



## **Release Notes for Cisco NCS 5500 Series Routers, Release 6.0.1**

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# Network Convergence System 5500 Series Routers



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**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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## Key Capabilities

### Flexible Packaging—Easy Routine Upgrades and Maintenance

Flexible packaging is an enhancement that modularizes and delivers the Cisco IOS XR operating system as RPM packages.

The base software is becoming leaner that contains only required mandatory packages. Other optional packages are separated out and made available as individually installable RPM packages. Users have the flexibility to select and install the services they want by choosing relevant RPMs. Redhat Package Manager (RPM) based delivery of packages enable easier and faster system updates.

Flexible packaging also supports automatic dependency management whereby, while the user is updating an RPM, the system identifies all relevant dependent packages and updates them. The system uses standard LINUX tools to manage dependency during upgrades.

For the detailed list of release specific feature set matrix (packages) and associated filenames, see ,

#### Limitation

- This release of Cisco IOS XR software does not provide 3rd-party and host package SMUs as part of automatic dependency management (install update and install upgrade commands). The 3rd party and host package SMUs must be installed separately, and in isolation from other installation procedures (installation of SMUs and RPMs in IOS XR or admin containers).
- This release of Cisco IOS XR software does not yet support asynchronous package upgrades.

### Data Models—Faster Programmatic and Standards-based Configuration

Data models are a programmatic and standards-based way of configuring and collecting operational data of a network device, replacing the process of manual configuration. Using Data models, Cisco IOS XR operating system supports the automating of configurations that belong to multiple routers across the network. Data models are written in a standard, industry-defined language, which can define a new configuration and state an existing configuration on a network.

Traditional CLI-based configurations, are proprietary, cumbersome, and highly text-based. Managing automated operations on a large network using CLIs is a challenge.

Cisco IOS XR supports the YANG data modeling language. YANG can be used with the Network Configuration Protocol (Netconf) or with gRPC (google-defined Remote Procedure Calls) to automate programmable network operations. Data models allow administrators to customize settings easily and automatically, without wasting time on manual configuration.

To get started with using data models, see the Obtain Data Models section in [Cisco IOS XR Programmability Configuration Guide for the NCS 5500 Series Router](#).

## Application Hosting—Efficient Leverage of Third-Party Tools

Application hosting gives administrators a platform for leveraging their own tools and utilities. Cisco IOS XR supports third-party off-the-shelf applications built using Linux tool chains. Users can run custom applications cross-compiled with the software development kit that Cisco provides. Application hosting is offered in two variants: Native and Container.

With networking rapidly moving to virtual environments, the need for a network operating system that supports operational agility and efficiency through seamless integration with existing tool chains became a key requirement for our customers.

Cisco IOS XR uses a 64-bit Linux-based operating system that simplifies the integration of applications, configuration management tools, and industry-standard zero touch provisioning mechanisms to meet the DevOps style workflows for service providers.

To access the SDK to build packages that use the Linux distribution offered by Cisco, and to host applications natively, see *Build RPMs for Native Application Hosting* section in the [Cisco IOS XR Application Hosting Configuration Guide](#).

## Telemetry—Push Towards Smarter Visibility

Streaming telemetry lets users direct data to a configured receiver for analysis and troubleshooting purposes in order to maintain the health of the network. This is achieved by leveraging the capabilities of machine-to-machine communication.

Traditionally, organizations used the pull model to collect data, where a client pulls data from network elements. This pull model, however, does not scale when there is more than one network management station in the network. These traditional techniques do not cater to all the underlying information of the router, and they require manual intervention.

Tuning a network based on real-time data is crucial for seamless operation of the network. Instead of a pull model, using a push model to continuously stream data out of the network enhances the operational performance and reduces the troubleshooting time. Data can be pushed out at intervals determined by the administrator, at a cadence as low as 10 seconds. Using sophisticated algorithms, a back-end server can then analyze data received from the Cisco IOS XR operating system. The data can be encoded in JavaScript Object Notation (JSON) or Google Protocol Buffers (GPB). This analysis enables back-end management systems to measure and even predict control-plane and data-plane trends.

A telemetry policy file is used to define the data to be generated and the cadence at which the data is to be streamed. To create a policy file and get started with streaming telemetry data, see the Create Policy File section in [Cisco IOS XR Telemetry Configuration Guide](#).

## Software Features Introduced in Release 6.0.1

- L2VPN—Layer 2 Virtual Private Network
- LLDP—Link Layer Discovery Protocol is a neighbor discovery protocol that is used for network devices to advertise information about themselves to other devices on the network.
- DHCP Relay Agents—The DHCPv4 and DHCPv6 relay agent is a host that forwards DHCP packets between clients and servers that do not reside on a shared physical subnet. Relay agent forwarding is distinct from the normal forwarding of an IP router where IP datagrams are switched between networks transparently.

- Data Models includes support for:
  - IOS-XR manageability interfaces to access the admin plane data.
  - External models through the Manageability Mapping Infrastructure (eMMI) infrastructure.
  - Open Config Data Models (OC MPLS, OC IF (3 sub models), OC BGP and RPL). In this release OC MPLS configuration is supported but Operational node support is not available in this release.
- Telemetry includes support for:
  - A cadence from 30s to 10s to stream telemetry data; thus improving the performance.
  - An improved GPB workflow where the need to generate the .map file is eliminated.
  - Whitelist entries in the policy files to explicitly specify a list of fields to include in the streamed output.
  - Additional options for transport and encoding to include key-value GPB encoding using GPB over TCP. These options are also extended to JSON encoder.

## Hardware Introduced in Release 6.0.1

In this release two new line cards and DC power supply are introduced for NCS 5500 Series Routers:

- NC55-24X100-SE—NCS 5500 24x100G Scale Base
- NC55-18H18F—NCS 5500 18X100G and 18X40GE Base Spare
- NC55-PWR-3KW-DC—NCS 5500 3KW DC power supply

In this release, support is added for the following optics:

- QSFP-100G-AOC10M
- QSFP-100G-PSM4-S
- QSFP-40G-SR4
- QSFP-40G-SR4-S
- QSFP-40G-CSR4
- QSFP-40G-SR-BD
- QSFP-40GE-LR4
- QSFP-40G-LR4
- QSFP-40G-LR4-S
- WSP-Q40GLR4L
- QSFP-4x10G-LR-S
- QSFP-40G-ER4

For more information, see [Hardware Installation Guide for Cisco NCS 5500 Series Routers](#)

## Release 6.0.1 Packages

This table lists the Cisco IOS XR Software feature set matrix (packages) with associated filenames.

**Table 1: Release 6.0.1 Packages for Cisco NCS 5500 Series Router**

Composite Package		
Feature Set	Filename	Description
Cisco IOS XR IP Unicast Routing Core Bundle	ncs5500-mini-x.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></ul>
Individually-Installable Optional Packages		
Feature Set	Filename	Description
Cisco IOS XR Manageability Package	ncs5500-mgbl-1.0.0.0-r601.x86_64.rpm	Extensible Markup Language (XML) Parser, Telemetry, Netconf, gRPC and HTTP server packages.
Cisco IOS XR MPLS Package	ncs5500-mpls-1.0.0.0-r601.x86_64.rpm ncs5500-mpls-te-rsvp-1.0.0.0-r601.x86_64.rpm	MPLS and MPLS Traffic Engineering (MPLS-TE) RPM.
Cisco IOS XR Security Package	ncs5500-k9sec-1.0.0.0-r601.x86_64.rpm	Support for Encryption, Decryption, Secure Shell (SSH), Secure Socket Layer (SSL), and Public-key infrastructure (PKI)

## Supported Hardware

For a complete list of hardware and [ordering information](#), see the [Cisco NCS 5500 Series Data Sheet](#)

Use the [Cisco Optics-to-Device Compatibility Matrix](#) tool to determine transceivers supported in Cisco hardware devices.

To install the Cisco NCS 5500 router, see [Hardware Installation Guide for Cisco NCS 5500 Series Routers](#).

## 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 6.0.1
Copyright (c) 2013-2016 by Cisco Systems, Inc.
```

```
Build Information:
  Built By      : <username>
  Built On     : Sat Apr 30 13:44:25 PDT 2016
```

```

Build Host   : iox-ucs-019
Workspace   : /auto/srcarchive11/production/6.0.1/ncs5500/workspace
Version     : 6.0.1
Location    : /opt/cisco/XR/packages/

```

```

cisco NCS-5500 () processor
System uptime is 5 hours, 57 minutes

```

## Caveats

There are no caveats in this release.

## Determine Firmware Support

Log in to the router and enter **show hw-module fpd** command in admin mode:

```

RP/0/RP0/CPU0:router(admin)# show hw-module fpd
Mon May  2  06:22:50.210 UTC

```

Location	Card type	HWver	FPD device	ATR Status	FPD Versions	
					Run	Programd
0/0	NC55-36X100G	0.205	Bootloader	CURRENT	1.17	1.17
0/0	NC55-36X100G	0.205	IOFPGA	CURRENT	0.12	0.12
0/1	NC55-36X100G	0.203	Bootloader	CURRENT	1.17	1.17
0/1	NC55-36X100G	0.203	IOFPGA	CURRENT	0.12	0.12
0/2	NC55-36X100G	0.203	Bootloader	CURRENT	1.17	1.17
0/2	NC55-36X100G	0.203	IOFPGA	CURRENT	0.12	0.12
0/3	NC55-36X100G	0.203	Bootloader	CURRENT	1.17	1.17
0/3	NC55-36X100G	0.203	IOFPGA	CURRENT	0.12	0.12
0/4	NC55-36X100G	0.108	Bootloader	CURRENT	1.17	1.17
0/4	NC55-36X100G	0.108	IOFPGA	CURRENT	0.12	0.12
0/5	NC55-24X100G-SE	0.402	Bootloader	CURRENT	1.09	1.09
0/5	NC55-24X100G-SE	0.402	IOFPGA	CURRENT	0.08	0.08
0/6	NC55-18H18F	0.1	Bootloader	CURRENT	1.09	1.09
0/6	NC55-18H18F	0.1	IOFPGA	CURRENT	0.19	0.19
0/RP0	NC55-RP	1.1	Bootloader	CURRENT	9.21	9.21
0/RP0	NC55-RP	1.1	IOFPGA	CURRENT	0.08	0.08
0/RP1	NC55-RP	1.1	Bootloader	CURRENT	9.21	9.21
0/RP1	NC55-RP	1.1	IOFPGA	CURRENT	0.08	0.08
0/FC0	NC55-5508-FC	0.305	Bootloader	CURRENT	1.65	1.65
0/FC0	NC55-5508-FC	0.305	IOFPGA	CURRENT	0.13	0.13
0/FC1	NC55-5508-FC	0.303	Bootloader	CURRENT	1.65	1.65
0/FC1	NC55-5508-FC	0.303	IOFPGA	CURRENT	0.13	0.13
0/FC2	NC55-5508-FC	0.305	Bootloader	CURRENT	1.65	1.65
0/FC2	NC55-5508-FC	0.305	IOFPGA	CURRENT	0.13	0.13
0/FC3	NC55-5508-FC	0.305	Bootloader	CURRENT	1.65	1.65
0/FC3	NC55-5508-FC	0.305	IOFPGA	CURRENT	0.13	0.13
0/FC4	NC55-5508-FC	0.305	Bootloader	CURRENT	1.65	1.65
0/FC4	NC55-5508-FC	0.305	IOFPGA	CURRENT	0.13	0.13
0/FC5	NC55-5508-FC	0.305	Bootloader	CURRENT	1.65	1.65
0/FC5	NC55-5508-FC	0.305	IOFPGA	CURRENT	0.13	0.13
0/SC0	NC55-SC	1.4	Bootloader	CURRENT	1.65	1.65
0/SC0	NC55-SC	1.4	IOFPGA	CURRENT	0.07	0.07
0/SC1	NC55-SC	1.4	Bootloader	CURRENT	1.65	1.65
0/SC1	NC55-SC	1.4	IOFPGA	CURRENT	0.07	0.07

The above show output lists the hardware components that are supported in current release with their status. The status of the hardware must be CURRENT; Running and Programd version must be similar.

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