Install Cisco IOS XR7 on NCS 5700 Series Routers

This section describes the concepts and procedures for upgrading or downgrading your system, installing optional packages, and obtaining bug fixes for the Cisco NCS 5700 series routers.

Cisco NCS 5700 series routers use the Cisco IOS XR7 framework. This framework refers to a set of architectural enhancements to the Cisco IOS XR software around the capabilities of modularity, simplified platform infrastructure, and programmability at various software layers.

The Cisco IOS XR software is composed of a base image (ISO) that provides the XR infrastructure, and a TAR file. The TAR file is made up of a set of packages (also called RPMs). These packages comprise mandatory and optional RPMs that can be deployed based on specific requirements. This software modularity approach provides a flexible consumption model that allows you to install a subset of IOS XR packages on devices based on your individual requirements. All critical components are modularized as packages so that you can select the features that you want to run on your router. For example, components like CDP and Telnet are modularized as packages and separated from the base image. These packages can be individually installed, upgraded or removed based on your requirements.

Cisco IOS XR7 install is Dandified Yum- or DNF-based software package manager that is used to install, update, and remove packages on the RPM-based Linux distributions. The package manager is used to automatically compute dependencies and determine the actions required to install packages.

Note For information on how to download the system upgrade procedures document, see the *About Cisco IOS XR Software Upgrade and Downgrade Guide*.

The following NCS 5700 line card variants support XR7 in Cisco IOS XR Release 7.3.1:

- NCS57B1-6D24
- NCS57B1-5DSE

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Software Deliverables and Terminologies

This section provides an understanding of the terms that are associated with installing the software.

- **Package:** A package, also known as an RPM, contains the software and metadata. A package is in `.rpm` format. A package can be mandatory or optional. Mandatory packages are part of the install image and cannot be removed. Optional packages are not required for the software to work, but can be installed to provide additional functionalities, and can be installed or removed based on requirement.
- **ISO image:** A bootable image that contains the installable files of the base operating system (OS). The image contains the IOS XR (XR7) infrastructure for fixed and distributed platforms in the form of base ISO image, mandatory RPMs. An ISO image is in `.iso` format.
- **Golden ISO (GISO):** A customizable ISO image that is built to contain preferable packages to suit diverse installation requirements. GISO can be customized to include a standard base image with the basic functional components, additional RPMs, bug fixes, and configuration files based on your requirement. GISO can also include a custom image label which can be seen using the **show version** command. From IOS XR Release 7.5.x and later, you can build your GISO image without support from Cisco. For more information, see Golden ISO images.
- **Source:** A location where packages can be installed from. The source can be a repository, local directory or a local tar file.
- **Repository:** A directory of RPMs and their metadata that a package manager uses to query the packages.
- **Active package:** A package whose software is currently running on the system.
- **Committed package:** A package that is committed and remains active following a system reload.
- **Atomic Change:** Every packaging operation is contained within an atomic change. Atomic changes may contain multiple packaging operations. During an atomic change, any changes to install IOS XR software will not be visible to the system. To make the changes visible to the system, the atomic change must be applied.
- **Top-level package:** Each block of software has a top-level package and various partition-level packages. The top-level package can be installed or upgraded directly, whereas the partition-level packages cannot be changed directly. The partition-level packages are installed or upgraded automatically as dependencies of the top-level package. The top-level package has the name format `xr-<feature>-<release>.x86_64.rpm`, whereas the dependent partition-level packages have the longer name format containing information about the partition. You can also use the standard RPM commands to check the summary or description metadata of the package, which will identify whether it is a top-level or a partition-level package.
- **Package manager:** An entity that handles the semantics to resolve dependencies in packaging operations.
- **Packaging operations:** The actions performed to change the packages that are installed on the system. The semantics are inherited from the underlying package manager. Examples of packaging operations are upgrade, downgrade, replace, add, or remove packages.
- **Synchronous action:** Synchronous action requests are supported for install actions using CLI command. Specify `synchronous` keyword in the install commands, and the prompt will only be returned when either the request has completed, `Ctrl + C` keys are pressed or a reload occurs. Pressing `Ctrl + C` keys during a synchronous action request will return the prompt to the user but will not halt the install operation. During the synchronous action request, the user is updated with the status of the request whenever it changes.
- **Transaction:** All atomic changes occur within a transaction. If the system reloads during an install transaction, the running software will be reverted to its previous state before the transaction was started. To maintain the software changes carried out during a transaction, you must commit the transaction.

- A complete install operation to modify the system's software requires three phases:
  - Packaging operation
  - **Apply:** This is required to complete an atomic change and make the software change visible to the system.
  - **Commit:** This is required to end a transaction and ensure that all software changes will still be present on router reload.

Note If you perform a manual or automatic system reload without completing the transaction with the **install commit** command, the action will revert the system to the point before the install transaction commenced, including any configuration changes. Only the log is preserved for debugging.

This action clears all configuration rollback points available. You will not be able to rollback to, or view, any commits made until the install rollback event. Any new commits made after the install rollback event will start from commit ID '1000000001'.

Supported Packages

The base image is contained within an `ISO` file. Additional optional packages (RPMs) are provided as modular software deliverables to align with diverse use cases and their deployments across the network.

- ISO image containing the base install image - `ncs540l-x64-7.0.1.iso`
- Tar file containing optional RPMs - `NCS540l-iosxr-7.0.1.tar`
- ZIP file for USB boot - `ncs540l-usb_boot-7.0.1.zip`

The software deliverables can be downloaded from Cisco Software Download center.

Note All Cisco IOS XR images are signed to ensure the authenticity of the software.

Optional Package	Included in ISO by Default
ncs5500-netflow	Yes
ncs5500-mcast	Yes
BGP	Yes
CDP	No
EIGRP	No
IPSLA	Yes

Optional Package	Included in ISO by Default
IS-IS	Yes
LLDP	Yes
MCAST	Yes
MPLS-OAM	Yes
Netflow	Yes
OSPF	Yes
Perfmgmt	Yes
RIP	No
Telnet	No
Track	Yes

Note Packages that are not included in the base ISO by default must be either added into a golden ISO, or installed separately.

SSH is part of the ISO image.

Install operation over IPv6 is not supported.