Release Notes for Cisco NCS 560 Series Routers, Cisco IOS XR Release 7.4.1

Network Convergence System 560 Series Routers

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What's New in Cisco IOS XR Release 7.4.1

Feature	Description
Hardware	
8-port 10/25G SFP+/SFP28 Multi-rate interface Module (N560-IMA-8Q/4L) support	The Cisco NCS 560-4 and NCS 560-7 routers and N560-RSP4 and N560-RSP4-E route processors (RSPs) now support the 8-port 10/25G SFP+/SFP28 Multi-rate interface Module (N560-IMA-8Q/4L) on additional slots with various speed combinations. The IM is supported on NCS 560-7 with N560-RSP4 or N560-RSP4-E on: • Slots 7 and 9 in 8x25G, 8x10G, 4x25G and 4x10G, 4x10G and 4x25G modes. Default mode is 8x25G. • Slots 4, 5, 10 and 11 in 8x10G default mode. The IM is supported on NCS 560-4 with N560-RSP4 or N560-RSP4-E on: • Slots 0 and 1 in 8x25G, 4x25G and 4x10G, 4x10G and 4x25G modes. Default mode is 8x25G. • Slots 2 and 3 in 4x25G and 4x10G, 8x10G, 2x50G and 4x10G modes. Default mode is 4x25G and 4x10G. • Slots 4, 5 in 8x10G default mode.
4X10G Support on A900-IMA-8Z and A900-IMA-8Z-L	The Cisco N560-RSP4 and N560-RSP4-E route processors (RSPs) now support the 8-port 10-Gigabit Ethernet interface modules (A900-IMA-8Z and A900-IMA-8Z-L) on slots 2,3,12, and 13. In these slots, only 4 ports will be supported. If an IM is inserted in these slots, then ports 0-3 are created on A900-IMA-8Z and ports 4-7 are created in case of A900-IMA-8Z-L.
2-port 100-Gigabit Ethernet interface module	The Cisco NCS 560-4 router now supports 2-port 100-Gigabit Ethernet QSFP28 or QSFP-DD module (N560-IMA-2C-DD) on slots 0, 1, 2 and 3 of NCS560-4. In NCS560-4, only one interface, corresponding to port 0 is created when N560-IMA-2C-DD is inserted on slots 2 and 3 and port 1 is not effective. Only 100G mode is supported on port 0 of slots 2 and 3.

Feature	Description
IP Addresses and Services	
Jumbo packet handling for DHCPv6	This release introduces the **handle-jumbo-packet** configuration command under the dhcp ipv6 mode. This command enables processing of incoming DHCPv6 packets greater than 1280 bytes and upto 12,800 bytes in size. Prior to this release, the router discarded incoming DHCPv6 packets greater than 1280 bytes. The newly introduced command is: • handle-jumbo-packet
Custom Prefix Length Selection	By default, /48 prefix length is inserted in the LEM memory. This feature allows you to choose a custom IPv6 prefix length to be inserted into the largest exact match (LEM) memory. This feature introduces the **hw-module fib scale ipv6 custom-lem** command.
L2VPN and Ethernet Services	

Control-word support for EVPN Bridge-Mode (E-LAN)	Control word is now supported and enabled by default in ELAN mode. If the **control-word-disable** command is not configured, ensure to configure it under EVPN or EVI configuration mode before an upgrade to avoid inconsistent behaviour with routers before this release.
	
	 ```Router# configure```
	```Router(config)# evpn```
	```Router(config-evpn)# evi 1```
	```Router(config-evpn-instance)# control-word-disable // Apply to interop with older releases EVPN ELAN```
	
	 If you want to enable **control-word** command for EVPN Bridging feature, then you must configure it only when both the endpoints run Release 7.4.1 or later.

PPPoE Traffic-Based Load Balance using Flow-Aware Transport Labels	This feature allows you to load balance the incoming PPPoE traffic received based on the inner PPPoE payload, source and destination IPv4 or IPv6 header. When you enable this feature, the router generates a unique Flow-Aware Transport (FAT) label for the incoming traffic based on inner IPv4 or IPv6 headers and uses the FAT labels for load balancing the PPPoE traffic. This feature introduces the **hw-module profile load-balance algorithm PPPoE** command.
Maximum MAC addresses on UNI port	This feature introduces MAC limit and MAC limit action on bridge port, which was earlier only available on bridge domain. This feature supports: • MAC limit of 1-64K • MAC limit action of flood and shutdown Thus, allowing you to limit the maximum number of clients connected to a bridge on a site.
VLAN list	VLANs separated by a comma are called VLAN lists. This feature allows you to configure a VLAN list on the L2 sub interface. VLAN-IDs of up to 9 are supported, per VLAN list. This feature overrides any limit set on the number of customers that can be supported in an Ethernet network.
L3VPN	

Feature	Description
Inter-AS Option B for L3VPN	This feature allows ISPs to provide MPLS Layer 3 VPN services to their end customers where the routing boundaries for a customer are spread across different geographical locations. Separate autonomous systems with autonomous system boundary routers (ASBRs) from different service providers can communicate by exchanging VPN-IPv4 addresses or IPv4 routes and MPLS labels. This feature provides better scalability as it requires only one BGP session to exchange all VPN prefixes between the ASBRs.
Multicast	
Support for Multicast Over IPV4 Unicast GRE Tunnels	This feature allows encapsulation of multicast packets using GRE tunnels, thereby enabling transport of multicast packets securely between source and destination routers located in different IP clouds.
Draft-Rosen Multicast VPN (Profile 0)	Rosen draft (profile 0) is a widely used MVPN model and uses GRE tunnels to securely transmit multicast traffic between the PE routers. It also enables ease of deployment by using the Protocol-Independent Multicast (PIM) protocol between edge routers (PE) and hosts (CE), and between PE routers that are running in VRF mode.
Designated Router Election Using StickyDR	With this feature, the router sends a PIM *hello* message with a special PIM DR priority value on a multi-access LAN. The router with this special DR priority value is always elected as the designated router. The traffic now flows in the same path even when a new router is added. This feature introduces the **sticky-dr** command.
Modular QoS	
Packets-Per-Second-Based Policer	Prior to this functionality, when configuring policers, the only available option for policer rates was bit-rate measured in units of bits per second (bps). With this release, you can configure policer rates in units of packets per second (pps) as well. pps-based policer is critical in fending off malicious attacks—when attackers target your specific resources with a vast amount of traffic that contain higher number of packets, but move at a slower packet rate. Protection from such attacks is possible because pps-based policers ensure that regardless of the packet size and rate, the policer only accepts a fixed number of packets per second. This functionality modifies the **police rate** command.
Network Synchronization	
GNSS support on NCS 560 routers	GNSS is now supported on the Cisco NCS 560 series routers.
Support for Frequency Synchronization on the Cisco N560-IMA-8Q/4L interface module	Based on the ITU-T G.8262 recommendations, precision frequency is enabled on timing devices to deliver frequency synchronization for bandwidth, frequency accuracy, holdover, and noise generation. This support allows for correct network operations when synchronous equipment is timed from either another synchronous equipment clock or a higher-quality clock.
PTP Profiles Support for N560-IMA-8Q	PTP Profiles support is now extended on the N560-IMA-8Q interface module.
Routing	

Feature	Description
Coexistence of BFD over bundle and BFD over logical bundle	This feature provides the benefits of both BOB and BLB. This feature enables you to configure both BFD over bundle (BOB) and BFD over logical bundle (BLB) over physical bundle interfaces and subinterfaces. BOB functionality allows you to detect failures in physical bundle interfaces. BLB functionality allows you to detect failures in the client protocols configured on the subinterfaces.
RIPv2	This feature enables RIP as the IGP of your network. RIP broadcasts UDP data packets to exchange routing information in networks that are flat rather than hierarchical, reducing network complexity and network management time.
Segment Routing	
Advertisement of Link Attributes for IS-IS Flexible Algorithm	Link attribute advertisements used during Flexible Algorithm path calculation must use the Application-Specific Link Attribute (ASLA) advertisements, as defined in IETF draft draft-ietf-lsr-flex-algo. This feature introduces support for ASLA advertisements during IS-IS Flexible Algorithm path calculation.
OSPF: Microloop Avoidance for Flexible Algorithm	This feature extends the current Microloop Avoidance functionality to support OSPF.
Path Invalidation Drop	By default, if an SR Policy becomes invalid (for example, if there is no valid candidate path available), traffic falls back to the native SR forwarding path. In some scenarios, a network operator may require that certain traffic be only carried over the path associated with an SR policy and never allow the native SR LSP to be used. This feature allows the SR policy to stay up in the control plane (to prevent prefixes mapped to the SR policy from falling back to the native SR LSP) but drop the traffic sent on the SR policy.
Per-Flow Automated Steering: L3 / L2 BGP Services + BSID Steering	This feature introduces support for BGP VPNv6 (6VPE) and BGP EVPN (single-home/multi-homed) over PFP, labeled traffic (Binding SID as top-most label in the stack) steering over per-flow policy (PFP). An ingress QoS policy applied to an input interface is used to classify flows and set corresponding MPLS experimental values.
SR ECMP-FEC Optimization L2 and L3 Recursive Services	This feature adds support for L2VPN service Label Edge Router (LER) and BGP PIC for Layer 3 BGP services when SR ECMP-FEC Optimization is enabled.
TE Metric Support for IS-IS Flex Algo	Flexible Algorithm allows for user-defined algorithms where the IGP computes paths based on a user-defined combination of metric type (path optimization objective) and constraint. This feature add support for TE metric as a metric type for IS-IS Flexible Algorithm. This allows the TE metric, along with IGP and delay metrics, to be used when running shortest path computations.
Unprotected Adjacency SIDs	By default, the SR-TE process prefers the protected Adj-SID of the link if one is available. If there is no protected Adj-SID available, the policy will come up with unprotected Adj-SID. This feature allows you to specify the Adj-SID protection behavior of the SR-TE process to prefer the protected or unprotected Adj-SID, or to use only the protected or unprotected Adj-SID.

Feature	Description
Link Anomaly Detection with IGP Penalty	This feature allows you to define thresholds above the measured delay that is considered "anomalous" or unusual. When this threshold is exceeded, an anomaly (A) bit/flag is set along with link delay attribute that is sent to clients.
System Management	
Smart License support on new interface modules, N560-IMA-2C-DD, N560-IMA-8Q, and A900-IMA-8Z	Smart Licensing support is now extended on the following interface modules: • N560-IMA-2C-DD • N560-IMA-8Q • A900-IMA-8Z
Smart Transport Support	You can now use Smart transport to communicate with CSSM. Smart transport is a transport method where a Smart Licensing (JSON) message is contained within an HTTPs message, and exchanged between a product instance and CSSM, to communicate. The following Smart transport configuration options are available: • Smart transport: In this method, a product instance uses a specific Smart transport licensing server URL. This must be configured exactly as shown in the workflow section. • Smart transport through an HTTPs proxy: In this method, a product instance uses a proxy server to communicate with the licensing server, and eventually, CSSM.
YANG Data Models for Smart Licensing	With this feature, you can use data models for all the smart licensing operations such as registering your device with a token, renewing token ID, deregistering device to remove the software entitlements and so on using NETCONF remote procedure calls (RPCs). The following data models are introduced: • Cisco-IOS-XR-smart-license-cfg.yang • Cisco-smart-license.yang • Cisco-IOS-XR-smartlicense-platform-oper.yang • Cisco-IOS-XR-infra-smartlicense-oper.yang • Cisco-IOS-XR-smart-license-act.yang You can access these data models from the Github repository.
Essential and Advantage smart licenses in a combined entitlement	With this release, the Advanced licenses are now referred to as the Advantage licenses, without essential entitlement. Also, a new license model – Advantage with Essentials, has been introduced that contains both Essential and Advantage licenses as a combined entitlement in a single PID. This simplifies the license procurement and management effort by eliminating the need to procure separate PIDs for Essential and Advantage licenses.
System Monitoring	
TWAMP Responder on IP VRF interface	TWAMP responder now supports VRF interfaces. Service providers can monitor and measure round-trip IP performance between any two devices and can check IP SLA compliance for both the core network and the customer network.

Feature	Description
System Security	
Admin Access for NETCONF and gRPC Sessions	This feature allows all authorized users on XR VM to access the admin data on the router through NETCONF or gRPC interface, like the CLI access. This functionality works by internally mapping the task group of the user on XR VM to a predefined group on System Admin VM. Therefore, the NETCONF and gRPC users can access the admin-related information on the router even if their user profiles do not exist on System Admin VM.

Prior to this release, only those users who were authorized on XR VM could access System Admin VM, and that too only through CLI, by using the admin command. Users who were not configured on System Admin VM were denied access through NETCONF or gRPC interface. |
| Hold-Down Timer for TACACS+ | TACACS+ servers provide AAA services to the user. In the event a TACACS+ server becomes unreachable, the router sends the client request to another server, leading to considerable delay in addressing the requests. To prevent this delay, you can set a hold-down timer on the router. The timer gets triggered after the router marks the TACACS+ server as down. During this period, the router does not select the server that is down for processing any client requests. When the timer expires, the router starts using that TACACS+ server for client transactions. This feature improves latency in providing AAA services to the user by limiting the client requests from being sent to unresponsive servers. This feature introduces the holddown-time command. |
| Support for Display Compact Option | This release introduces:

- Display compact option in the dossier CLI, thereby allowing you to obtain IMA event logs in the **protobuf** format, which can be decoded at a client site. This provides flexibility to use any decoding mechanism.

Use the `display compact` keyword with the existing `show platform security integrity dossier include system-integrity-snapshot` command. |

Behavior Change Introduced in This Release

Restrictions and Limitations on the Cisco NCS 560 Series Router

- 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.

- Unlabeled BGP PIC EDGE for global prefixes is not supported.

Caveats

This section describes open and resolved severity 1 and 2 caveats and select severity 3 caveats:

- The "Open Caveats" sections list open caveats that apply to the current release and may apply to previous releases. A caveat that is open for a prior release and is still unresolved applies to all future releases until it is resolved.

- The "Resolved Caveats" sections list caveats resolved in a specific release, but open in previous releases.

The bug IDs are sorted alphanumerically.

✎

Note The Caveats section includes the bug ID and a short description of the bug. For details on the symptoms, conditions, and workaround for a specific caveat you must use the Bug Search Tool.

Cisco IOS XR Caveats Release 7.4.1

Bug ID	Headline
CSCvy99157	Yang response of "show install active" showing non xr packages.
CSCvz05331	Traffic drops on the Cisco N560-IMA-8Q/4L interface module when multiple OIRs are performed. Traffic drops are followed by stateful switchover.
CSCvy68341	On the Cisco N560-IMA-8Q/4L interface module, during stateful switchover (SSO), the switch over from active RP to standby RP does not occur rarely.

Bug Search Tool

Use the Cisco Bug Search Tool to access open and resolved bugs for a release.

The tool allows you to search for a specific bug ID, or for all bugs specific to a product and a release.

Supported Packages and System Requirements

For more information on system upgrade and package installation process, see Perform System Upgrade and Install Feature Packages.

For a complete list of supported optics, hardware and ordering information, see the Cisco NCS 560 Series Routers Interface Modules Data Sheet and Cisco Network Convergence System 560-4 Router Data Sheet.

To install the Cisco NCS 560 Series Routers, see Cisco N560-RSP4 and Cisco N560-RSP4-E Route Processor Hardware Installation Guide and Cisco NCS 560-4 Router Hardware Installation Guide.

Release 7.4.1 Packages

This following table lists the supported packages and their corresponding file names.

Table 1: Release 7.4.1 Packages for Cisco NCS 560 Series Router

Composite Package		
Feature Set	**Filename**	**Description**
Cisco IOS XR IP Unicast Routing Core Bundle	ncs560-mini-x-7.4.1.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-2.0.0.0-r741.x86_64.rpm	Telemetry, Extensible Markup Language (XML), Parser, and HTTP server packages, NETCONF, YANG Models, gRPC.
Cisco IOS XR OSPF package	ncs560-ospf-2.0.0.0-r741.x86_64.rpm	Supports OSPF
Cisco IOS XR Security Package	ncs560-k9sec-2.0.0.0-r741.x86_64.rpm	Support for Encryption, Decryption, Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key infrastructure (PKI)
Multicast Package	ncs560-mcast-2.0.0.0-r741.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-2.0.0.0-r741.x86_64.rpm	Supports Intermediate System to Intermediate System (IS-IS).
Cisco IOS XR USB Boot Package	ncs560-usb_boot-7.4.1.zip	Supports Cisco IOS XR USB Boot Package

Composite Package		
Feature Set	**Filename**	**Description**
Cisco IOS XR MPLS Package	ncs560-mpls-1.0.0.0-r741.x86_64.rpm ncs560-mpls-te-rsvp-2.0.0.0-r741.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-r741.x86_64.rpm	Lawful Intercept
Cisco IOS XR EIGRP Package	ncs560-eigrp-1.0.0.0-r741.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:R3_PE3_RSP4#show version
Thu Aug  5 09:15:44.861 IST
Cisco IOS XR Software, Version 7.4.1
Copyright (c) 2013-2021 by Cisco Systems, Inc.

Build Information:
 Built By     : ingunawa
 Built On     : Wed Aug  4 04:33:20 PDT 2021
 Built Host   : iox-ucs-016
 Workspace    : /auto/srcarchive17/prod/7.4.1/ncs560/ws
 Version      : 7.4.1
 Location     : /opt/cisco/XR/packages/
 Label        : 7.4.1

cisco NCS-560 () processor
System uptime is 10 minutes
```

Determine Firmware Support

Log in to the router and enter the **show fpd package** and **show hw-module fpd** command.

```
RP/0/RP0/CPU0:R3_PE3_RSP4#show fpd package
Thu Aug  5 09:15:48.316 IST

=============================== =================================================
                                      Field Programmable Device Package
                                =================================================
                                             Req    SW      Min Req   Min Req
Card Type           FPD Description          Reload Ver     SW Ver    Board Ver
```

```
==================  ==========================  ======  =======  ========  =========
-------------------------------------------------------------------------------------
A900-IMA8CS1Z-CC    IMFPGA                        YES      1.98      1.98      0.0
-------------------------------------------------------------------------------------
A900-IMA8CS1Z-M     IMFPGA                        YES      1.98      1.98      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      1.49      1.49      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       1.23      1.23      0.0
-------------------------------------------------------------------------------------
A907-FAN-E          PSOC(A)                       NO       1.65      1.65      0.0
                    PSOC(A)                       NO       1.66      1.66      0.4
-------------------------------------------------------------------------------------
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-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-RSP4         ADM(A)                        NO       1.06      1.06      0.0
                    IOFPGA(A)                     YES      0.67      0.67      0.0
                    PRIMARY-BIOS(A)               YES      0.18      0.18      0.0
                    SATA(A)                       NO       2.10      2.10      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      0.18      0.18      0.0
                    SATA(A)                       NO       2.10      2.10      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      0.18      0.18      0.0
                    SATA(A)                       NO       2.10      2.10      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      0.18      0.18      0.0
                    SATA(A)                       NO       2.10      2.10      0.0
-------------------------------------------------------------------------------------
N560-FAN-H          PSOC(A)                       NO       2.02      2.02      0.0
-------------------------------------------------------------------------------------
N560-IMA-8Q/4L      IMFPGA                        YES      1.24      1.24      0.0
-------------------------------------------------------------------------------------
N560-IMA1W          CFP2-D-DCO                    NO      38.2739   38.2739    0.0
                    CFP2-DE-DCO                   NO      38.2739   38.2739    0.0
                    CFP2-DET-DCO                  NO      38.2739   38.2739    0.0
                    CFP2-DETS-DCO                 NO      38.2739   38.2739    0.0
                    CFP2-DS-DCO                   NO      38.2739   38.2739    0.0
                    CFP2-DS100-DCO                NO      38.2739   38.2739    0.0
                    IMFPGA                        YES      1.28      1.28      0.0
-------------------------------------------------------------------------------------
N560-IMA2C          IMFPGA                        YES      5.01      5.01      0.0
-------------------------------------------------------------------------------------
N560-IMA2C-CC       IMFPGA                        YES      5.01      5.01      0.0
```

```
--------------------------------------------------------------------------
N560-IMA2C-DD          IMFPGA                     YES   1.28    1.28      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   0.67    0.67      0.0
                       PRIMARY-BIOS(A)            YES   0.18    0.18      0.0
                       SATA(A)                    NO    2.10    2.10      0.0
--------------------------------------------------------------------------
N560-RSP4-E            ADM(A)                     NO    1.06    1.06      0.0
                       IOFPGA(A)                  YES   0.67    0.67      0.0
                       PRIMARY-BIOS(A)            YES   0.18    0.18      0.0
                       SATA(A)                    NO    2.10    2.10      0.0
--------------------------------------------------------------------------
NCS4200-1T16G-PS       IMFPGA                     YES   1.96    1.96      0.0
--------------------------------------------------------------------------
NCS4200-2H-PQ          IMFPGA                     YES   5.01    5.01      0.0
--------------------------------------------------------------------------
NCS4200-8T-PS          IMFPGA                     YES   17.05   17.05     0.0

RP/0/RP0/CPU0:R3_PE3_RSP4#show hw-module location all fpd
Thu Aug  5 09:15:52.336 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   1.98     1.98
0/1        A900-IMA8CS1Z-M      0.0  IMFPGA             CURRENT   1.98     1.98
0/2        A900-IMA8Z           0.0  IMFPGA             CURRENT   17.05    17.05
0/3        A900-IMA8CS1Z-M      0.0  IMFPGA             CURRENT   1.98     1.98
0/4        A900-IMA8Z-L         0.0  IMFPGA             CURRENT   1.49     1.49
0/5        A900-IMA8Z           0.0  IMFPGA             CURRENT   17.05    17.05
0/7        N560-IMA2C           0.0  IMFPGA             CURRENT   5.01     5.01
0/9        N560-IMA2C-DD        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   1.96     1.96
0/13       A900-IMA8CS1Z-M      0.0  IMFPGA             CURRENT   1.98     1.98
0/14       A900-IMA8CS1Z-M      0.0  IMFPGA             CURRENT   1.98     1.98
0/15       A900-IMA8CS1Z-M      0.0  IMFPGA             CURRENT   1.98     1.98
0/RP0      N560-RSP4-E          0.0  ADM                CURRENT   1.06     1.06
0/RP0      N560-RSP4-E          0.0  IOFPGA             CURRENT   0.67     0.67
0/RP0      N560-RSP4-E          0.0  PRIMARY-BIOS       CURRENT   0.18     0.18
0/RP0      N560-RSP4-E          0.0  SATA               CURRENT   2.10     2.10
0/RP1      N560-RSP4-E          0.0  ADM                CURRENT   1.06     1.06
0/RP1      N560-RSP4-E          0.0  IOFPGA             CURRENT   0.67     0.67
0/RP1      N560-RSP4-E          0.0  PRIMARY-BIOS       CURRENT   0.18     0.18
0/RP1      N560-RSP4-E          0.0  SATA               CURRENT   2.10     2.10
0/FT0      N560-FAN-H           1.0  PSOC               CURRENT   2.02     2.02
```

Other Important Information

Supported Transceiver Modules

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

Upgrading Cisco IOS XR Software

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

The upgrade document for Cisco NCS 560 router is available along with the software image in *NCS560_Upgrade_MOP_7.4.1.tar* file.

Use user-class Option 'xr-config' Instead Of 'exr-config' To Provision ZTP

In Cisco IOS XR Release 7.3.1 and earlier, the system accepts the device sending **user-class = "exr-config"**; however starting Cisco IOS XR Release 7.3.2 and later, you must use only **user-class = "xr-config"**.

In Cisco IOS XR Release 7.3.2 and later, use:

```
host cisco-rp0 {
   hardware ethernet e4:c7:22:be:10:ba;
   fixed-address 172.30.12.54;
   if exists user-class and option user-class = "iPXE" {
      filename = "http://172.30.0.22/boot.ipxe";
   } elsif exists user-class and option user-class = "xr-config" {
      filename = "http://172.30.0.22/scripts/cisco-rp0_ztp.sh";
   }
}
```

Additional References

Supported MIBs

The Cisco NCS 5500 MIB support list is also applicable to the Cisco NCS 560 Series Routers. For the list of supported MIBs, see the Cisco NCS5500 MIB Support List.

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