

# NCS5700

## IOS-XR Release 26.1.1

### IOS-XR7 System Upgrade Procedure

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## Purpose, Scope and Audience

This document outlines the available methods for upgrading the Cisco NCS 5700 Series Network Convergence System Router to Release 26.1.1. The table below presents the supported compatibility matrix for this release.

**Table 1.** Compatibility Matrix

Platform	From	To
NCS5700	IOS-XR 7.11.2	IOS-XR 26.1.1
NCS5700	IOS-XR 7.11.21	IOS-XR 26.1.1
NCS5700	IOS-XR 24.1.2	IOS-XR 26.1.1
NCS5700	IOS-XR 24.2.2	IOS-XR 26.1.1
NCS5700	IOS-XR 24.2.21	IOS-XR 26.1.1
NCS5700	IOS-XR 24.3.20	IOS-XR 26.1.1
NCS5700	IOS-XR 24.3.2	IOS-XR 26.1.1
NCS5700	IOS-XR 24.4.2	IOS-XR 26.1.1
NCS5700	IOS-XR 25.1.1	IOS-XR 26.1.1
NCS5700	IOS-XR 25.1.2	IOS-XR 26.1.1
NCS5700	IOS-XR 25.2.1	IOS-XR 26.1.1
NCS5700	IOS-XR 25.2.2	IOS-XR 26.1.1
NCS5700	IOS-XR 25.3.1	IOS-XR 26.1.1
NCS5700	IOS-XR 25.4.1	IOS-XR 26.1.1
NCS5700	IOS-XR 25.4.2	IOS-XR 26.1.1

### Note:

- A direct, single-step upgrade from any release prior to 7.11.2 to 26.1.1 is not supported. You must first upgrade to the intermediate release 7.11.2 before proceeding with the upgrade to 26.1.1
- USB/PXE boot is an option for single-step install directly to 26.1.1
- For downgrades, please check show install upgrade-matrix running for all supported downgrades from IOS-XR 26.1.1 release. To downgrade to an unsupported version Eg: 7.5.2, please do USB/PXE boot.

Audience: This guide is for Cisco Systems Field Engineers and Network Operators.

## Bridge SMU / Mandatory RPMs

A bridge SMU is an SMU that is a prerequisite to an upgrade or downgrade to another Cisco IOS XR software release. Bridge SMUs are also referred to as mandatory upgrade or downgrade SMUs because they must be installed before an upgrade or downgrade.

Refer to [Cisco IOS XR General Information](#) for procedures for each upgrade or downgrade and for details of any mandatory bridge SMUs.

From Release	To Release	Bridge SMUs	Inclusion reason (if not default)	From Release	To Release	Target SMUs	Inclusion reason (if not default)
25.4.2	26.1.1			26.1.1	25.4.2		
25.4.1	26.1.1			26.1.1	25.4.1		
25.2.2	26.1.1			26.1.1	25.2.2		
25.3.1	26.1.1			26.1.1	25.3.1		
25.2.1	26.1.1			26.1.1	25.2.1		
25.1.2	26.1.1			26.1.1	25.1.2		
25.1.1	26.1.1			26.1.1	25.1.1		
24.4.2	26.1.1			26.1.1	24.4.2		
24.3.20	26.1.1			26.1.1	24.3.20		
24.3.2	26.1.1	CSCwm77418		26.1.1	24.3.2	CSCwm77418	
24.2.21	26.1.1			26.1.1	24.2.21		
24.2.2	26.1.1	CSCwm77418		26.1.1	24.2.2	CSCwm77418	
24.1.2	26.1.1	CSCwm77418		26.1.1	24.1.2	CSCwm77418	
7.11.21	26.1.1	CSCwm77418		26.1.1	7.11.21	CSCwm77418	
7.11.2	26.1.1	CSCwm77418		26.1.1	7.11.2	CSCwm77418	

## Required Package Files

**Table 2.** Package Files

Description	Package Name	Details
<b>Bootable ISO Image</b>	ncs5700-x64-26.1.1.iso	Contains all mandatory packages. Download from <a href="#">Cisco Software Download</a> portal.
<b>Optional RPMs</b>	ncs5700-x64-optional-rpms.26.1.1.tar	Contains Optional RPMs. Download from <a href="#">Cisco Software Download</a> portal.
<b>Optional RPMs with K9sec</b>	ncs5700-x64-k9sec-rpms.26.1.1.tar	Contains Optional K9sec package. Download from <a href="#">Cisco Software Download</a> portal.
<b>USB Boot image</b>	ncs5700-x64-usb-26.1.1.zip	Contains USB Bootable packages. Download from <a href="#">Cisco Software Download</a> portal.

Description	Package Name	Details
<b>Golden ISO Image</b>	Golden ISO (GISO) is a customized ISO	Refer Configuration Guide - System Setup and Software Installation Guide for Cisco NCS 5500 Series Routers. Chapter: Customize Installation using Golden ISO

## Pre-upgrade Tasks

This includes tasks and health checks that can be performed outside of the standard upgrade MOP to verify abnormal hardware behavior and validate system parameters relevant to upgrade success.

## Configuration Backup

Copy the running-configuration to a harddisk: on the router and to a remote scp server.

```
RP/0/RP0/CPU0# copy running-config harddisk:/running_config-<mmddyyyy>
RP/0/RP0/CPU0:ios#scp harddisk:/ running_config-<mmddyyyy> user@<ip-address>:<location>
```

## Check for config inconsistency

Check for any inconsistencies in the configuration before upgrade using '*show configuration failed startup*'. If there are any errors, clear them using '*clear configuration inconsistency*'

## Check for available disk space

Check the space available in the install repository; at least 2GB of free space in /harddisk: is required to perform system upgrade. Use "*show media*" to check the space availability.

TIP: Remove old or large size files to free disk space:

- delete harddisk:\*core\*
- delete harddisk:/showtech/\*
- delete harddisk:<old iso files if any>

## Check FPD auto-upgrade

Enable auto FPD auto upgrade from XR and Sysadmin.

```
RP/0/RP0/CPU0:ios(config)#fpd auto-upgrade enable
RP/0/RP0/CPU0:ios(config)#commit
```

## System stability check

The following commands should be executed at the XR prompt to verify basic system stability before the upgrade.

CLI	Description
<a href="#">show platform</a>	Verify that all nodes are in "IOS XR RUN/OPERATIONAL" state
<a href="#">show redundancy</a>	Verify that a Standby RP is available, and the system is in "NSR-ready" state
<a href="#">show ipv4 interface brief &lt;or&gt;</a> <a href="#">show ipv6 interface brief &lt;or&gt;</a> <a href="#">show interface summary</a>	Verify that all necessary interfaces are "UP"
<a href="#">show install active</a>	Verify that the proper set of packages are active
<a href="#">show install committed</a>	Verify that the proper set of committed packages are same as active. If not, execute 'install commit'
<a href="#">show hw-module fpd</a>	Ensure all the FPD versions status are CURRENT
<a href="#">show alarms brief system active</a>	Shows any outstanding active alarms in system
<a href="#">show environment all</a>	Shows temperature, Fan, Voltage, Power status
<a href="#">show media location all</a>	Shows the disk usage in XR and admin state
<a href="#">show inventory</a>	Shows chassis inventory information
<a href="#">show logging</a>	Capture show logging to check for any errors
<a href="#">show watchdog memory-state location all</a>	Monitors watchdog memory status
<a href="#">show health gsp</a>	GSP health check
<a href="#">show health sysdb</a>	Sysdb health check

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## Node Isolation

Once the sanity check is done, it's recommended to drain/isolate the router. This can be achieved using regular routing techniques (ISIS overload bit, OSPF max metric, MPLS traffic engineering, BGP attributes, etc.).

## Software Upgrade

Available Boot Methods for Install/Upgrade:

1. Install Replace with Golden ISO (Recommended)  
Use a pre-built Golden ISO image to perform a fresh installation or replacement of the existing system. Recommended method if the router with a running pre-26.1.1 image is in a stable state, and the intention is to upgrade without losing the existing configuration
2. Install replace using ISO + Optional RPMs  
Start with a standard ISO image for installation, with the option to include additional RPM packages as needed.
3. Network Boot using USB (ISO or Golden ISO)  
Initiate a network boot from a USB device containing either a standard ISO or a Golden ISO image.
4. Network Boot using iPXE (ISO or Golden ISO)  
Leverage iPXE to perform a network boot with either a standard ISO or a Golden ISO image.

### Method 1: Upgrade using the Golden ISO (GISO)

Users have the option to create a custom Golden ISO (GISO) by utilizing the gisobuild.py script perform the upgrade with the single command 'install replace <giso>'. For detailed instructions, please refer to the "Customize Installation using Golden ISO" chapter in the **Configuration Guide of Release 26.1.1 - System Setup and Software Installation Guide for Cisco NCS 5700 Series Routers**.

Alternatively, you may contact the Cisco Technical Assistance Centre (TAC) to request a Golden ISO (GISO) that includes the specific optional RPMs you require.

#### GISO on External Server (Recommended)

Upgrade the system to replace the current software with the GISO image available on external server.

Pre-requisite: Refer Appendix section for Managing External server/repo reachability.

Example for http:

```
RP/0/RP0/CPU0:ios#install replace http://<httpserver-ip>/<PATH OF IMAGE>/ncs5700-goldenk9-x64-26.1.1.iso commit noprompt
```

Example for ftp:

```
RP/0/RP0/CPU0:ios#install replace ftp://<ftpserver-ip>/<PATH OF IMAGE>/ncs5700-goldenk9-x64-26.1.1.iso commit noprompt
```



## GISO on Router harddisk

Download/Copy the ISO (or GISO) image to the harddisk: location on the router. Verify the md5 checksum of the copied file with the original MD5 values on CCO

Upgrade the system to replace the current software with the GISO image available on the /harddisk: of the router

```
Step1: RP/0/RP0/CPU0:ios#scp <user>@<ip-address>:<directory>/ncs5700-goldenk9-x64-26.1.1.iso harddisk:
```

```
Step2: RP/0/RP0/CPU0:ios#show md5 file /harddisk:/ncs5700-goldenk9-x64-26.1.1.iso
```

```
Step3: RP/0/RP0/CPU0:ios#install replace harddisk:/ncs5700-goldenk9-x64-26.1.1.iso commit noprompt
```

Full local path to ISO - must be in or under /var/xr/disk1/, /harddisk:/, or /misc/disk1/

## Method 2: Upgrade using the ISO and optional RPMs

This method requires the user to follow a two-step process: first, installing the ISO, and then installing any optional RPMs to complete the upgrade.

### Install the ISO Package

Upgrade the system to replace the current software with the ISO image available on external server.

Pre-requisite: Refer Appendix section for Managing External server/repo reachability.

Example for http:

```
RP/0/RP0/CPU0:ios#install replace http://<httpserver-ip>/<PATH OF IMAGE>/ncs5700-x64-26.1.1.iso commit noprompt
```

Example for ftp:

```
RP/0/RP0/CPU0:ios#install replace ftp://<ftpserver-ip>/<PATH OF IMAGE>/ncs5700-x64-26.1.1.iso commit noprompt
```

Or

Copy the ISO file to router harddisk:/

```
Step1: RP/0/RP0/CPU0:ios#scp <user>@<ip-address>:<directory>/ncs5700-x64-26.1.1.iso harddisk:
```

```
Step2: RP/0/RP0/CPU0:ios#show md5 file /harddisk:/ncs5700-x64-26.1.1.iso
```

```
Step3: RP/0/RP0/CPU0:ios#install replace harddisk:/ncs5700-x64-26.1.1.iso commit noprompt
```

Full local path to ISO - must be in or under /var/xr/disk1/, /harddisk:/, or /misc/disk1/

### Install Optional RPMs (packages)

- Copy the required RPMs in a repository and make sure the repository and server are reachable from the router.
- Repository can be hosted locally on the router or on a remote server which is reachable over http/https/ftp

#### Creating a local repository:

1. Create a directory under the /harddisk:/, say "new\_repo"
2. Copy the rpm .tgz/.tar file on the router under this "new\_repo" directory
3. Unzip and untar all the .tgz/.tar file: "tar -xvzf <rpm tar ball>"
4. Convert the dir into repository by running 'createrepo\_c </repo-dir-path/>' on router linux prompt
5. Configure the local repository on XR, as per below example

```
Sample config of local repository:
RP/0/RP0/CPU0:iso#show run install install
repository new-repo
url file:///misc/disk1/new_repo
!
```

#### Creating a remote repository:

1. Identify a remote linux server which is reachable over http/https/ftp from router
2. Create a directory, say 'repo' under the http root dir(ideally '/var/www/html/') on the remote server
3. Copy the rpm .tgz/.tar file to the remote server inside the 'repo' directory
4. Unzip and untar all the .tgz/.tar file: "tar -xvzf <rpm tar ball>"
5. Convert the dir into repository by running 'createrepo --database </repo-dir-path/>' on remote server
6. Configure the remote repository on XR, as per below example.

```
Sample config of remote repository:
RP/0/RP0/CPU0:ios#show run install install
repository new_repo
url http://192.168.1.20/new\_repo
!
```

- Check 'show install available' to make sure the RPMs are available to install.

```
RP/0/RP0/CPU0:ios#show install available
Trying to access repositories...
```

Package Cached	Architecture	Version Repository
-----	-----	-----
xr-cdp	x86_64	26.1.1v1.0.0-1 new_repo
xr-telnet	x86_64	26.1.1v1.0.0-1 new_repo
xr-healthcheck	x86_64	26.1.1v1.0.0-1 new_repo
xr-k9sec	x86_64	26.1.1v1.0.0-1 new_repo

- Install optional rpm packages as shown below:

```
RP/0/RP0/CPU0:ios#install package add xr-cdp xr-telnet
```

Note : Do not use 'install package upgrade', it is used when installing packages of different versions/smu fixes.

- Install smu rpm packages as shown below:

```
RP/0/RP0/CPU0:ios#install package upgrade xr-syslog
```

- Once this operation is completed, execute the command below:

```
RP/0/RP0/CPU0:ios#install apply reload
```

- After reloading, once the device is up with latest image, perform the install commit:

```
RP/0/RP0/CPU0:ios#install commit
```

---

## Method 3: Upgrading the router using USB or PXE

### USB re-image of the router:

Please refer to the section “Boot the Router Using USB Drive” in the following URL:

<https://www.cisco.com/c/en/us/td/docs/iosxr/ncs5500/system-setup/25xx/configuration/guide/b-system-setup-cg-ncs5500-25xx/m-ncs5700-system-setup.html>

### PXE re-image of the router:

Please refer to the section “Boot the Router Using Manual iPXE” in the following URL:

<https://www.cisco.com/c/en/us/td/docs/iosxr/ncs5500/system-setup/25xx/configuration/guide/b-system-setup-cg-ncs5500-25xx/m-ncs5700-system-setup.html>

**Note:** iPXE/USB will wipe out all the data/config from the router. Please backup any required configuration or files before proceeding with the upgrade. Refer to section ‘Pre-Upgrade Task à Configuration backup’ for steps to perform this.

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## Post-Upgrade Tasks

### Health Check

Execute and verify the health check commands mentioned in “System stability check” section of **Pre-upgrade Tasks**

### Check for config inconsistency

Check for any inconsistencies in the configuration before upgrade using ‘*show configuration failed startup*’. If there are any errors, clear them using ‘*clear configuration inconsistency*’

### Check/fix the configuration file system

```
RP/0/RP0/CPU0:ios#cfs check
```

### Check the FPD versions

```
RP/0/RP0/CPU0:ios#show hw-module location all fpd
```

**Note:** IOS-XR 26.1.1 supports auto-fpd upgrade by default. All FPDs should show the status as "CURRENT" in "show hw-module location all fpd" after upgrade.

If ‘*show hw-module fpd*’ shows FPD status as ‘CURRENT’ state, please skip the manual FPD upgrade procedure.

### Manual FPD Upgrade:

If ‘*fpd auto-upgrade*’ was disabled before upgrade and ‘*show hw-module fpd*’ shows any FPDs in ‘NEED UPGD’ state, then the following procedure can be used to manually upgrade all the FPDs.

**Note:** Some of the FPDs like Timing, Power modules do not participate in upgrade all fpd command, they need to be upgraded separately using explicit command.

```
RP/0/RP0/CPU0:ios# upgrade hw-module location pm-all fpd all
```

Once all FPDs have been upgraded, check the output of “*show hw-module fpd*”. If any FPD status is listed as RLOAD\_REQ, reload the router or Linecard:

```
RP/0/RP0/CPU0:ios#reload location all
```

```
Proceed with reload? [confirm]
```

After router reload, all the FPDs should be up-to-date and FPD 'Status' should display ‘CURRENT’

---

## Downgrade/Rollback to previous IOS-XR version

There are few options to choose from to downgrade IOS XR version.

**Note:** If FPD upgrade was done as part of 26.1.1 installation, FPDs do not need to be updated again once the previously published image is activated.

**Option 1:** Using install replace method as described in **Software Upgrade - Method 1: Upgrade using the Golden ISO (GiSO)** with downgrade version iso file.

**Option 2:** For USB and iPXE, please refer **Software Upgrade - Method 3: Upgrading the router using USB or PXE** with downgrade version packages.

**Note:** iPXE/USB will wipe out all the data/config from the router. Please backup any required configuration or files before proceeding with the upgrade. Refer to section 'Pre-Upgrade Task "Configuration backup"' for steps to perform this.

## Caveats

The caveats listed below may be summaries only. Please review release note enclosure (RNE) for each DDTS for complete details (Including known workarounds and/or actions to take).

DDTS	Description

## Appendix

### Managing External server/repo reachability:

Install replace using external server (http/sftp) or installing rpm/smu via external/remote repo requires connectivity from router Linux NW stack to external server, since the install infra uses 'curl' Linux utility to access it.

- If the connectivity to external server is via an In-band data port ethernet interface:
  - a. Please verify that external server can reach the router's lowest-numbered loopback interface (Ex:Loopback0), since the Linux networking uses loopback as source interface. Ping should work from external server to router's lowest-numbered loopback interface IP address.

Alternatively, from router bash prompt, please verify the ping to external server is working.

```
RP/0/RP0/CPU0:Router#bash
```

```
[Router:~]$ping <server-ip>
```

Ping should be working to external server from router's bash prompt.

- b. If connectivity is instead needed to an external server that cannot route to the lowest-numbered loopback interface of router, then user must manually add a new route to Linux with source ip which will help in connectivity.

```
RP/0/RP0/CPU0:Router#bash
```

```
[Router:~]$ ip route add <server-ip/mask> dev to_xr scope link src <source-ip>
```

```
[Router:~]$ping <server-ip>
```

Ping should be working to external server from router's bash prompt.

- If the connectivity to external server is via the Management interface: User should add a static route on bash routing table to reach external server via Mgmt. interface, since by default Linux networking will be using router's lowest-numbered loopback interface as source and static route from XR will not be imported into bash.

CLI to add static route:

```
RP/0/RP0/CPU0:Router#bash
```

```
[Router:~]$ ip route add <server-ip/mask> via <Mgmt. gateway IP> dev Mg0_RP0_CPU0_0
```

Verify ping after adding static route:

```
RP/0/RP0/CPU0:Router#bash [Router:~]$ping <server-ip>
```

Ping should be working to external server from router's bash prompt.

**Americas Headquarters**  
Cisco Systems, Inc.  
San Jose, CA

**Asia Pacific Headquarters**  
Cisco Systems (USA) Pte. Ltd.  
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