



# Upgrading or Downgrading the Cisco Nexus 9000 Series NX-OS Software

---

This chapter describes how to upgrade or downgrade the Cisco NX-OS software. It contains the following sections:

- [About the Software Image, on page 1](#)
- [Prerequisites for Upgrading the Cisco NX-OS Software, on page 2](#)
- [Prerequisites for Downgrading the Cisco NX-OS Software, on page 2](#)
- [Cisco NX-OS Software Upgrade Guidelines, on page 3](#)
- [Cisco NX-OS Software Downgrade Guidelines, on page 3](#)
- [Upgrading the Cisco NX-OS Software, on page 4](#)
- [Upgrade Process for vPCs, on page 7](#)
- [Downgrading to an Earlier Software Release, on page 8](#)

## About the Software Image

Each device is shipped with the Cisco NX-OS software. The Cisco NX-OS software consists of one NXOS software image (for example, n9000-dk9.6.1.2.I2.1.bin). Only this image is required to load the Cisco NX-OS operating system. This image runs on all Cisco Nexus 9000 Series switches and the Cisco Nexus 3164Q switch starting with Cisco NX-OS Release 6.1(2)I2(2a).



---

**Note** Another type of binary file is the software maintenance upgrade (SMU) package file. SMUs contain fixes for specific defects. They are created to respond to immediate issues and do not include new features. SMU package files are available for download from [Cisco.com](#) and generally include the ID number of the resolved defect in the filename (for example, n9000-dk9.6.1.2.I2.1.CSCab00001.gbin). For more information on SMUs, see the [Cisco Nexus 9000 Series NX-OS System Management Configuration Guide](#).

---



---

**Note** Cisco also provides electronic programmable logic device (EPLD) image upgrades to enhance hardware functionality or to resolve known hardware issues. The EPLD image upgrades are independent from the Cisco NX-OS software upgrades. For more information on EPLD images and the upgrade process, see the [Cisco Nexus 9000 Series FPGA/EPLD Upgrade Release Notes](#).

---

## Prerequisites for Upgrading the Cisco NX-OS Software

Upgrading the Cisco NX-OS software has the following prerequisites:

- For ISSU compatibility for all releases, see the [Cisco NX-OS ISSU Support Matrix](#).
- Ensure that everyone who has access to the device or the network is not configuring the device or the network during this time. You cannot configure a device during an upgrade. Use the **show configuration session summary** command to verify that you have no active configuration sessions.
- Save, commit, or discard any active configuration sessions before upgrading or downgrading the Cisco NX-OS software image on your device. On a device with dual supervisors, the active supervisor module cannot switch over to the standby supervisor module during the Cisco NX-OS software upgrade if you have an active configuration session.
- To transfer NX-OS software images to the Nexus switch through a file transfer protocol (such as TFTP, FTP, SFTP, SCP, etc.), verify that the Nexus switch can connect to the remote file server where the NX-OS software images are stored. If you do not have a router to route traffic between subnets, ensure that the Nexus switch and the remote file server are on the same subnetwork. To verify connectivity to the remote server, transfer a test file using a file transfer protocol of your choice or use the ping command if the remote file server is configured to respond to ICMP Echo Request packets. An example of using the **ping** command to verify connectivity to a remote file server 192.0.2.100 is shown below:

```
switch# ping 192.0.2.100 vrf management
PING 192.0.2.100 (192.0.2.100): 56 data bytes
64 bytes from 192.0.2.100: icmp_seq=0 ttl=239 time=106.647 ms
64 bytes from 192.0.2.100: icmp_seq=1 ttl=239 time=76.807 ms
64 bytes from 192.0.2.100: icmp_seq=2 ttl=239 time=76.593 ms
64 bytes from 192.0.2.100: icmp_seq=3 ttl=239 time=81.679 ms
64 bytes from 192.0.2.100: icmp_seq=4 ttl=239 time=76.5 ms

--- 192.0.2.100 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 76.5/83.645/106.647 ms
```

For more information on configuration sessions, see the *Cisco Nexus 9000 Series NX-OS System Management Configuration Guide* specific to your release.

## Prerequisites for Downgrading the Cisco NX-OS Software

Downgrading the Cisco NX-OS software has the following prerequisites:

- Before you downgrade from a Cisco NX-OS release that supports the Control Plane Policing (CoPP) feature to an earlier Cisco NX-OS release that does not support the CoPP feature, you should verify compatibility using the **show incompatibility nxos bootflash:filename** command. If an incompatibility exists, disable any features that are incompatible with the downgrade image before downgrading the software.

# Cisco NX-OS Software Upgrade Guidelines

Before attempting to upgrade to any software image, follow these guidelines:

- Schedule the upgrade when your network is stable and steady.
- Avoid any power interruption, which could corrupt the software image, during the installation procedure.
- On devices with dual supervisor modules, both supervisor modules must have connections on the console ports to maintain connectivity when switchovers occur during a software upgrade. See the [Hardware Installation Guide](#) for your specific chassis.
- Perform the installation on the active supervisor module, not the standby supervisor module.
- The compressed image of Cisco Nexus 3000-series is hardware dependent and can only be used on the same device that it got compressed or downloaded from CCO. Do not use the Nexus 3000-series compressed image on Nexus 9000-series
- When performing a PoAP upgrade from Cisco NX-OS Release 6.0(2)A8(11) to Cisco NX-OS Release 7.0(3)I7(8), the provisioning fails if the software image is not compacted. The PoAP script does not support SCP compact in 6.0(2)A8(11), so a non-compacted image is copied instead, and this causes a bios upgrade failure.

To address this issue, use a pre-compacted image for PoAP from 6.0(2)A8(11). Perform a **copy scp: ur/bootflash: destination-file-system compact** to the switch, then copy it back to the PoAP server. Start the provisioning. PoAP should pick-up the already compacted image and the provisioning should be successful.

- When redistributing static routes, Cisco NX-OS requires the **default-information originate** command to successfully redistribute the default static route starting in 7.0(3)I7(6).
- Detect a bad software image before performing an ISSU upgrade from an old release to a new release by checking the md5sum after downloading the new image (with seg6).
- If you upgrade from a Cisco NX-OS release that supports the CoPP feature to a Cisco NX-OS release that supports the CoPP feature with additional classes for new protocols, you must either run the setup utility using the **setup** command or use the **copp profile** command for the new CoPP classes to be available. For more information on these commands, see the "Configuring Control Plane Policing" chapter in the [Cisco Nexus 9000 Series NX-OS Security Configuration Guide](#).

# Cisco NX-OS Software Downgrade Guidelines

Before attempting to downgrade to an earlier software release, follow these guidelines:

- The only supported method of downgrading a Cisco Nexus 9000 Series switch is to utilize the **install all** command. Changing the boot variables, saving the configuration, and reloading the switch is not a supported method to downgrade the switch.
- Disable the Guest Shell if you need to downgrade from Cisco NX-OS Release 7.0(3)I7(7) to an earlier release.
- Software downgrades should be performed using the **install all** command. Changing the boot variables, saving the configuration, and reloading the switch is not a supported method to downgrade the switch.

- On devices with dual supervisor modules, both supervisor modules must have connections on the console ports to maintain connectivity when switchovers occur during a software downgrade. See the [Hardware Installation Guide](#) for your specific chassis.
- Cisco NX-OS automatically installs and enables the guest shell by default. However, if the device is reloaded with a Cisco NX-OS image that does not provide guest shell support, the existing guest shell is automatically removed and a %VMAN-2-INVALID\_PACKAGE message is issued. As a best practice, remove the guest shell with the **guestshell destroy** command before downgrading to an earlier Cisco NX-OS image.

## Upgrading the Cisco NX-OS Software



**Note** If an error message appears during the upgrade, the upgrade will fail because of the reason indicated. See the [Cisco Nexus 9000 Series NX-OS Troubleshooting Guide](#) for a list of possible causes and solutions.

### Procedure

**Step 1** Read the release notes for the software image file for any exceptions to this upgrade procedure. See the [Cisco Nexus 9000 Series NX-OS Release Notes](#).

**Step 2** Log in to the device on the console port connection.

**Step 3** Ensure that the required space is available for the image file to be copied.

```
switch# dir bootflash:
49152   May 10 14:43:39 2014 lost+found/
80850712 May 10 15:57:44 2014 n9000-dk9.6.1.2.I2.1.bin
...
```

```
Usage for bootflash://sup-local
 4825743360 bytes used
16312102912 bytes free
21137846272 bytes total
```

**Note** We recommend that you have the image file for at least one previous release of the Cisco NX-OS software on the device to use if the new image file does not load successfully.

**Step 4** If you need more space on the active supervisor module, delete unnecessary files to make space available.

```
switch# delete bootflash:n9000-dk9.6.1.2.I2.1.bin
```

**Step 5** Verify that there is space available on the standby supervisor module.

```
switch# dir bootflash://sup-standby/
49152   May 10 14:43:39 2014 lost+found/
80850712 May 10 15:57:44 2014 n9000-dk9.6.1.2.I2.1.bin
...
```

```
Usage for bootflash://sup-standby
 4825743360 bytes used
16312102912 bytes free
```

```
21137846272 bytes total
```

**Step 6** If you need more space on the standby supervisor module, delete any unnecessary files to make space available.

```
switch# delete bootflash://sup-standby/n9000-dk9.6.1.2.I2.1.bin
```

**Step 7** Log in to Cisco.com, choose the software image file for your device from the following URL, and download it to a file server: <http://software.cisco.com/download/navigator.html>.

**Step 8** Copy the software image to the active supervisor module using a transfer protocol. You can use FTP, TFTP, SCP, or SFTP.

```
switch# copy scp://user@scpserver.cisco.com/download/n9000-dk9.6.1.2.I2.2.bin
bootflash:n9000-dk9.6.1.2.I2.2.bin
```

**Step 9** Check the impact of upgrading the software before actually performing the upgrade.

```
switch# show install all impact nxos bootflash:n9000-dk9.6.1.2.I2.2.bin
Installer will perform compatibility check first. Please wait.
uri is: /n9000-dk9.6.1.2.I2.2.bin
Installer is forced disruptive

Verifying image bootflash:/n9000-dk9.6.1.2.I2.2.bin for boot variable "nxos".
[#####] 100% -- SUCCESS

Verifying image type.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "nxos" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.2.bin.
[#####] 100% -- SUCCESS

Performing module support checks.
[#####] 100% -- SUCCESS

Notifying services about system upgrade.
```

```
[#####] 100% -- SUCCESS
```

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
2	yes	disruptive	reset	Reset due to single supervisor
4	yes	disruptive	reset	Reset due to single supervisor
6	yes	disruptive	reset	Reset due to single supervisor
22	yes	disruptive	reset	Reset due to single supervisor
24	yes	disruptive	reset	Reset due to single supervisor
26	yes	disruptive	reset	Reset due to single supervisor
27	yes	disruptive	reset	Reset due to single supervisor
28	yes	disruptive	reset	Reset due to single supervisor
29	yes	disruptive	reset	Reset due to single supervisor
30	yes	disruptive	reset	Reset due to single supervisor

Images will be upgraded according to following table:

Module	Image	Running-Version(pri:alt)	New-Version	Upg-Required
2	lcn9k	6.1(2)I2(1)	6.1(2)I2(2)	yes
2	bios	v01.35(00)	v01.35(00):v01.27(00)	no
4	lcn9k	6.1(2)I2(1)	6.1(2)I2(2)	yes
4	bios	v01.35(00)	v01.35(00):v01.23(00)	no
6	lcn9k	6.1(2)I2(1)	6.1(2)I2(2)	yes
6	bios	v01.35(00)	v01.35(00):v01.24(00)	no
22	lcn9k	6.1(2)I2(1)	6.1(2)I2(2)	yes
22	bios	v01.35(00)	v01.35(00):v01.24(00)	no
24	lcn9k	6.1(2)I2(1)	6.1(2)I2(2)	yes
24	bios	v01.35(00)	v01.35(00):v01.24(00)	no
26	lcn9k	6.1(2)I2(1)	6.1(2)I2(2)	yes
26	bios	v01.35(00)	v01.35(00):v01.24(00)	no
27	nxos	6.1(2)I2(1)	6.1(2)I2(2)	no
27	bios	v01.35(00)	v01.35(00):v01.24(00)	no
28	nxos	6.1(2)I2(1)	6.1(2)I2(2)	no
28	bios	v01.35(00)	v01.35(00):v01.24(00)	no
29	lcn9k	6.1(2)I2(1)	6.1(2)I2(2)	yes
29	bios	v01.35(00)	v01.35(00):v01.24(00)	no
30	lcn9k	6.1(2)I2(1)	6.1(2)I2(2)	yes
30	bios	v01.35(00)	v01.35(00):v01.24(00)	no

**Step 10** Save the running configuration to the startup configuration.

```
switch# copy running-config startup-config
```

**Step 11** Upgrade the Cisco NX-OS software.

```
switch# install all nxos bootflash:n9000-dk9.6.1.2.I2.2.bin
```

You can save time by upgrading up to three line cards concurrently. To do so, add the **parallel** option to the **install all** command (for example, **install all parallel nxos bootflash:n9000-dk9.6.1.2.I2.2.bin**).

**Note** If you enter the **install all** command without specifying a filename, the command performs a compatibility check, notifies you of the modules that will be upgraded, and confirms that you want to continue with the installation. If you choose to proceed, it installs the NXOS software image that is currently running on the switch and upgrades the BIOS of various modules from the running image if required.

**Step 12** (Optional) Display the entire upgrade process.

```
switch# show install all status
```

**Step 13** (Optional) Log in and verify that the device is running the required software version.

```
switch# show version
```

**Step 14** (Optional) If necessary, install any licenses to ensure that the required features are available on the device. See the [Cisco NX-OS Licensing Guide](#).

---

## Upgrade Process for vPCs

### Upgrade Process for a vPC Topology on the Primary Switch

The following list summarizes the upgrade process on a switch in a vPC topology that holds either the Primary or Operational Primary vPC roles. Steps that differ from a switch upgrade in a non-vPC topology are in bold.



---

**Note** In vPC topologies, the two peer switches must be upgraded individually. An upgrade on one peer switch does not automatically update the vPC peer switch.

---

1. **The install all command issued on the vPC primary switch triggers the installation upgrade.**
2. The compatibility checks display the impact of the upgrade.
3. The installation proceeds or not based on the upgrade impact.
4. **The configuration is locked on both vPC peer switches.**
5. The current state is saved.
6. The system unloads and runs the new image.
7. The stateful restart of the system software and application occurs.
8. The installer resumes with the new image.
9. The installation is complete.

When the installation is complete, the vPC primary switch is upgraded.



---

**Note** The vPC primary switch is running the upgraded version, and the vPC secondary switch is running the original software version.

---

### Upgrade Process for a vPC Topology on the Secondary Switch

The following list summarizes the upgrade process on a switch in a vPC topology that holds either the Secondary or Operational Secondary vPC roles. Steps that differ from a switch upgrade in a non-vPC topology are in bold.

1. **The install all command issued on the vPC secondary switch triggers the installation upgrade.**
2. The compatibility checks display the impact of the upgrade.
3. The installation proceeds or not based on the upgrade impact.
4. The current state is saved.
5. The system unloads and runs the new image.
6. The stateful restart of the system software and application occurs.
7. The installer resumes with the new image.
8. **The configuration is unlocked on the primary and secondary switches.**
9. The installation is complete.

## Downgrading to an Earlier Software Release



**Note** If an error message appears during the downgrade, the downgrade will fail because of the reason indicated. See the [Cisco Nexus 9000 Series NX-OS Troubleshooting Guide](#) for a list of possible causes and solutions.

### Procedure

**Step 1** **Read the release notes for the software image file for any exceptions to this downgrade procedure.** See the [Cisco Nexus 9000 Series NX-OS Release Notes](#).

**Step 2** Log in to the device on the console port connection.

**Step 3** Verify that the image file for the downgrade is present on the active supervisor module bootflash:

```
switch# dir bootflash:
49152 May 10 14:43:39 2014 lost+found/
80850712 May 10 15:57:44 2014 n9000-dk9.6.1.2.I2.2.bin
...

Usage for bootflash://sup-local
 4825743360 bytes used
16312102912 bytes free
21137846272 bytes total
```

**Step 4** If the software image file is not present, log in to Cisco.com, choose the software image file for your device from the following URL, and download it to a file server: <http://software.cisco.com/download/navigator.html>.

**Note** If you need more space on the active or standby supervisor module bootflash:, use the **delete** command to remove unnecessary files.

**Step 5** Copy the software image to the active supervisor module using a transfer protocol. You can use FTP, TFTP, SCP, or SFTP.

```
switch# copy scp://user@scpserver.cisco.com//download/n9000-dk9.6.1.2.I2.1.bin
bootflash:n9000-dk9.6.1.2.I2.1.bin
```

**Step 6** Check for any software incompatibilities.

```
switch# show incompatibility-all nxos bootflash:n9000-dk9.6.1.2.I2.1.bin
Checking incompatible configuration(s)
No incompatible configurations
```

The resulting output displays any incompatibilities and remedies.

**Step 7** Disable any features that are incompatible with the downgrade image.

**Step 8** Check for any hardware incompatibilities.

```
switch# show install all impact nxos bootflash:n9000-dk9.6.1.2.I2.1.bin
Installer will perform compatibility check first. Please wait.
uri is: /n9000-dk9.6.1.2.I2.1.bin
Installer is forced disruptive

Verifying image bootflash:/n9000-dk9.6.1.2.I2.1.bin for boot variable "nxos".
[#####] 100% -- SUCCESS

Verifying image type.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "nxos" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Preparing "lcn9k" version info using image bootflash:/n9000-dk9.6.1.2.I2.1.bin.
[#####] 100% -- SUCCESS

Performing module support checks.
[#####] 100% -- SUCCESS

Notifying services about system upgrade.
[#####] 100% -- SUCCESS

Compatibility check is done:
```

Module	bootable	Impact	Install-type	Reason
2	yes	disruptive	reset	Reset due to single supervisor
4	yes	disruptive	reset	Reset due to single supervisor
6	yes	disruptive	reset	Reset due to single supervisor
22	yes	disruptive	reset	Reset due to single supervisor
24	yes	disruptive	reset	Reset due to single supervisor
26	yes	disruptive	reset	Reset due to single supervisor
27	yes	disruptive	reset	Reset due to single supervisor
28	yes	disruptive	reset	Reset due to single supervisor
29	yes	disruptive	reset	Reset due to single supervisor
30	yes	disruptive	reset	Reset due to single supervisor

Images will be upgraded according to following table:

Module	Image	Running-Version (pri:alt)	New-Version	Upg-Required
2	lcn9k	6.1(2)I2(2)	6.1(2)I2(1)	yes
2	bios	v01.35(00):v01.27(00)	v01.35(00)	no
4	lcn9k	6.1(2)I2(2)	6.1(2)I2(1)	yes
4	bios	v01.35(00):v01.23(00)	v01.35(00)	no
6	lcn9k	6.1(2)I2(2)	6.1(2)I2(1)	yes
6	bios	v01.35(00):v01.24(00)	v01.35(00)	no
22	lcn9k	6.1(2)I2(2)	6.1(2)I2(1)	yes
22	bios	v01.35(00):v01.24(00)	v01.35(00)	no
24	lcn9k	6.1(2)I2(2)	6.1(2)I2(1)	yes
24	bios	v01.35(00):v01.24(00)	v01.35(00)	no
26	lcn9k	6.1(2)I2(2)	6.1(2)I2(1)	yes
26	bios	v01.35(00):v01.24(00)	v01.35(00)	no
27	nxos	6.1(2)I2(2)	6.1(2)I2(1)	no
27	bios	v06.26(05/10/2014):v06.21(11/17/2013)	v06.26(05/10/2014)	no
28	nxos	6.1(2)I2(2)	6.1(2)I2(1)	no
28	bios	v06.26(05/10/2014):v06.21(11/17/2013)	v06.26(05/10/2014)	no
29	lcn9k	6.1(2)I2(2)	6.1(2)I2(1)	yes
29	bios	v01.35(00):v01.24(00)	v01.35(00)	no
30	lcn9k	6.1(2)I2(2)	6.1(2)I2(1)	yes
30	bios	v01.35(00):v01.24(00)	v01.35(00)	no

**Step 9** Power off any unsupported modules.

```
switch# poweroff module module-number
```

**Step 10** Save the running configuration to the startup configuration.

```
switch# copy running-config startup-config
```

**Step 11** Downgrade the Cisco NX-OS software.

```
switch# install all nxos bootflash:n9000-dk9.6.1.2.I2.1.bin
```

**Note** If you enter the **install all** command without specifying a filename, the command performs a compatibility check, notifies you of the modules that will be upgraded, and confirms that you want to continue with the installation. If you choose to proceed, it installs the NXOS software image that is currently running on the switch and upgrades the BIOS of various modules from the running image if required.

**Step 12** (Optional) Display the entire downgrade process.

**Example:**

```
switch# show install all status
```

**Step 13** (Optional) Log in and verify that the device is running the required software version.

```
switch# show version
```

---

