed-responder-summary</i> and <i>allowed-querier-summary</i>, to configure the list of IP addresses that can send TWAMP-light packets to responder or querier nodes. • New container, <i>usid-info</i>, and new leaves such as <i>sid-value</i>, <i>usid-length</i>, <i>sid-format</i>, and <i>sid-behavior</i> in the <i>PM-USID-INFO</i> grouping, to monitor the liveness of a SRv6 candidate path.
Cisco-IOS-XR-infra-xtc-agent-cfg.yang	This native data model is enhanced with a new leaf, <i>minimum-active-segment-lists</i> , to configure the minimum number of active segment lists associated with the candidate path.

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
CSCwi24703	After IM reload trigger, VPWS AC interface gets stuck in down state with multiple flap

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 7.11.1 Packages for Cisco NCS 560 Series Router

Composite Package		
Feature Set	Filename	Description
Cisco IOS XR IP Unicast Routing Core Bundle	ncs560-mini-x-7.11.1.iso	Contains base image contents that includes: <ul style="list-style-type: none"> • 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-r7111.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-r7111.x86_64.rpm	Supports OSPF
Cisco IOS XR Security Package	ncs560-k9sec-1.0.0.0-r7111.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).

Composite Package		
Feature Set	Filename	Description
Multicast Package	ncs560-mcast-1.0.0.0-r7111.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.
Cisco IOS XR ISIS package	ncs560-isis-1.0.0.0-r7111.x86_64.rpm	Supports Intermediate System to Intermediate System (IS-IS).
Cisco IOS XR USB Boot Package	ncs560-usb_boot-7.11.1.zip	Supports Cisco IOS XR USB Boot Package
Cisco IOS XR MPLS Package	ncs560-mpls-1.0.0.0-r7111.x86_64.rpm ncs560-mpls-te-rsvp-1.0.0.0-r7111.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-r7111.x86_64.rpm	Lawful Intercept
Cisco IOS XR EIGRP Package	ncs560-eigrp-1.0.0.0-r7111.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 7.11.1
Copyright (c) 2013-2023 by Cisco Systems, Inc.

Build Information:
Built By      : deenayak
Built On     : Sun Dec  3 15:55:41 PST 2023
Built Host   : iox-lnx-158
Workspace    : /auto/srcarchive14/prod/7.11.1/ncs560/ws
```

```

Version      : 7.11.1
Location     : /opt/cisco/XR/packages/
Label       : 7.11.1

cisco NCS-560 () processor
System uptime is 2 days 21 hours 9 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
                               =====
Card Type           FPD Description           Req   SW   Min Req  Min Req
=====  =====  =====  =====  =====  =====
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    2.04   0.04     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   0.68   0.68     0.0
                   PRIMARY-BIOS (A)          YES   0.22   0.22     0.0

```

Determine Firmware Support

	SATA (A)	NO	2.20	2.20	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	0.68	0.68	0.0
	PRIMARY-BIOS (A)	YES	0.22	0.22	0.0
	SATA (A)	NO	2.20	2.20	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	0.68	0.68	0.0
	PRIMARY-BIOS (A)	YES	0.22	0.22	0.0
	SATA (A)	NO	2.20	2.20	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	0.68	0.68	0.0
	PRIMARY-BIOS (A)	YES	0.22	0.22	0.0
	SATA (A)	NO	2.20	2.20	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_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-PrimMCU (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	0.79	0.79	0.0
	PRIMARY-BIOS (A)	YES	0.22	0.22	0.0
	SATA (A)	NO	2.20	2.20	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	0.79	0.79	0.0

	PRIMARY-BIOS (A)	YES	0.22	0.22	0.0
	SATA (A)	NO	2.20	2.20	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	0.22	0.22	0.0
	SATA (A)	NO	2.20	2.20	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
Auto-upgrade:Disabled
```

Location	Card type	HWver	FPD device	ATR Status	FPD Versions	
					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	A900-IMA8Z-L	0.0	IMFPGA	CURRENT	1.50	1.50
0/7	N560-IMA2C-DD	0.0	IMFPGA	CURRENT	1.28	1.28
0/9	N560-IMA1W	65.32	CFP2-DE-DCO	CURRENT	38.27397	38.27397
0/9	N560-IMA1W	0.0	IMFPGA	CURRENT	1.28	1.28
0/10	A900-IMA8Z	0.0	IMFPGA	CURRENT	17.05	17.05
0/11	A900-IMA8Z-L	0.0	IMFPGA	CURRENT	1.50	1.50
0/12	A900-IMA8CS1Z-M	0.0	IMFPGA	CURRENT	1.115	1.115
0/13	A900-IMA8CS1Z-M	0.0	IMFPGA	CURRENT	1.115	1.115
0/14	NCS4200-1T16G-PS	0.0	IMFPGA	CURRENT	1.115	1.115
0/15	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	0.79	0.79
0/RP0	N560-RSP4-E	0.0	PRIMARY-BIOS	CURRENT	0.22	0.22

0/RP0	N560-RSP4-E	0.0	SATA	CURRENT	2.20	2.20
0/RP1	N560-RSP4-E	0.0	ADM	CURRENT	1.06	1.06
0/RP1	N560-RSP4-E	0.0	IOFPGA	CURRENT	0.79	0.79
0/RP1	N560-RSP4-E	0.0	PRIMARY-BIOS	CURRENT	0.22	0.22
0/RP1	N560-RSP4-E	0.0	SATA	CURRENT	2.20	2.20
0/FT0	N560-FAN-H	1.0	PSOC	CURRENT	2.02	2.02
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
0/PM2	A900-PWR1200-A	0.1	DCA-PrimCU	CURRENT	0.13	0.13
0/PM2	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

For software installation and upgrades, refer to the respective upgrade/downgrade docs *.tar* files based on your [560 router variant](#).

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_7.11.1.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>

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies of this document are considered uncontrolled. See the current online version for the latest version.

Cisco has more than 200 offices worldwide. Addresses and phone numbers are listed on the Cisco website at www.cisco.com/go/offices.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <https://www.cisco.com/c/en/us/about/legal/trademarks.html>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)

© 2023 Cisco Systems, Inc. All rights reserved.