



## Release Notes for Cisco NCS 560 Series Routers, Cisco IOS XR Release 7.10.1

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Revised: June 25, 2024

# What's New in Cisco IOS XR Release 7.10.1

Cisco IOS XR Release 7.10.1 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
<a href="#">Cisco IOS XR Error Messages</a>	Search by release number, error strings, or compare release numbers to view a detailed repository of error messages and descriptions.
<a href="#">Cisco IOS XR MIBs</a>	Select the MIB of your choice from a drop-down to explore an extensive repository of MIB information.
<a href="#">YANG Data Models Navigator</a>	<p>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.</p> <p>As we continue to enhance the tool, we would love to hear your feedback. You are welcome to drop us a note <a href="#">here</a>.</p>
Use Case-based Documentation at Learning Labs	<p>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.</p> <p>Check out the new interactive documentation here:</p> <ul style="list-style-type: none"><li>• <a href="#">End to end 3-stage CLOS Networks for SONiC</a></li><li>• <a href="#">Use cases for QoS and Model-driven Telemetry</a></li></ul>

## 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
<b>Segment Routing</b>	

Feature	Description
<a href="#">IS-IS Partition Detection and Leakage of Specific Route Advertisements</a>	<p>In an open ring topology, a single fiber cut may partition the area or domain into two pieces. With summarization enabled, the area (domain) partition may result in traffic drops. Depending on the configuration in the Area Border Routers (ABRs) or Autonomous System Boundary Routers (ASBRs) that is picked as an entry point to the partitioned area (domain), the traffic is delivered to its destination or dropped as unreachable at ABR or ASBR.</p> <p>IS-IS partition detection and leakage of specific route advertisements features are introduced to retain connectivity for the partitioned area (domain) when summarization is used.</p> <p>The ABRs or ASBRs detect a network partition within an area (domain) and upon detection, ensure that the summary route is replaced with specific route advertisements in IS-IS.</p> <p>The feature introduces these changes:</p> <p><b>New Command:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">partition-detect</a></li> </ul> <p><b>Modified Command:</b></p> <ul style="list-style-type: none"> <li>• The <b>partition-repair</b> keyword is introduced in the <a href="#">summary-prefix</a> command.</li> </ul> <p><b>YANG Data Model:</b></p> <ul style="list-style-type: none"> <li>• New XPathS for <code>Cisco-IOS-XR-um-router-isis-cfg.yang</code> (see <a href="#">GitHub</a>, <a href="#">YANG Data Models Navigator</a>)</li> </ul>
<a href="#">SR Policy Liveness Monitoring - Hardware Offloading</a>	<p>You can now hardware offload the liveness monitoring in performance measurement to the router hardware, which is the Network Processing Unit (NPU). This feature helps you optimize and scale the measurement operation, helping you meet delay-bound Service Level Agreements (SLAs). Previously, this feature was software driven.</p> <p>This feature introduces a new keyword <b>npu-offload</b> under the <a href="#">performance-measurement liveness-profile name liveness profile</a> command.</p>
<a href="#">Configurable Filters for IS-IS Advertisements to BGP-Link State</a>	<p>This feature allows you to configure a route map to filter IS-IS route advertisements to BGP-Link State (LS). It also provides a per-area configuration knob to disable IS-IS advertisements for external and propagated prefixes. This configuration of filters hence reduces the amount of redundant data for external and interarea prefixes sent to the BGP - LS clients.</p> <p>This feature introduces <b>exclude-external</b>, <b>exclude-interarea</b>, and <b>route-policy name</b> optional keywords in the <a href="#">distribute link-state</a> command:</p>
<a href="#">Multicast: Cisco Nonstop Forwarding for Tree-SID</a>	<p>Starting from this release, Multicast Nonstop Forwarding supports Tree-SID (Tree Segment Identifier). This ensures that traffic forwarding continues without interruptions whenever the active RSP fails over to the standby RSP.</p> <p>This feature prevents hardware or software failures on the control plane from disrupting the forwarding of existing packet flows through the router for Tree-SID. Thus, ensuring improved network availability, network stability, preventing routing flaps, and no loss of user sessions while the routing protocol information is being restored.</p> <p>The feature modifies the <a href="#">show mrib nsf private</a> command.</p>

Feature	Description
<a href="#">Multicast VPN: Dynamic Tree-SID</a> <a href="#">Multicast VPN IPv6</a>	<p>This feature allows Dynamic Tree Segment Identifier (Tree-SID) deployment where IPv6 Multicast payload is used for optimally transporting IP VPN multicast traffic over the provider network, using SR-PCE as a controller. This implementation supports IPv6 only for the Dynamic Tree-SID. Currently, the Static Tree-SID supports IPV4 payloads only, not the IPv6 payloads.</p>
<b>L2VPN and Ethernet Services</b>	
<a href="#">EVPN BUM Flood Traffic Optimization</a>	<p>You can save the consumption of network bandwidth by preventing the replication of Broadcast, Unknown unicast and Multicast (BUM) traffic towards EVPN core and attachment circuits (AC). This feature not only prevents the replication of BUM traffic but also ensures that only the designated router receives the BUM traffic.</p> <p>The feature introduces these changes:</p> <ul style="list-style-type: none"> <li>• <b>CLI:</b> New commands. <ul style="list-style-type: none"> <li>• <a href="#">hw-module l2-replication core-optimized</a></li> <li>• <a href="#">flood mode ac-shg-optimized</a></li> </ul> </li> <li>• <b>YANG Data Model:</b> New XPath for <a href="#">Cisco-IOS-XR-um-hw-module-profile-cfg.yang</a> (see <a href="#">GitHub</a>, <a href="#">YANG Data Models Navigator</a>)</li> </ul>
<a href="#">EVPN Link Bandwidth for Proportional Multipath on VNF</a>	<p>You can now use the EVPN link bandwidth to set proportional multipath on Virtual Network Forwarders (VNFs) connected to Top of Racks (ToRs). You can advertise the link bandwidth extended community attribute for each path in a network. When you enable EVPN link bandwidth on multiple paths, the bandwidth values of these paths are aggregated and the cumulative bandwidth is advertised across the VNFs. The load metrics is installed in Routing Information Base (RIB) and the RIB redistributes nexthop prefixes to the paths to achieve proportional multipath.</p> <p>This allows distribution of traffic proportional to the capacity of the links across all the available Virtual Network Forwarders (VNFs) that facilitates optimal traffic load balancing across the VNFs.</p> <p>The feature introduces these changes:</p> <p><b>CLI:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">evpn-link-bandwidth</a></li> <li>• <a href="#">set extcommunity evpn-link-bandwidth</a></li> <li>• <a href="#">delete extcommunity evpn-link-bandwidth</a></li> </ul>

Feature	Description
<a href="#">EVPN Port-Active Hot Standby on Bundle Interfaces</a>	<p>The EVPN port-active mode configuration is now modified to support hot standby. In a hot standby bundle interface, the main and subinterfaces remain up. This functionality ensures fast convergence of standby to active transition.</p> <p>Previously, the interfaces in a standby node would be down. During the failure and recovery of active node, the standby node transitions through the Out-of-Service (OOS) state to the Up state.</p> <p>If you still want the nodes to transition through the OOS state, use the <b>access-signal out-of-service</b> command to revert to the previous behavior.</p> <p>The feature introduces these changes:</p> <p><b>CLI:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">access-signal out-of-service</a></li> </ul> <p><b>YANG Data Model:</b></p> <ul style="list-style-type: none"> <li>• New XPath for <code>Cisco-IOS-XR-l2vpn-cfg.yang</code> (see <a href="#">GitHub</a>, <a href="#">YANG Data Models Navigator</a>)</li> </ul>
<a href="#">Set EVPN Gateway IP Address in EVPN Route Type 5 NLRI</a>	<p>You can now facilitate optimal traffic load balancing across the Virtual Network Forwarders (VNFs) and minimize control plane updates when the VNFs or virtual machines (VMs) are moved across Top of Racks (ToR) by setting the EVPN gateway IP address in the EVPN route type 5 network layer reachability information (NLRI) that advertises IPv4 and IPv6 addresses. With this functionality, only one IP prefix route is withdrawn ensuring fast traffic switchover and reduced convergence time in the event of failure.</p> <p>Previously, the gateway IP address field in the EVPN route type 5 NLRI was not used. By default, the NLRI advertisement included the EVPN gateway IP address of zero, which was represented as 0.0.0.0 for IPv4 and :: for IPv6. This resulted in the withdrawal of all prefixes one by one in the event of a failure, leading to traffic loss.</p> <p>The feature introduces these changes:</p> <p><b>CLI:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">set advertise-evpn-gw-ip</a></li> <li>• <a href="#">advertise gateway-ip-disable</a></li> </ul>
<b>IP Addresses and Services</b>	
<a href="#">Single Pass IPv6 Egress ACL</a>	<p>You can now experience faster packet processing and save NPU cycles by avoiding the recycling of packets within the router. This is made possible by enabling the single-pass egress ACL which avoids multiple round-trips of packets in the ingress-to-egress path, thereby eliminating the need for additional packet processing. Also, because the match criteria requirement for a single-pass egress IPv6 ACL is reduced, the TCAM key size is reduced.</p> <p>This feature introduces the <a href="#">hw-module profile acl ipv6 single-pass-egress-acl</a> command.</p>
<b>Modular QoS</b>	

Feature	Description
<a href="#">QoS IP DSCP Preservation for IPv6 SR-TE</a>	<p>This release introduces the functionality to preserve IP DSCP markings for IPv6 SR-TE traffic and covers the following scenarios:</p> <ul style="list-style-type: none"> <li>• <b>For two or less than two topmost or imposition labels:</b> when you set the MPLS experimental bits (EXP) values (also called Traffic Class values), the IP DSCP markings are now preserved by default in the ingress policies when the MPLS labels are pushed into the packet.</li> <li>• <b>For more than three imposition labels:</b> you must enable this functionality to preserve IP DSCP markings.</li> </ul> <p>With preservation, traffic with IPv6 packets with DSCP marking for priority, flows as intended and there's no drop in traffic because of incorrect or missing labels.</p> <p>In previous releases, irrespective of the number of MPLS labels, when the EXP values were copied into the packet header during imposition, even the IP DSCP markings for IPv6 traffic were modified. This modification resulted in traffic drops at the next-hop routers in SR-TE tunnels.</p> <p>This feature introduces a new keyword, <b>v6uc-enable</b>, in the <b>hw-module profile mpls-ext-dscp-preserve</b> command.</p>
<b>MPLS</b>	
<a href="#">Automatic Bandwidth Bundle TE++ for Numbered Tunnels</a>	<p>We have optimized network performance and enabled efficient utilization of resources for numbered tunnels based on real-time traffic by automatically adding or removing tunnels between two endpoints. This is made possible because this release introduces support for auto-bandwidth TE++ for numbered tunnels, expanding upon the previous support for only named tunnels, letting you define explicit paths and allocate the bandwidth to each tunnel.</p> <p>This feature introduces these changes:</p> <p><b>CLI:</b></p> <ul style="list-style-type: none"> <li>• The <b>auto-capacity</b> keyword is added to the <b>interface tunnel-te</b> command.</li> </ul> <p><b>YANG Data Model:</b></p> <p>New XPath for Cisco-IOS-XR-mpls-te-cfg.yang (see <a href="#">GitHub</a>, <a href="#">YANG Data Models Navigator</a>)</p>
<b>Multicast</b>	
<a href="#">Draft-Rosen Multicast VPN (Profile 0) in PIM Sparse Mode (SM)</a>	<p>Draft-Rosen Multicast VPN (Profile 0) is now supported in PIM sparse mode (PIM-SM) between the PE routers that are running in VRF mode. PIM SM provides precise control in cases of large multicast traffic when there is less bandwidth available. This control is possible because it uses a temporary Rendezvous Point (RP) router to connect the multicast traffic source to the next hop router.</p> <p>Prior to this release, Profile 0 was supported only in PIM Source Specific Multicast (SSM) mode.</p>
<b>Netflow</b>	

Feature	Description
<a href="#">Simultaneous L2 and L3 Flow Monitoring using IPFIX</a>	<p>This feature introduces support for simultaneous L2 and L3 flow monitoring. Now, you can configure IP Flow Information Export (IPFIX) to actively monitor and record end-to-end L2 and L3 flow information elements from network devices. Previously, only L2 or L3 flow could be monitored at a time.</p> <p>This feature introduces these changes:</p> <p>CLI: The following sub-menus are introduced for these commands:</p> <ul style="list-style-type: none"> <li>• The <b>record ipv4</b> command is modified to support a new optional keyword, <b>I2-I3</b></li> <li>• The <b>record ipv6</b> command is modified to support a new optional keyword, <b>I2-I3</b></li> </ul>
<b>Programmability</b>	
<pre>openconfig-isis.yang Version 1.0.0</pre>	<p>The OpenConfig data model defines the configuration and state information related to ISIS protocol configuration running on a router. With this release, you can configure the following XPaths:</p> <pre>openconfig-network-instance/network-instances/network-instance/protocols/protocol/isis/interfaces/interface/</pre> <ul style="list-style-type: none"> <li>• <code>config/hello-padding</code>: controls the padding type for IS-IS Hello PDUs.</li> <li>• <code>mpls/igp-ldp-sync/config/enabled</code>: synchronization between the LDP and IS-IS.</li> <li>• <code>levels/level/hello-authentication/config/keychain</code>: refers to a keychain that should be used for hello authentication.</li> <li>• <code>enable-bfd/config/enabled</code>: when this leaf is set to true, BFD is used to detect the liveness of the remote peer or next-hop.</li> <li>• <code>levels/level/config/enabled</code>: when set to true, the functionality within which this leaf is defined is enabled and when set to false it is explicitly disabled.</li> </ul> <pre>openconfig-network-instance/network-instances/network-instance/protocols/protocol/isis/</pre> <ul style="list-style-type: none"> <li>• <code>global/mpls/igp-ldp-sync/config/enabled</code>: synchronization between the LDP and IS-IS.</li> <li>• <code>global/config/maximum-area-addresses</code>: supports maximum area.</li> <li>• <code>globalconfig/Iid-tlv</code>: (ISIS Instance Identifier TLV) when set to true, the IID-TLV identifies the unique instance as well as the topology/topologies to which the PDU applies.</li> <li>• <code>levels/level/authentication/config/keychain</code>: refers to the keychain that should be used for authenticating IS-IS packets.</li> </ul> <p>Event-driven and Model-driven telemetry is supported.</p>
<b>Routing</b>	

Feature	Description
<a href="#">Autonomous System Boundary Router Isolation and Adjacency Control for LSA Overflows</a>	<p>In a network employing an Autonomous System Boundary Router (ASBR) and other routers, you are now assured of uninterrupted traffic flow even if the ASBR generates LSAs that exceed the limit you configured. This is made possible as you can now isolate ASBRs and also control the duration of adjacency in the EXCHANGE or LOADING phase. By isolating the ASBR from its immediate neighbors, the remaining network topology can continue to function without disruption, effectively preventing any adverse impact on traffic flow. This approach also simplifies the recovery process, as manual intervention is only necessary for the immediate neighbors of the ASBR routers.</p> <p>This feature introduces these changes:</p> <p><b>CLI:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">max-external-lsa</a></li> <li>• <a href="#">exchange-timer</a></li> </ul> <p><b>YANG Data Model:</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Cisco-IOS-XR-ipv4-ospf-cfg.yang</a></li> <li>• <a href="#">Cisco-IOS-XR-ipv4-ospf-oper.yang</a></li> <li>• <a href="#">Cisco-IOS-XR-um-router-ospf-cfg.yang</a></li> </ul> <p>(see <a href="#">GitHub</a>, <a href="#">YANG Data Models Navigator</a>)</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
<b>Programmability</b>	
Cisco-IOS-XR-l2vpn-cfg.yang	This Cisco native data model is enhanced to support EVPN port-active with hot standby on bundle interfaces.
Cisco-IOS-XR-um-hw-module-profile-cfg.yang	This Cisco unified data model is enhanced to support optimization of EVPN BUM flood traffic.



Feature	Description
openconfig-isis.yang	<p>The OpenConfig data model defines the configuration and state information related to ISIS protocol configuration running on a router. With this release, you can configure the following XPaths:</p> <p><del>openconfig-network-instance/network-instances/network-instance/protocols/protocol/isis/interfaces/interface/</del></p> <ul style="list-style-type: none"> <li>• config/hello-padding: controls the padding type for IS-IS Hello PDUs.</li> <li>• mpls/igp-ldp-sync/config/enabled: synchronization between the LDP and IS-IS.</li> <li>• levels/level/hello-authentication/config/keychain: refers to a keychain that should be used for hello authentication.</li> <li>• enable-bfd/config/enabled: when this leaf is set to true, BFD is used to detect the liveness of the remote peer or next-hop.</li> <li>• levels/level/config/enabled: when set to true, the functionality within which this leaf is defined is enabled and when set to false it is explicitly disabled.</li> </ul> <p><del>openconfig-network-instance/network-instances/network-instance/protocols/protocol/isis/</del></p> <ul style="list-style-type: none"> <li>• global/mpls/igp-ldp-sync/config/enabled: synchronization between the LDP and IS-IS.</li> <li>• global/config/maximum-area-addresses: supports maximum area.</li> <li>• globalconfig/Iid-tlv: (ISIS Instance Identifier TLV) when set to true, the IID-TLV identifies the unique instance as well as the topology/topologies to which the PDU applies.</li> <li>• levels/level/authentication/config/keychain: refers to the keychain that should be used for authenticating IS-IS packets.</li> </ul> <p>Event-driven and Model-driven telemetry is supported.</p>
Cisco-IOS-XR-um-router-isis-cfg.yang	<p>The latest update to the Cisco-IOS-XR-um-router-isis-cfg.yang unified data model includes the addition of the partition-detect and partition-repair containers. These new containers indicate the configuration of the partition-detect and partition-repair nodes.</p>

## Hardware Introduced



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**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](#).

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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 indexaddress 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 adjacencyaddress** 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
<a href="#">CSCwf89722</a>	EVPN VPWS down post migrating from Multi-homing to Single-Homing
<a href="#">CSCwf81475</a>	Netflow IPv6: The record-ipv6 under monitor-map reports incorrect output and input interface with outbundlemember or outphysint options.

## 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 7.10.1 Packages for Cisco NCS 560 Series Router**

Composite Package		
Feature Set	Filename	Description
Cisco IOS XR IP Unicast Routing Core Bundle	ncs560-mini-x-7.10.1.iso	Contains base image contents that includes: <ul style="list-style-type: none"> <li>• Host operating system</li> <li>• System Admin boot image</li> <li>• IOS XR boot image</li> <li>• BGP packages</li> <li>• OS</li> <li>• Admin</li> <li>• Base</li> <li>• Forwarding</li> <li>• Modular Services Card</li> <li>• Routing</li> <li>• SNMP Agent</li> <li>• Alarm Correlation</li> </ul>
Cisco IOS XR Manageability Package	ncs560-mgbl-1.0.0.0-r7101.x86_64.rpm	Telemetry, Extensible Markup Language (XML), Parser, and HTTP server packages, NETCONF, YANG Models, gRPC.

<b>Composite Package</b>		
<b>Feature Set</b>	<b>Filename</b>	<b>Description</b>
Cisco IOS XR OSPF package	ncs560-ospf-1.0.0.0-r7101.x86_64.rpm	Supports OSPF
Cisco IOS XR Security Package	ncs560-k9sec-1.0.0.0-r7101.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-r7101.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-r7101.x86_64.rpm	Supports Intermediate System to Intermediate System (IS-IS).
Cisco IOS XR USB Boot Package	ncs560-usb_boot-7.10.1.zip	Supports Cisco IOS XR USB Boot Package
Cisco IOS XR MPLS Package	ncs560-mpls-1.0.0.0-r7101.x86_64.rpm ncs560-mpls-te-rsvp-1.0.0.0-r7101.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-r7101.x86_64.rpm	Lawful Intercept
Cisco IOS XR EIGRP Package	ncs560-eigrp-1.0.0.0-r7101.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 7.10.1
```

Copyright (c) 2013-2023 by Cisco Systems, Inc.

Build Information:

Built By : deenayak  
Built On : Wed Aug 16 21:34:23 PDT 2023  
Built Host : iox-ucs-034  
Workspace : /auto/srcarchive16/prod/7.10.1/ncs560/ws  
Version : 7.10.1  
Location : /opt/cisco/XR/packages/  
Label : 7.10.1

cisco NCS-560 () processor  
System uptime is 7 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   1.113  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-PrimMCU (A)          NO    0.11   0.11     0.0
                  DCA-SecMCU (A)          NO    1.04   1.04     0.0
-----
A900-PWR1200-D    LIT-PrimMCU (A)         NO    2.04   0.04     0.0
                  LIT-SecMCU (A)         NO    1.27   1.27     0.0
-----
A900-PWR900-D2    LIT-PrimMCU (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	0.67	0.67	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_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	0.67	0.67	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_SMI (A)	NO	1.10	1.10	0.0
N560-4-RSP4E	ADM (A)	NO	1.06	1.06	0.0
	IOFPGA (A)	YES	0.67	0.67	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_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	0.67	0.67	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_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	0.78	0.78	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_SMI (A)	NO	1.10	1.10	0.0

N560-RSP4-E	ADM (A)	NO	1.06	1.06	0.0
	IOFPGA (A)	YES	0.78	0.78	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_SMI (A)	NO	1.10	1.10	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	0.22	0.22	0.0
	SATA (A)	NO	2.20	2.20	0.0
	SATA_MAR (A)	NO	1.30	1.30	0.0
	SATA_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:Enabled
```

Location	Card type	HWver	FPD device	ATR	Status	FPD Versions	
						Running	Programd
=====							
0/0	A900-IMA8CS1Z-M	0.0	IMFPGA		CURRENT	1.113	1.113
0/1	A900-IMA8CS1Z-M	0.0	IMFPGA		CURRENT	1.113	1.113
0/2	NCS4200-1T16G-PS	0.0	IMFPGA		CURRENT	1.113	1.113
0/3	NCS4200-1T16G-PS	0.0	IMFPGA		CURRENT	1.113	1.113
0/4	N560-IMA-8Q/4L	0.0	IMFPGA		CURRENT	1.27	1.27
0/5	A900-IMA8Z	0.0	IMFPGA		CURRENT	17.05	17.05
0/7	N560-IMA2C	0.0	IMFPGA		CURRENT	6.06	6.06
0/9	N560-IMA1W	65.32	CFP2-D-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	0.0	IMFPGA		CURRENT	17.05	17.05
0/12	NCS4200-1T16G-PS	0.0	IMFPGA		CURRENT	1.113	1.113
0/13	NCS4200-1T16G-PS	0.0	IMFPGA		CURRENT	1.113	1.113
0/14	NCS4200-1T16G-PS	0.0	IMFPGA		CURRENT	1.113	1.113
0/15	A900-IMA8CS1Z-M	0.0	IMFPGA		CURRENT	1.113	1.113
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	0.22	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	0.78	0.78
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-PrimMCU		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-PrimMCU		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-PrimMCU		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



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

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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\_7.10.1.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>







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