# Release Notes for Cisco NCS 540 Series Routers, Cisco IOS XR Release 7.2.2

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## Network Convergence System 540 Series Routers

**Note** *This software release has reached end-of-life status. For more information, see the* End-of-Life and End-of-Sale Notices.

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**Note** Cisco IOS XR Release 7.2.2 is an Extended Maintenance Release of Cisco IOS XR Release 7.2.1 for Cisco NCS 540 Series routers. For more details on the Cisco IOS XR release model and associated support, see Guidelines for Cisco IOS XR Software.

## What's New in Cisco IOS XR Release 7.2.2

| Feature | Description |
|---|---|
| **L2VPN and Ethernet Services** | |
| Support for Ethernet Data Plane Loopback | Ethernet Data Plane Loopback (EDPL) is supported on all L2 transport interfaces like, physical, bundle interfaces, and L2 sub-interfaces. The router supports both internal and external loopback. Applicable only to Cisco N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, and N540X-12Z16G-SYS-A/D routers. |

| Feature | Description |
|---|---|
| Support for Ethernet Local Management Interface (E-LMI) | The Provider Edge (PE) device uses E-LMI to communicate connectivity status (EVC status) and configuration parameters of Ethernet Services available on the UNI to the Customer Edge (CE) device. E-LMI defines the message formats and procedures for conveying the information from PE to CE, however it does not define the method by which the information is collected on the PE. Applicable only to Cisco N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, and N540X-12Z16G-SYS-A/D routers. |
| **Segment Routing** | |
| DHCPv6 Relay Agent Support on SRv6 | An IOS XR router can act as a DHCPv6 relay agent with a DHCPv6 server connected over an SRv6 network. A DHCP relay agent is a host that forwards DHCP packets between clients and servers that do not reside on a shared physical subnet. |
| SRv6 Flexible Algorithm for IS-IS | This feature allows operators to customize IGP shortest path computation according to their own needs. An operator can assign custom SR prefix-SIDs to realize forwarding beyond link-cost-based SPF. As a result, Flexible Algorithm provides a traffic engineered path automatically computed by the IGP to any destination reachable by the IGP. The SR architecture associates prefix-SIDs to an algorithm which defines how the path is computed. Flexible Algorithm allows for user-defined algorithms where the IGP computes paths based on a user-defined combination of metric type and constraint. |
| SRv6 OAM — SID Verification | This feature provides enhanced Operations, Administration, and Maintenance (OAM) in Segment Routing Networks with IPv6 Data plane (SRv6). Existing OAM mechanisms to ping and trace a remote IPv6 prefix, along the shortest path, continue to work without any modification in an SRv6 network. However, classic IPv6 OAM cannot be used to ping or trace a remote SRv6 SID function. This feature augments ping and traceroute operations to target remote SRv6 SIDs. An SRv6-enabled router now allocates a new SRv6 OAM SID known as END.OP (OAM Endpoint with Punt). |
| SRv6 Services: BGP Global IPv6 | This feature extends support of SRv6-based BGP services to include Internet (IPv6) services by implementing End.DT6 SRv6 functions at the PE node. |
| SRv6 Services: EVPN VPWS — All-Active Multi-Homing | This feature provides an ELINE (P2P) service with all-active multihoming capability over an SRv6 network. All-Active Multi-Homing enables an operator to connect a customer edge (CE) device to two or more provider edge (PE) devices to provide load balancing and redundant connectivity. With All-Active Multi-Homing, all the PEs can forward traffic to and from the multi-homed device. |
| SRv6 Services: IPv6 L3VPN | This feature provides support for IPv6 L3VPNs (VPNv6) over an SRv6 network SRv6-based L3VPN uses SRv6 Segment IDs (SIDs) for service segments instead of labels. SRv6-based L3VPN functionality interconnects multiple sites to resemble a private network service over public infrastructure. |

| Feature | Description |
|---|---|
| Segment Routing Performance Measurement for Link Delay and SR Policy Delay Using RFC 5357 (TWAMP Light) Encoding | This feature introduces support for Two-Way Active Measurement Protocol (TWAMP) Light (RFC 5357) for link delay and SR policy delay measurement. TWAMP Light adds two-way or round-trip measurement capabilities. Network performance data such as packet loss, delay and delay variation, and bandwidth utilization is a critical measure for Traffic Engineering (TE). This data provides service providers the characteristics of their networks for performance evaluation that is required to ensure the Service Level Agreements (SLAs). The performance measurement and delay variation feature allows you to measure those metrics and advertise them through IGP extensions as extended TE metrics. Applicable only to Cisco N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, and N540X-12Z16G-SYS-A/D routers. |
| **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. Applicable only to Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS routers. |
| **Network Synchronization** | |
| PTP over BVI | This feature allows PTP traffic to flow over a bridged virtual interface. |
| SyncE and PTP support over Breakout Ports | IEEE-1588 PTP telecom Profiles 8275.1 and 8275.2, and Frequency Synchronization support is now extended to breakout ports on Cisco NCS540-24Z8Q2C-SYS, N540-ACC-SYS, and N540X-ACC-SYS routers. |
| **L2VPN** | |
| VPLS over BGP LU with or without PIC over ISIS or OSPF SR | This feature enables VPLS across inter-AS through BGP LU while Segment Routing is enabled in the core. This feature functions independent of BGP PIC. This feature is supported on Cisco NCS 540 routers. |

# Behavior Change Introduced in this Release

Behavior change refers to any modification of an existing software feature, configuration, or a command. This release introduces following behavior change:

**Guidelines for Enabling FIPS**

You must follow these guidelines while enabling FIPS mode:

- You must configure the session with a FIPS-approved cryptographic algorithm. A session configured with non-approved cryptographic algorithm for FIPS (such as, MD5 and HMAC-MD5) does not work. This is applicable for OSPF, BGP, RSVP, ISIS, or any application using key chain with non-approved cryptographic algorithm, and only for FIPS mode (that is, when **crypto fips-mode** command is configured).

- If you are using any HMAC-SHA algorithm for a session, then you must ensure that the configured key-string has a minimum length of 14 characters. Otherwise, the session goes down. This is applicable only for FIPS mode.

- If you try to execute the telnet configuration on a system where the FIPS mode is already enabled, then the system rejects the telnet configuration.

- If telnet configuration already exists on the system, and if FIPS mode is enabled later, then the system rejects the telnet connection. But, it does not affect the telnet configuration as such.

- It is recommended to configure the **crypto fips-mode** command first, followed by the FIPS-related commands in a separate commit. The list of commands related to FIPS with non-approved cryptographic algorithms are:

  - **key chain** *key-chain-name* **key** *key-id* **cryptographic-algorithm MD5**

  - **key chain** *key-chain-name* **key** *key-id* **cryptographic-algorithm HMAC-MD5**

  - **router ospfv3 1 authentication ipsec spi 256 md5** *md5-value*

  - **router ospfv3 1 encryption ipsec spi 256 esp des** *des-value*

  - **router ospfv3 1 encryption ipsec spi 256 esp des** *des-value* **authentication md5** *md5-value*

  - **snmp-server user** *username usergroup-name* **v3 auth md5 priv des56**

  - **ssh server algorithms key-exchange diffie-hellman-group1-sha1**

  - **telnet vrf default ipv4 server max-servers** *server-limit*

**PSU Redundancy Lost Alarm**:

PSU redundancy lost alarms are generated when there is no proper input feed applied on any one of Power Modules (PMs) (PM0 or PM1). The alarms are also generated when the output for PM0 or PM1 is not proper.

The following alarms are raised for PSU redundancy lost event with a faulty PM0:

- Power Module Generic Fault

- Power Module Error

- Power Group Redundancy Lost

This is applicable to the following routers with fixed PSUs:

- N540-28Z4C-SYS-A/D

- N540X-16Z4G8Q2C-A/D

- N540-12Z20G-SYS-A/D

- N540X-12Z16G-SYS-A/D

- N540X-6Z18G-SYS-A/D

- N540X-8Z16G-SYS-A/D

- N540X-4Z14G2Q-A/D

# Restrictions and Limitations on the Cisco NCS 540 Series Router

- In the Cisco IOS XR Release 7.2.x, the Packet IO feature is not supported on bundle interfaces.

- The **show inventory** and the **show diagnostic** commands do not display the fan serial number.

- The interface ports 0/0/0/24 to 0/0/0/31 do not support 1G Copper SFPs on Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS variants. Also, these ports do not support Auto-Negotiation with 1GE optical SFPs and they cannot act as 1GE Synchronous Ethernet sources.

- The interface ports 0/0/0/20 to 0/0/0/27 do not support 1G Copper SFPs on Cisco N540X-16Z4G8Q2C-A and N540X-16Z4G8Q2C-D variants. Also, these ports do not support Auto-Negotiation with 1GE optical SFPs and they cannot act as 1GE Synchronous Ethernet sources.

- Remove the speed settings on the 1G Copper optics when 10M/100M is configured and replaced with 1G SFP optics.

- The **hw-module profile mfib statistics** command 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 7.2.2

There are no caveats for this release.

## 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 Cisco Network Convergence System 540 Medium Density Routers Data Sheet and Cisco Network Convergence System 540 Small Density Router Data Sheet.

To install the Cisco NCS 540 Series Routers, see Cisco NCS 540 Router Hardware Installation Guide.

# Release 7.2.2 Packages

The following tables list the supported packages and their corresponding file names.

- The first table lists the supported packages for Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS variants.

- The second table lists the supported packages for Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, and N540X-16Z4G8Q2C-A/D variants.

*Table 1: Release 7.2.2 Packages for Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS Variants*

| **Composite Package** | | |
|---|---|---|
| **Feature Set** | **Filename** | **Description** |
| Cisco IOS XR IP Unicast Routing Core Bundle | ncs540-mini-x-7.2.2.iso | Contains the following base image content: <br><br>• Host operating system <br><br>• System Admin boot image <br><br>• IOS XR boot image <br><br>• BGP packages |
| **Individually-Installable Optional Packages** | | |
| **Feature Set** | **Filename** | **Description** |
| Cisco IOS XR Manageability Package | ncs540-mgbl-1.0.0.0-r722.x86_64.rpm | Extensible Markup Language (XML) Parser, Telemetry, Netconf, gRPC and HTTP server packages. |
| Cisco IOS XR MPLS Package | ncs540-mpls-1.0.0.0-r722.x86_64.rpm <br><br>ncs540-mpls-te-rsvp-1.0.0.0-r722.x86_64.rpm | MPLS and MPLS Traffic Engineering (MPLS-TE) RPM. |
| Cisco IOS XR Security Package | ncs540-k9sec-1.0.0.0-r722.x86_64.rpm | Support for dot1x |
| Cisco IOS XR ISIS package | ncs540-isis-1.0.0.0-r722.x86_64.rpm | Support ISIS |
| Cisco IOS XR OSPF package | ncs540-ospf-1.0.0.0-r722.x86_64.rpm | Support OSPF |
| Lawful Intercept (LI) Package | ncs540-li-1.0.0.0-r722.x86_64.rpm | Includes LI software images |
| Multicast Package | ncs540-mcast-1.0.0.0-r722.x86_64.rpm | Support Multicast |
| USB Boot Package | ncs540-usb_boot-7.2.2.zip | Package required to perform USB Boot |
| Cisco IOS XR EIGRP Package | ncs540-eigrp-1.0.0.0-r722.x86_64.rpm | Includes EIGRP protocol support software. |

*Table 2: Release 7.2.2 Packages for Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, and N540X-16Z4G8Q2C-A/D Variants*

| Composite Package | | |
| --- | --- | --- |
| **Feature Set** | **Filename** | **Description** |
| Cisco IOS XR Bundle | ncs540l-x64-7.2.2.iso | Contains the following base image content:<br><br>• Host operating system<br><br>• System Admin boot image<br><br>• IOS XR boot image<br><br>The ISO image also includes the following optional packages:<br><br>• BGP<br><br>• IP SLA<br><br>• IS-IS<br><br>• LLDP<br><br>• Mcast<br><br>• MPLS-OAM<br><br>• ncs540l-mcast<br><br>• ncs540l-netflow<br><br>• Netflow<br><br>• OSPF<br><br>• Perfmgmt<br><br>• Track |
| **Individually Installable Optional Packages** | | |
| **Feature Set** | **Filename** | **Description** |
| USB Boot Package | ncs540l-usb_boot-7.2.2.zip | Package required to perform USB Boot |
| **Optional Packages** | | |
| Optional packages may be installed for CDP, EIGRP and Telnet, and are available in NCS540l-iosxr-7.2.2.tar file.<br><br>Optional package to install dot1x feature is available in NCS540l-k9sec-rpms.7.2.2.tar file. | | |

## Determine Software Version

Log in to the router and enter the **show version** command on the Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS variants:

```
RP/0/RP0/CPU0:ROUTER#show version

Thu Jan 28 22:49:38.856 IST
Cisco IOS XR Software, Version 7.2.2
Copyright (c) 2013-2021 by Cisco Systems, Inc.

Build Information:
Built By : ingunawa
Built On : Mon Jan 25 21:49:12 PST 2021
Built Host : iox-lnx-007
Workspace : /auto/srcarchive15/prod/7.2.2/ncs540/ws
Version : 7.2.2
Location : /opt/cisco/XR/packages/
Label : 7.2.2

cisco NCS-540 () processor
System uptime is 1 day 5 hours 46 minutes
```

Log in to the router and enter the show version command on the Cisco N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D and N540X-12Z16G-SYS-A/D variants:

```
RP/0/RP0/CPU0:ROUTER#show version

Thu Jan 28 22:51:00.616 IST
Cisco IOS XR Software, Version 7.2.2 LNT
Copyright (c) 2013-2021 by Cisco Systems, Inc.

Build Information:
Built By : ingunawa
Built On : Tue Jan 26 05:10:55 UTC 2021
Build Host : iox-lnx-008
Workspace : /auto/srcarchive15/prod/7.2.2/ncs540l/ws
Version : 7.2.2
Label : 7.2.2

cisco NCS540L (C3708 @ 1.70GHz)
System uptime is 1 day, 3 hours, 31 minutes
```

## Determine Firmware Support

Use the show command in EXEC mode to view the hardware components with their current FPD version and status. The status of the hardware must be CURRENT; Running and Programed version must be the same.

Log in to the router and enter the **show fpd package** and **show hw-module fpd** commands on the Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS variants:

```
RP/0/RP0/CPU0:ROUTER#show hw-module fpd

show hw-module fpd
Thu Jan 28 17:20:15.784 UTC+00:00
FPD Versions
===============
Location Card type HWver FPD device ATR Status Run Programd
--------------------------------------------------------------------------------
0/RP0 N540-ACC-SYS 1.0 Bootloader CURRENT 1.13 1.13
0/RP0 N540-ACC-SYS 1.0 CPU-IOFPGA CURRENT 0.07 0.07
```

```
0/RP0 N540-ACC-SYS 1.0 MB-IOFPGA CURRENT 0.22 0.22


RP/0/RP0/CPU0:ROUTER#show fpd package

Fri Jan 29 04:00:06.296 UTC+00:00


============================== ====================================================
Field Programmable Device Package
=================================================
Req SW Min Req Min Req
Card Type FPD Description Reload Ver SW Ver Board Ver
================== ========================= ====== ======= ======== =========
N540-24Z8Q2C-M Bootloader YES 1.13 1.13 0.0
CPU-IOFPGA YES 0.07 0.07 0.0
MB-IOFPGA YES 0.22 0.22 0.0
SATA NO 5.00 5.00 0.0
--------------------------------------------------------------------------------
N540-ACC-SYS Bootloader YES 1.13 1.13 0.0
CPU-IOFPGA YES 0.07 0.07 0.0
MB-IOFPGA YES 0.22 0.22 0.0
SATA NO 5.00 5.00 0.0
--------------------------------------------------------------------------------
N540-X-24Z8Q2C-M Bootloader YES 1.13 1.13 0.0
CPU-IOFPGA YES 0.07 0.07 0.0
MB-IOFPGA YES 0.22 0.22 0.0
SATA NO 5.00 5.00 0.0
--------------------------------------------------------------------------------
N540X-ACC-SYS Bootloader YES 1.13 1.13 0.0
CPU-IOFPGA YES 0.07 0.07 0.0
MB-IOFPGA YES 0.22 0.22 0.0
SATA NO 5.00 5.00 0.0
--------------------------------------------------------------------------------
```

Log in to the router and enter the **show fpd package** and **show hw-module fpd** commands on the Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D and N540X-16Z4G8Q2C-A/D variants:

```
RP/0/RP0/CPU0:ROUTER#show hw-module fpd

Thu Jan 28 22:51:33.879 IST

Auto-upgrade:Disabled
Attribute codes: B golden, P protect, S secure
FPD Versions
=================
Location Card type HWver FPD device ATR Status Running Programd Reload Loc
------------------------------------------------------------------------------------------------------
0/RP0/CPU0 N540-28Z4C-SYS-A 4.0 IoFpga CURRENT 2.03 2.03 0/RP0
0/RP0/CPU0 N540-28Z4C-SYS-A 4.0 IoFpgaGolden B NEED UPGD 1.31 0/RP0
0/RP0/CPU0 N540-28Z4C-SYS-A 4.0 Primary-BIOS S CURRENT 1.17 1.17 0/RP0
0/RP0/CPU0 N540-28Z4C-SYS-A 4.0 StdbyFpga S CURRENT 0.40 0.40 0/RP0
0/RP0/CPU0 N540-28Z4C-SYS-A 4.0 StdbyFpgaGolden BS NEED UPGD 0.37 0/RP0
0/RP0/CPU0 N540-28Z4C-SYS-A 4.0 TamFw S CURRENT 4.11 4.11 0/RP0
0/RP0/CPU0 N540-28Z4C-SYS-A 4.0 TamFwGolden BS CURRENT 4.11 0/RP0


RP/0/RP0/CPU0:ROUTER#show fpd package

Fri Jan 29 10:28:04.917 IST


============================== ====================================================
Field Programmable Device Package
=================================================
```

```
Req SW Min Req Min Req
Card Type FPD Description Reload Ver SW Ver Board Ver
================== ========================= ====== ======= ======== =========
-------------------------------------------------------------------------------
N540-12Z20G-SYS-A IoFpga YES 2.03 2.03 0.0
IoFpgaGolden YES 2.03 2.03 0.0
Primary-BIOS YES 1.17 1.17 0.0
StdbyFpga YES 0.40 0.40 0.0
StdbyFpgaGolden YES 0.40 0.40 0.0
TamFw YES 4.11 4.11 0.0
TamFwGolden YES 4.11 4.11 0.0
-------------------------------------------------------------------------------
N540-12Z20G-SYS-D IoFpga YES 2.03 2.03 0.0
IoFpgaGolden YES 2.03 2.03 0.0
Primary-BIOS YES 1.17 1.17 0.0
StdbyFpga YES 0.40 0.40 0.0
StdbyFpgaGolden YES 0.40 0.40 0.0
TamFw YES 4.11 4.11 0.0
TamFwGolden YES 4.11 4.11 0.0
-------------------------------------------------------------------------------
N540-28Z4C-SYS-A IoFpga YES 2.03 2.03 0.0
IoFpgaGolden YES 2.03 2.03 0.0
Primary-BIOS YES 1.17 1.17 0.0
StdbyFpga YES 0.40 0.40 0.0
StdbyFpgaGolden YES 0.40 0.40 0.0
TamFw YES 4.11 4.11 0.0
TamFwGolden YES 4.11 4.11 0.0
-------------------------------------------------------------------------------
N540-28Z4C-SYS-D IoFpga YES 2.03 2.03 0.0
IoFpgaGolden YES 2.03 2.03 0.0
Primary-BIOS YES 1.17 1.17 0.0
StdbyFpga YES 0.40 0.40 0.0
StdbyFpgaGolden YES 0.40 0.40 0.0
TamFw YES 4.11 4.11 0.0
TamFwGolden YES 4.11 4.11 0.0
-------------------------------------------------------------------------------
N540-FH-AGG-SYS DpFpga YES 0.08 0.08 0.0
IoFpga YES 1.15 1.15 0.0
IoFpgaGolden YES 1.07 1.07 0.0
Primary-BIOS YES 10.12 10.12 0.0
StdbyFpga YES 0.26 0.26 0.0
StdbyFpgaGolden YES 0.13 0.13 0.0
TamFw YES 6.04 6.04 0.0
TamFwGolden YES 5.03 5.03 0.0
-------------------------------------------------------------------------------
N540-FH-CSR-SYS DpFpga YES 0.12 0.12 0.0
IoFpga YES 1.15 1.15 0.0
IoFpgaGolden YES 1.07 1.07 0.0
Primary-BIOS YES 10.12 10.12 0.0
StdbyFpga YES 0.26 0.26 0.0
StdbyFpgaGolden YES 0.13 0.13 0.0
TamFw YES 6.04 6.04 0.0
TamFwGolden YES 5.03 5.03 0.0
-------------------------------------------------------------------------------
N540X-12Z16G-SYS-A IoFpga YES 2.03 2.03 0.0
IoFpgaGolden YES 2.03 2.03 0.0
Primary-BIOS YES 1.17 1.17 0.0
StdbyFpga YES 0.40 0.40 0.0
StdbyFpgaGolden YES 0.40 0.40 0.0
TamFw YES 4.11 4.11 0.0
TamFwGolden YES 4.11 4.11 0.0
-------------------------------------------------------------------------------
N540X-12Z16G-SYS-D IoFpga YES 2.03 2.03 0.0
IoFpgaGolden YES 2.03 2.03 0.0
```

```
Primary-BIOS YES 1.17 1.17 0.0
StdbyFpga YES 0.40 0.40 0.0
StdbyFpgaGolden YES 0.40 0.40 0.0
TamFw YES 4.11 4.11 0.0
TamFwGolden YES 4.11 4.11 0.0
--------------------------------------------------------------------------------
N540X-16Z4G8Q2C-A IoFpga YES 2.03 2.03 0.0
IoFpgaGolden YES 2.03 2.03 0.0
Primary-BIOS YES 1.17 1.17 0.0
StdbyFpga YES 0.40 0.40 0.0
StdbyFpgaGolden YES 0.40 0.40 0.0
TamFw YES 4.11 4.11 0.0
TamFwGolden YES 4.11 4.11 0.0
--------------------------------------------------------------------------------
N540X-16Z4G8Q2C-D IoFpga YES 2.03 2.03 0.0
IoFpgaGolden YES 2.03 2.03 0.0
Primary-BIOS YES 1.17 1.17 0.0
StdbyFpga YES 0.40 0.40 0.0
StdbyFpgaGolden YES 0.40 0.40 0.0
TamFw YES 4.11 4.11 0.0
TamFwGolden YES 4.11 4.11 0.0
```

# Other Important Information

MLDP LFA FRR feature is not supported.

## 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 NCS540 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.

The upgrade document for Cisco N540-24Z8Q2C-SYS, N540X-ACC-SYS, and N540-ACC-SYS variants is available along with the software image in NCS540-docs-7.2.2.tar file.

The upgrade document for Cisco N540-28Z4C-SYS-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, and N540X-16Z4G8Q2C-A/D variants is available along with the software image in NCS540l-docs-7.2.2.tar file.

# Additional References

## Supported MIBs

The Cisco NCS 5500 MIB support list is also applicable to the Cisco NCS 540 Series Routers. For the list of supported MIBs, see the Cisco NCS5500 MIB Support List.

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