



Cisco Nexus 3600 Series NX-OS Software Upgrade and Downgrade Guide, Release 10.5(x)

First Published: 2024-07-27

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies of this document are considered uncontrolled. See the current online version for the latest version.

Cisco has more than 200 offices worldwide. Addresses and phone numbers are listed on the Cisco website at www.cisco.com/go/offices.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <https://www.cisco.com/c/en/us/about/legal/trademarks.html>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)

© 2024 Cisco Systems, Inc. All rights reserved.



CONTENTS

PREFACE

Preface	vii
Audience	vii
Document Conventions	vii
Related Documentation for Cisco Nexus 3600 Platform Switches	viii
Documentation Feedback	viii
Communications, Services, and Additional Information	viii

CHAPTER 1

New and Changed Information	1
New and Changed Information	1

CHAPTER 2

Upgrading or Downgrading the Cisco Nexus 3600 Series NX-OS Software	3
About the Software Image	3
Recommendations for Upgrading the Cisco NX-OS Software	4
Cisco NX-OS Software Upgrade Guidelines	4
Prerequisites for Upgrading the Cisco NX-OS Software	5
Upgrading the Cisco NX-OS Software	5
Cisco NX-OS Software Downgrade Guidelines	8
Prerequisites for Downgrading the Cisco NX-OS Software	9
Downgrading to an Earlier Software Release	9
NX-OS Upgrade History	11

CHAPTER 3

Migrating Switches in a vPC Topology	13
vPC Forklift Upgrade	13

CHAPTER 4

Optionality in Cisco NX-OS Software	15
Optionality in Cisco NX-OS Software	15

Guidelines for Cisco NX-OS Patchable Packages/RPM Installation	17
Using Modular Packages	17
Booting the NX-OS Image in Base or Full Mode	18
Information About RPMs	18
Format of the RPM	18
Optional RPMs and Their Associated Features	19
Guidelines for NX-OS Feature RPM Installation	21
Guidelines for Third-Party RPM Installation	22
Using Install CLIs for Feature or Third-Party RPM Operation	23
Using Install CLIs for Digital Signature Support	25
Querying All Installed RPMs	26
Installing the RPMs Using One Step Procedure	27
Installing the RPMs Using Two Steps Procedure	28
Upgrading the RPMs Using One Step	29
Downgrading the RPMs	30
Uninstalling the RPMs	31
Removing the RPMs	32
Information About DNF Commands	33
Performing Package Operations Using the DNF Commands	33
Finding the Base Version RPM of the Image	33
Checking the List of the Installed RPMs	34
Getting Details of the Installed RPMs	34
Installing the RPMs	35
Upgrading the RPMs	37
Downgrading the RPMs	39
Deleting the RPMs	41
Support for DNF Groups	42
Finding Repositories	45
Finding the Installed DNF Version	46
Mapping the NX-OS CLI to the DNF Commands	46
Configuring an FTP server and Setting up a Local FTP YUM Repository	47
Creating an FTP Server on Red Hat Enterprise Linux 7 (RHEL7) Virtual Machine	48
Creating a Local FTP YUM Repository	48
Configuring a Switch to Reach an FTP Server	50

Creating User Roles for Install Operation 51
Compacting Cisco NX-OS Software Images 51



Preface

This preface includes the following sections:

- [Audience, on page vii](#)
- [Document Conventions, on page vii](#)
- [Related Documentation for Cisco Nexus 3600 Platform Switches, on page viii](#)
- [Documentation Feedback, on page viii](#)
- [Communications, Services, and Additional Information, on page viii](#)

Audience

This publication is for network administrators who install, configure, and maintain Cisco Nexus switches.

Document Conventions

Command descriptions use the following conventions:

Convention	Description
bold	Bold text indicates the commands and keywords that you enter literally as shown.
<i>Italic</i>	Italic text indicates arguments for which the user supplies the values.
[x]	Square brackets enclose an optional element (keyword or argument).
[x y]	Square brackets enclosing keywords or arguments separated by a vertical bar indicate an optional choice.
{x y}	Braces enclosing keywords or arguments separated by a vertical bar indicate a required choice.
[x {y z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.

Convention	Description
<i>variable</i>	Indicates a variable for which you supply values, in context where italics cannot be used.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Examples use the following conventions:

Convention	Description
<code>screen font</code>	Terminal sessions and information the switch displays are in screen font.
boldface screen font	Information you must enter is in boldface screen font.
<i>italic screen font</i>	Arguments for which you supply values are in italic screen font.
<>	Nonprinting characters, such as passwords, are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Related Documentation for Cisco Nexus 3600 Platform Switches

The entire Cisco Nexus 3600 platform switch documentation set is available at the following URL:

<http://www.cisco.com/c/en/us/support/switches/nexus-3000-series-switches/tsd-products-support-series-home.html>

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to nexus3k-docfeedback@cisco.com. We appreciate your feedback.

Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at [Cisco Profile Manager](#).
- To get the business impact you're looking for with the technologies that matter, visit [Cisco Services](#).
- To submit a service request, visit [Cisco Support](#).
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit [Cisco Marketplace](#).
- To obtain general networking, training, and certification titles, visit [Cisco Press](#).
- To find warranty information for a specific product or product family, access [Cisco Warranty Finder](#).

Cisco Bug Search Tool

[Cisco Bug Search Tool](#) (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.



CHAPTER 1

New and Changed Information

- [New and Changed Information](#), on page 1

New and Changed Information

Table 1: New and Changed Features

Feature	Description	Changed in Release	Where Documented
NA	No feature updates for this release.	10.5(1)F	NA



CHAPTER 2

Upgrading or Downgrading the Cisco Nexus 3600 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 3](#)
- [Recommendations for Upgrading the Cisco NX-OS Software, on page 4](#)
- [Cisco NX-OS Software Upgrade Guidelines, on page 4](#)
- [Prerequisites for Upgrading the Cisco NX-OS Software, on page 5](#)
- [Upgrading the Cisco NX-OS Software, on page 5](#)
- [Cisco NX-OS Software Downgrade Guidelines, on page 8](#)
- [Prerequisites for Downgrading the Cisco NX-OS Software, on page 9](#)
- [Downgrading to an Earlier Software Release, on page 9](#)
- [NX-OS Upgrade History, on page 11](#)

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. The image filename begins with "nxos".

Only this image is required to load the Cisco NX-OS operating system. This image runs on all Cisco Nexus 3600 Series switches.



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 more information on SMUs, see the Cisco Nexus 3600 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.

Recommendations for Upgrading the Cisco NX-OS Software

Cisco recommends performing a Nexus Health and Configuration Check before performing an upgrade. The benefits include identification of potential issues, susceptible Field Notices and Security Vulnerabilities, missing recommended configurations and so on. For more information about the procedure, see [Perform Nexus Health and Configuration Check](#).

Cisco NX-OS Software Upgrade Guidelines



Note The [Cisco Nexus 3600 Series NX-OS Release Notes](#) contain specific upgrade guidelines for each release. See the Release Notes before starting the upgrade.

The following upgrade paths are supported for upgrading from an earlier release to Cisco NX-OS Release 10.1(1):

- Release 9.2(x) → Release 10.1(1)
- Release 9.3(x) → Release 10.1(1)

To upgrade from Cisco NX-OS Release 9.2(1) you must set the boot variable, copy the running configuration to the startup configuration and reload the device. To upgrade from Cisco NX-OS Release 9.2(2) or later or from Cisco NX-OS Release 9.3(x), we recommend that you use **install all** command.

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.
- 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 3600 Series NX-OS Security Configuration Guide](#).
- When you upgrade from an earlier release to a Cisco NX-OS release that supports switch profiles, you have the option to move some of the running-configuration commands to a switch profile. For more information, see the [Cisco Nexus 3600 Series NX-OS System Management Configuration Guide](#).
- By default, the software upgrade process is disruptive.
- Beginning with Cisco NX-OS Release 10.4(2)F, for Nexus 3600-R platform, to upgrade bios to the latest version you should first upgrade to nxos image. This release onwards, the install all nxos command only upgrades the nxos sw to the latest version but the bios image will be upgraded to the last bios released prior to 10.4(2)F version.

To upgrade to bios released with 10.4(2)F or higher version, first upgrade the nxos image and then use bios-force option to upgrade the bios. For example,

1. Install all nxos bootflash:nxos64-msll.10.4.2.F.bin.

The system reloads and boots up with 10.4(2)F image.

2. Install all nxos bios-force.



Note The device reloads twice, once for nxos upgrade and then again for bios upgrade.

Prerequisites for Upgrading the Cisco NX-OS Software

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

- 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.

- Ensure that the device has a route to the remote server. The device and the remote server must be in the same subnetwork if you do not have a router to route traffic between subnets. To verify connectivity to the remote server, use the **ping** command.

```
switch# ping 172.18.217.1 vrf management
PING 172.18.217.1 (172.18.217.1): 56 data bytes
64 bytes from 172.18.217.1: icmp_seq=0 ttl=239 time=106.647 ms
64 bytes from 172.18.217.1: icmp_seq=1 ttl=239 time=76.807 ms
64 bytes from 172.18.217.1: icmp_seq=2 ttl=239 time=76.593 ms
64 bytes from 172.18.217.1: icmp_seq=3 ttl=239 time=81.679 ms
64 bytes from 172.18.217.1: icmp_seq=4 ttl=239 time=76.5 ms

--- 172.18.217.1 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 3000 Series NX-OS System Management Configuration Guide*.

Upgrading the Cisco NX-OS Software

Use this procedure to upgrade to a Cisco NX-OS 10.1(x) release. Before upgrading, it is recommended to verify the source (Current Release) and destination (Target Release) version using the [Cisco Nexus 9000 and 3000 ISSU Support Matrix](#) available on Cisco.com.



Note To upgrade from Cisco NX-OS Release 9.2(1), you must set the boot variable, copy the running configuration to the startup configuration, and reload the device.

SUMMARY STEPS

1. **Read the release notes for the software image file for any exceptions to this upgrade procedure.** See the [Cisco Nexus 3600 Series NX-OS Release Notes](#).
2. Log in to the device on the console port connection.
3. Ensure that the required space is available for the image file to be copied.
4. If you need more space on the supervisor module, delete unnecessary files to make space available.
5. Verify that there is space available on the active and the standby supervisor modules.
6. If you need more space on the supervisor module, delete any unnecessary files to make space available.
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>.
8. Copy the software image to the active supervisor module using a transfer protocol. You can use FTP, TFTP, SCP, or SFTP.
9. Display the SHA256 checksum for the file to verify the operating system integrity and ensure that the downloaded image is safe to install and use.
10. Check the impact of upgrading the software before actually performing the upgrade.
11. Save the running configuration to the startup configuration.
12. Upgrade the Cisco NX-OS software using the **install all nxos bootflash:filename [no-reload | non-interruptive]** command.
13. (Optional) Display the entire upgrade process.
14. (Optional) Log in and verify that the device is running the required software version.
15. (Optional) If necessary, install any licenses to ensure that the required features are available on the device. See the [Cisco NX-OS Licensing Guide](#).

DETAILED STEPS

Step 1 **Read the release notes for the software image file for any exceptions to this upgrade procedure.** See the [Cisco Nexus 3600 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:
```

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 supervisor module, delete unnecessary files to make space available.

```
switch# delete bootflash:nxos.9.3.6.bin
```

Step 5 Verify that there is space available on the active and the standby supervisor modules.

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

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/nxos.10.1.1.bin bootflash:nxos.10.1.1.bin
```

For software images requiring compaction, you must use SCP, HTTP, or HTTPS as the source and bootflash or USB as the destination. The following example uses SCP and bootflash:

```
switch# copy scp://user@scpserver.cisco.com//download/nxos.10.1.1.bin
bootflash:nxos.10.1.1.bin compact vrf management use-kstack
```

```
user1@10.65.42.196's password:
nxos.10.1.1.bin 100% 1887MB 6.6MB/s 04:47
Copy complete, now saving to disk (please wait)...
Copy complete.
```

The **compact** keyword compacts the NX-OS image prior to copying the file to the supervisor module.

Note Software image compaction is only supported on SCP, HTTP, or HTTPS. If you attempt compaction with any other protocol, the system returns the following error:

```
Compact option is allowed only with source as scp/http/https and destination
as bootflash or usb
```

Note Compacted images are not supported with LXC boot mode.

Step 9 Display the SHA256 checksum for the file to verify the operating system integrity and ensure that the downloaded image is safe to install and use.

```
switch# show file bootflash://sup-1/nxos.10.1.1.bin sha256sum
5214d563b7985ddad67d52658af573d6c64e5a9792b35c458f5296f954bc53be
```

Step 10 Check the impact of upgrading the software before actually performing the upgrade.

```
switch# show install all impact nxos bootflash:nxos.10.1.1.bin
```

Step 11 Save the running configuration to the startup configuration.

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

Step 12 Upgrade the Cisco NX-OS software using the **install all nxos bootflash:filename [no-reload | non-interruptive]** command.

```
switch# install all nxos bootflash:nxos.10.1.1.bin
```

The following options are available:

- **no-reload**—Exits the software upgrade process before the device is reloaded.
- **non-interruptive**—Upgrades the software without any prompts. This option skips all error and sanity checks.

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 13 (Optional) Display the entire upgrade process.

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

Step 14 (Optional) Log in and verify that the device is running the required software version.

```
switch# show version
```

Step 15 (Optional) If necessary, install any licenses to ensure that the required features are available on the device. See the [Cisco NX-OS Licensing Guide](#).

Cisco NX-OS Software Downgrade Guidelines

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

- The following downgrade paths are supported for downgrading from Cisco NX-OS Release 10.1(1) to an earlier release:
 - Release 10.1(1) → Release 9.2(x)
 - Release 10.1(1) → Release 9.3(x)

To downgrade to Cisco NX-OS Release 9.2(1) you must set the boot variable, copy the running configuration to the startup configuration and reload the device. To downgrade to Cisco NX-OS Release 9.3(x) or to Cisco NX-OS Release 9.2(2) and later, we recommend that you use the **install all** command.

- 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.
- You must delete the switch profile (if configured) when downgrading from a Cisco NX-OS release that supports switch profiles to a release that does not. For more information, see the [Cisco Nexus 3600 Series NX-OS System Management Configuration Guide](#).



Note Software downgrades are disruptive. In-service software downgrades (ISSDs), also known as nondisruptive downgrades, are not supported.

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.

Downgrading to an Earlier Software Release

Use this procedure to downgrade from Cisco NX-OS Release 10.1(x) to Cisco NX-OS Release 9.3(x) or to Cisco NX-OS Release 9.2(2) and later.



Note To downgrade to Cisco NX-OS Release 9.2(1), you must set the boot variable, copy the running configuration to the startup configuration, and reload the device.

SUMMARY STEPS

1. **Read the release notes for the software image file for any exceptions to this downgrade procedure.** See the [Cisco Nexus 3600 NX-OS Release Notes](#).
2. Log in to the device on the console port connection.
3. Verify that the image file for the downgrade is present on the active supervisor module bootflash.
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>.
5. Copy the software image to the active supervisor module using a transfer protocol. You can use FTP, TFTP, SCP, or SFTP.
6. Check for any software incompatibilities.
7. Disable any features that are incompatible with the downgrade image.
8. Check for any hardware incompatibilities.
9. Power off any unsupported modules.
10. Save the running configuration to the startup configuration.
11. Downgrade the Cisco NX-OS software.
12. (Optional) Display the entire downgrade process.
13. (Optional) Log in and verify that the device is running the required software version.

DETAILED STEPS

- Step 1** **Read the release notes for the software image file for any exceptions to this downgrade procedure.** See the [Cisco Nexus 3600 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:
```

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>.

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/nxos.9.2.3.bin bootflash:nxos.9.2.3.bin
```

Step 6 Check for any software incompatibilities.

```
switch# show incompatibility-all nxos bootflash:nxos.9.2.3.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:nxos.9.2.3.bin
```

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:nxos.9.2.3.bin
switch# install all nxos nxos.9.2.3.bin.CCO
Installer will perform compatibility check first. Please wait.
Installer is forced disruptive

Verifying image bootflash:/nxos.9.2.3.bin.CCO for boot variable "nxos".
[#####] 100% -- SUCCESS

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

Preparing "nxos" version info using image bootflash:/nxos.9.2.3.bin.CCO.
[#####] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/nxos.9.2.3.bin.CCO.
[#####] 100% -- SUCCESS

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

Notifying services about system upgrade.
2019 Jun 06 09:59:20 Switch %$ VDC-1 %$ %VSHD-5-VSHD_SYSLOG_CONFIG_I: Configured from vty by admin
on vsh.bin.30370
[#####] 100% -- SUCCESS
```

```

Compatibility check is done:
Module bootable Impact Install-type Reason
-----
1 yes disruptive reset Incompatible image for ISSU

```

```

Images will be upgraded according to following table:
Module Image Running-Version(pri:alt) New-Version Upg-Required
-----
1 nxos 9.3(1) 9.2(3) yes
1 bios v01.11(06/06/2019):v01.11(06/06/2019) v01.10(03/15/2019) no

```

Switch will be reloaded for disruptive upgrade.

Do you want to continue with the installation (y/n)? [n]

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
```

NX-OS Upgrade History

During the life of a Cisco Nexus 3600 switch, many upgrade procedures can be performed. Upgrades can occur for maintenance purposes or to update the operating system to obtain new features. Over time, switches may be updated on numerous occasions. Viewing the types of upgrades and when they occurred can help in troubleshooting issues or simply understanding the history of the switch.

Beginning with Cisco NX-OS Release 9.3(5), Cisco Nexus 3600 switches log all upgrade activity performed over time providing a comprehensive history of these events. The stored upgrade history types are:

- Cisco NX-OS System Upgrades
- Electronic Programmable Logic Device (EPLD) Upgrades
- Software Maintenance Upgrade (SMU) Installations

View the Cisco NX-OS upgrade history by entering the **show upgrade history** command. The output displays any upgrade activity that previously occurred on the switch and defines the start and end times for each event. The following is an example output of the **show upgrade history** command:

```
switch# show upgrade history
TYPE          VERSION  DATE          STATUS
NXOS system image 9.3(6)  29 Jan 2021 05:41:11 Installation started
NXOS system image 9.3(6)  29 Jan 2021 05:55:13 Installation End
NXOS system image 10.1(1) 29 Jan 2021 05:56:06 Installation started
NXOS system image 10.1(1) 29 Jan 2021 14:59:05 Installation End
```



CHAPTER 3

Migrating Switches in a vPC Topology

This chapter describes how to migrate from one pair of switches to another in a vPC topology. It contains the following sections:

- [vPC Forklift Upgrade, on page 13](#)

vPC Forklift Upgrade

In a vPC topology, you can migrate from a pair of Cisco Nexus 3600 platform switches to a different pair of Cisco Nexus 3600 platform switches. For more information, see the "vPC Forklift Upgrade Scenario" section in the *Cisco Nexus 3600 Series NX-OS Interfaces Configuration Guide*.



CHAPTER 4

Optionality in Cisco NX-OS Software

This chapter describes optionality in Cisco NX-OS software.

- [Optionality in Cisco NX-OS Software, on page 15](#)
- [Guidelines for Cisco NX-OS Patchable Packages/RPM Installation, on page 17](#)
- [Using Modular Packages, on page 17](#)
- [Booting the NX-OS Image in Base or Full Mode, on page 18](#)
- [Information About RPMs, on page 18](#)
- [Information About DNF Commands, on page 33](#)
- [Configuring an FTP server and Setting up a Local FTP YUM Repository, on page 47](#)
- [Creating User Roles for Install Operation, on page 51](#)
- [Compacting Cisco NX-OS Software Images, on page 51](#)

Optionality in Cisco NX-OS Software

Beginning with Cisco NXOS Release 9.2(1), Cisco NX-OS software image supports modular package management. Cisco NX-OS software now provides flexibility to add, remove, and upgrade the features selectively without changing the base NX-OS software.

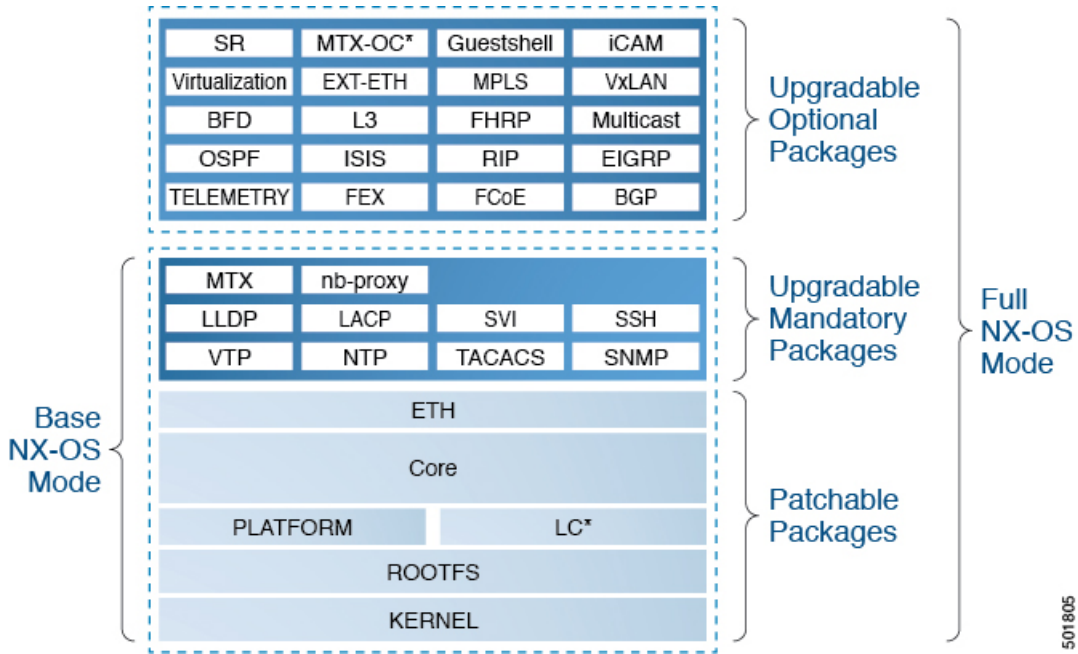
The advantages for using modular Cisco NX-OS software are:

- Lean NX-OS software
- Asynchronous delivery of the features and the fixes: Quick fixes are provided that are independent of the releases, including new features.
- Reduced footprint of binaries and libraries at run time

Cisco NX-OS software is provisioned to boot the NX-OS software in two modes as described in the following illustration:

- Base NX-OS mode
- Full NX-OS mode

Figure 1: Optionality in Cisco NX-OS Software



- Base NX-OS mode contains:
 - Upgradable mandatory packages
 - Patchable packages
- Full NX-OS mode contains:
 - Upgradable optional packages
 - Upgradable mandatory packages
 - Patchable packages



Note The default mode is full NX-OS mode.

In base NX-OS mode, basic Layer 2 and Layer 3 features are available. All dynamic routing features (for example, BGP, OSPF, EIGRP, RIP, and ISIS) and other optional feature RPMs are not available by default. You have to install the optional feature RPMs on top of the base image.

In full NX-OS mode, all feature RPMs are installed during boot time when Ethernet plugin is activated by the plugin manager. There is no change in the user behavior as compared to the previous releases.

Guidelines for Cisco NX-OS Patchable Packages/RPM Installation

For guidelines on Cisco NX-OS patchable packages/RPM installation (Release 7.x feature), see the Performing Software Maintenance Upgrades section in the [Cisco Nexus 9000 Series NX-OS System Management Configuration Guide](#).

Using Modular Packages

The Cisco NX-OS software image is traditionally constructed with the packaging that forms a Cisco Linux distribution. It makes upgrading certain packages difficult as each package is large in size.

This section describes a new package management for the Cisco NX-OS software image. Beginning with Cisco NX-OS Release 9.2(1), some NXOS features are considered as optional, for example, BGP, OSPF, VXLAN, MPLS, Segment Routing.

Each modular package has the following important characteristics:

- Upgrade functionality: The modular packages can be independently upgraded. The modular packages should be used from the same release as performing upgrades on these packages across multiple releases is not supported.
- Optionality: The modular packages are optional, for example, these packages can be removed or uninstalled at run time. The removal of the modular packages does not affect bringing-up the system and it does not affect any other functionality of the switches.



Note All APIs exported by the modular package should be used only after the installation of the feature.

RPM and DNF

RPM (Red Hat Package Manager) is the package management system used for packaging in the Linux Standard Base (LSB). The RPM command options are grouped into three subgroups for:

- Querying and verifying packages
- Installing, upgrading, and removing packages
- Performing miscellaneous functions

rpm is the command name for the main command that is used with RPM, whereas **.rpm** is the extension that is used for the RPM files.

Dandified YUM (Yellowdog Updater, Modified) or DNF is an open source command-line tool for RPM based Linux systems. It allows users and system administrators to easily install, update, remove, or search software packages on the systems. DNF adds the automatic updates and the package management, including dependency management, to the RPM systems. In addition to understanding the installed packages on a system, DNF works with the repositories that are collections of the packages and they are typically accessible over a network connection.

Booting the NX-OS Image in Base or Full Mode

You can now boot the NX-OS image in base or full mode. The full boot mode installs the complete NX-OS software which is similar to the software of the previous releases. This is the default boot mode. The base boot mode has no optional RPMs installed.

To use the command line option, see the following steps:

- Use the **install reset nxos base** option to install the NX-OS image in the base boot mode using the VSH prompt. After reload, the switch is in the base mode with no optional packages installed.
- Use the **install reset nxos full** option to install the NX-OS image in the full boot mode using the VSH prompt. After reload, the switch is in the full mode with the optional packages automatically installed.

For more information, see Using Install CLIs for Feature RPM Operation section.

Information About RPMs

RPMs can be upgraded or downgraded to a new software version using NXOS install commands or by using DNF commands. An upgradable RPM can be optional or mandatory.



Note During the boot-up process of NX-OS, signed RPMs remain in memory while the image extraction stage takes place. However, this method is not the most efficient in terms of memory consumption. As of Cisco NX-OS Release 10.4(3)F, after the system reaches a stable state and adequate SSD space is accessible, the RPMs are transferred from memory to persistent storage. This feature is supported on N9K-C92348GC-X and all Nexus 9300 TOR switches.

See the following sections for more information about optional and mandatory RPMs.

Format of the RPM

The general format of a RPM is <name>-<version>-<release>.<arch>.rpm. The same format is followed for NXOS feature RPMS.

- Name: package name, for example, BGP
- Version in <x.y.x.b> format: <major.minor.patch.build_number>, for example, 2.0.1.0
- Release: The branch from which the RPM is created, for example, 9.2.1
- Arch: The architecture type of the RPM, for example, lib32_n9000

See the following table for more information on the naming convention, for example, fex-2.0.0.0-9.2.1.lib32_n9000.rpm:

Table 2: RPM Naming Convention

RPM Naming Convention Example: <code>fex-2.0.0.0-9.2.1.lib32_n9000.rpm</code>	Description
fex	Indicates the name of the component.
2	Indicates that the RPM is not backward compatible. Configuration loss takes place during an upgrade.
0	Indicates the incremental API changes/CLI changes/Schema changes with backward compatibility. It is applicable to the new features on top of the existing capabilities. No configuration is lost during an upgrade.
0	Indicates a bug fix without any functionality change. No configuration is lost during an upgrade.
0	This number tracks how many times the component has changed during the development cycle of a release. This value will be 0 for all the release images.
9.2.1	Indicates the release number or the distribution version for the RPM. It aligns to the NVR format. Since the feature RPM is only applicable to a NXOS release, this field has NXOS release version number present.
lib32_n9000	Indicates the architecture type of the RPM.

Optional RPMs and Their Associated Features

The optional RPMs are the RPMs that can be installed to enable the features without affecting the native NXOS behavior or they can be removed using the **install deactivate** command from the switch.

Optional RPMs, for example, EIGRP are not a part of the base software. They can be added, upgraded, and removed as required using either **dnf** or **install** CLI commands from the switch.

See the following list of the optional RPMs and their associated features:

Table 3: List of Optional RPMs and Their Associated Features

Package Name	Associated Features
BGP	feature bgp
BFD	feature bfd
Container-tracker	feature container-tracker
EIGRP	feature eigrp

Package Name	Associated Features
Ext-Eth	<ul style="list-style-type: none"> • feature openflow • feature evb • feature imp • feature netflow • feature sla_sender • feature sla_responder • feature sla_twamp-server • feature sflow
EXT_ETH_LOWMEM	<ul style="list-style-type: none"> • feature evb • feature netflow
FCoE	<ul style="list-style-type: none"> • feature-set fcoe • feature-set fcoe-npv
FEX	feature-set fex
FHRP	<ul style="list-style-type: none"> • feature hsrp • feature vrrpv3
HW TELEMETRY	feature hw telemetry
iCAM	feature icam
ISIS	feature isis
MPLS	<ul style="list-style-type: none"> • feature mpls segment-routing • feature mpls evpn
Multicast	<ul style="list-style-type: none"> • feature pim • feature pim6 • feature msdp • feature ngmvpn
NIA	NA
NXSDK	NA

Package Name	Associated Features
OSPF	<ul style="list-style-type: none"> • feature ospf • feature ospfv3
RIP	feature rip
SDAA	NA
Services	feature catena
SR	feature mpls segment-routing traffic-engineering
TELEMETRY	feature telemetry
Virtualization	NA
VM Tracker	feature vmtracker
VXLAN	<ul style="list-style-type: none"> • feature nv overlay • feature fabric forwarding

Guidelines for NX-OS Feature RPM Installation

See the following NX-OS system RPM repositories that are present in the Cisco NX-OS Series switches for the RPM management.



Note Avoid manually copying the RPMs to system repositories. Instead use the install or DNF commands.

Table 4: RPM Repositories That Are Present in the Switches

Repository Name	Repository Path	Description
groups-repo	/rpms	Part of the bundled NX-OS image. It is used to keep all the RPMs that are bundled as part of the NX-OS image. All RPMs based in this repository are known as base RPMs.

Repository Name	Repository Path	Description
localdb	/bootflash/.rpmstore/patching/localrepo	Used for RPM persistency. When a user adds a NX-OS feature RPM as part of install add command, the RPM is copied to this location and it is persisted during the reloads. User has the responsibility to clean the repository. To add a RPM to this repository, use install add command. To remove a RPM from this repository, use install remove command. DNF commands can be used to populate the repository too. The maximum space for the repository is 200Mb along with the patching repository for Cisco Nexus 9000 Series switches except Cisco Nexus 3000 Series switches. For Cisco Nexus 3000 Series switches, the maximum space for the repository is 20 Mb only.
patching	/bootflash/.rpmstore/patching/patchrepo	Used for RPM persistency. When a user adds a NX-OS patch RPM to the switch, the patch RPM is copied to this repository.
thirdparty	/bootflash/.rpmstore/thirdparty	Used for RPM persistency when a user adds a third party RPM.

The **groups-repo** and **localdb** repositories hold the NX-OS feature RPMs that should be installed during the system boot or during activation. DNF commands or **install** command can be used for the installation or the removal of these RPMs.

The following rules are applied to the feature RPM installation procedure during boot or install time:

- Only RPMs with the same NX-OS release number should be selected for the installation.
- Base RPMs cannot be added to the **localdb** repository.

Guidelines for Third-Party RPM Installation

Currently, any third-party package that is not provided by Cisco is allowed to be installed on the device, even when it is not signed by Cisco.

Starting with release 10.1(x) any third-party package that is not signed by Cisco is not allowed to be installed on the device. However, if you wish to bypass this and install the software, you can configure the device to enable the third-party software installation. The configuration will persist as a normal configuration and can

be verified by using the **running-config** command. Following this configuration, you can install any third-party software with the known risks.

Using Install CLIs for Feature or Third-Party RPM Operation

See the following reference table for using install CLIs for the feature RPM operations:

Table 5: Reference for Install CLIs for the Feature RPM Operations

CLI	Description
install reset	<p>This operation removes all the patches, persisted configurations, upgraded packages, third-party installed packages, unsaved configurations, and reloads the switch's previous mode (Full/Base) with the default packages.</p> <p>The install reset command also performs write erase operation. The following message is displayed at the prompt:</p> <pre>switch(config)# install reset</pre> <hr/> <pre>WARNING!!This operation will remove all patches, upgraded packages, persisted etc configs, third party packages installed, startup configuration(write erase) and reload the switch with default packages.</pre> <hr/> <pre>Do you want to proceed with reset operation? (y/n)? [n]</pre>
install reset nxos base	<p>This operation installs NXOS in base mode by removing all patches, upgraded packages, persisted etc configurations, third-party packages installed, startup configuration (write erase), and reloads the switch with the default packages.</p>
install reset nxos full	<p>This operation installs NXOS with full mode by removing all patches, upgraded packages, persisted etc configs, third-party packages installed, startup configuration (write erase), and reloads the switch with the default packages (with mandatory and optional RPMs).</p>
install add <>	<p>Adds an RPM file to the respective repository and updates the repository (patch/feature/third-party).</p>
install activate <rpm name>	<p>Installs an RPM that is present in the repository.</p>
install commit <rpm name>	<p>Used for the patch RPMs. Makes the patch persist during the reload.</p>

CLI	Description
install deactivate <i><rpm name></i>	Un-installs an RPM. Beginning with Cisco NX-OS Release 10.1(1), when you use this command to deactivate RPMs, the options to either downgrade to the base version of RPM or to uninstall RPM appear. You can select the option that you desire and the operation will proceed.
install remove <i><rpm name></i>	Removes an RPM file from the repository and updates the repository.
sh install active	Displays the list of the installed RPMs in the system apart from base rootfs RPMs. (features/patch/third-party).
sh install inactive	Displays the list of the RPMs that are present in the repository but they are not installed.
sh install packages	Lists all the RPMs that are installed including rootfs RPMs.

CLI	Description
<p>[no] system software allow third-party</p>	<p>Beginning with Cisco NX-OS Release 10.1(1) the third-party RPM installations are not allowed to be installed on the device by default. This command bypasses this restriction and configures the device to enable the third-party software installation.</p> <p>The following command shows the error message when you activate third-party RPM without applying the third-party configuration:</p> <pre>switch(config)# install activate pbwMonitor-1.0-1.5.0.x86_64.rpm Install operation 193 failed because package is not signed by Cisco.Enable TPS installation using 'system software allow third-party' CLI at Tue Nov 17 04:23:10 2020</pre> <p>The following command shows activating third-party RPM installations after applying the configuration:</p> <pre>switch(config)# system software allow third-party switch(config)# 2020 Nov 17 04:25:41 switch %\$ VDC-1 %\$ %USER-2-SYSTEM_MSG: <<%PATCH-INSTALLER-2-TPS_FEATURE_ENABLED>> User has enabled TPS installation - patch_installer switch(config)# install activate pbwMonitor-1.0-1.5.0.x86_64.rpm [#####] 100% Install operation 194 completed successfully at Tue Nov 17 04:25:58 2020</pre> <p>The following command shows disabling the third-party configuration:</p> <pre>switch(config)# no system software allow third-party switch(config)# 2020 Nov 17 04:27:17 switch %\$ VDC-1 %\$ %USER-2-SYSTEM_MSG: <<%PATCH-INSTALLER-2-TPS_FEATURE_DISABLED>> User has disabled TPS installation - patch_installer</pre>



Note If you are using ISSU or upgrading to Cisco NX-OS Release 10.1.1 release from an earlier version, you must manually apply the third-party configuration within the first 30 minutes after the upgrade to ensure the third-party RPMs get installed.

Using Install CLIs for Digital Signature Support

Use the following CLI commands to install CLIs for digital signature support:

SUMMARY STEPS

1. switch#install add bootflash:<keyfile> gpg-key
2. switch#install verify package <package-name>
3. OR switch#install verify bootflash:<RPM file>

DETAILED STEPS

	Command or Action	Purpose
Step 1	<pre>switch#install add bootflash:<keyfile> gpg-key</pre> <p>Example:</p> <pre>install add bootflash:RPM-GPG-KEY-puppetlabs gpg-key [#####] 100% Install operation 304 completed successfully at Thu Jun 19 16:40:28 2018</pre>	Cisco release RPMs are signed with Cisco GPG (GNU Privacy Guard) key. The public GPG key is present at <code>/etc/pki/rpm-gpg/arm-Nexus9k-rel.gpg</code> . To add other public keys from different sources, use the steps in this section.
Step 2	<pre>switch#install verify package <package-name></pre>	Verifies the package.
Step 3	<p>OR</p> <pre>switch#install verify bootflash:<RPM file></pre> <p>Example:</p> <pre>switch# install verify bootflash:vxlan-2.0.0.0-9.2.1.lib32_n9000.rpm RSA signed switch#</pre>	Use step 2 or 3 to verify whether the RPM file is a signed or non-signed file.

Querying All Installed RPMs

Complete the following step to query all the installed RPMs:

SUMMARY STEPS

1. show install packages

DETAILED STEPS

	Command or Action	Purpose
Step 1	<pre>show install packages</pre> <p>Example:</p> <pre>switch# show install packages Boot Image: NXOS Image: bootflash:/nxos.9.2.1.bin ----- Installed Packages attr.x86_64 2.4.47-r0.0 installed Unsigned</pre>	Queries all the installed RPMs.

	Command or Action	Purpose
	<pre>aufs-util.x86_64 3.14+git0+b59a2167a1-r0.0 installed Unsigned base-files.n9000 3.0.14-r89.0 installed Unsigned base-passwd.lib32_x86 3.5.29-r0.1.0 installed Unsigned bash.lib32_x86 4.3.30-r0.0 installed Unsigned bfd.lib32_n9000 2.0.0.0-9.2.1 installed Signed bgp.lib32_n9000 2.0.0.0-9.2.1 installed Signed binutils.x86_64 2.25.1-r0.0 installed Unsigned bridge-utils.x86_64 1.5-r0.0 installed Unsigned busybox.x86_64 1.23.2-r0.0 installed Unsigned busybox-udhcpc.x86_64 1.23.2-r0.0 installed Unsigned bzip2.x86_64 1.0.6-r5.0 installed Unsigned ca-certificates.all 20150426-r0.0 installed Unsigned cgrouplite.x86_64 1.1-r0.0 installed Unsigned chkconfig.x86_64 1.3.58-r7.0 installed Unsigned container-tracker.lib32_n9000 2.0.0.0-9.2.1 installed Signed containerd-docker.x86_64 0.2.3+gitaa8187dbd3b7ad67d8e5e3a15115d3eef43a7ed1-r0.0 installed Unsigned core.lib32_n9000 2.0.0.0-9.2.1 installed Signed coreutils.lib32_x86 8.24-r0.0 installed Unsigned cpio.x86_64 2.12-r0.0 installed Unsigned cracklib.lib32_x86 2.9.5-r0.0 installed Unsigned cracklib.x86_64 2.9.5-r0.0 installed Unsigned createrepo.x86_64 0.4.11-r9.0 installed Unsigned cronie.x86_64 1.5.0-r0.0 installed Unsigned curl.lib32_x86 7.60.0-r0.0 installed Unsigned db.x86_64 6.0.30-r0.0 installed Unsigned dbus-1.lib32_x86 1.8.20-r0.0 installed Unsigned dhcp-client.x86_64 4.3.2-r0.0 installed Unsigned dhcp-server.x86_64 4.3.2-r0.0 installed Unsigned switch#</pre>	

Installing the RPMs Using One Step Procedure

The CLIs for both install and upgrade RPMs are the same. See the following step to install the RPMs using one step procedure:

Procedure

	Command or Action	Purpose
<p>Step 1</p>	<pre>install add <rpm> activate Example: switch# install add bootflash:chef.rpm activate Adding the patch (/chef.rpm) [#####] 100% Install operation 868 completed successfully at Tue May 8 11:20:10 2018 Activating the patch (/chef.rpm)</pre>	<p>Installs and activates the RPM.</p>

	Command or Action	Purpose
	<pre>[#####] 100% Install operation 869 completed successfully at Tue May 8 11:20:20 2018</pre>	

Example

```
switch# show install active
Boot Image:
    NXOS Image: bootflash:/nxos.9.2.1.bin

Active Packages:
bgp-2.0.1.0-9.2.1.lib32_n9000
chef-12.0.0alpha.2+20150319234423.git.1608.b6eb10f-1.e15.x86_64

Active Base Packages:
  lacp-2.0.0.0-9.2.1.lib32_n9000
  lldp-2.0.0.0-9.2.1.lib32_n9000
  mtx-device-2.0.0.0-9.2.1.lib32_n9000
  mtx-grpc-agent-2.0.0.0-9.2.1.lib32_n9000
  mtx-infra-2.0.0.0-9.2.1.lib32_n9000
  mtx-netconf-agent-2.0.0.0-9.2.1.lib32_n9000
  mtx-restconf-agent-2.0.0.0-9.2.1.lib32_n9000
  mtx-telemetry-2.0.0.0-9.2.1.lib32_n9000
  ntp-2.0.0.0-9.2.1.lib32_n9000
  nxos-ssh-2.0.0.0-9.2.1.lib32_n9000
  snmp-2.0.0.0-9.2.1.lib32_n9000
  svi-2.0.0.0-9.2.1.lib32_n9000
  tacacs-2.0.0.0-9.2.1.lib32_n9000
  vtp-2.0.0.0-9.2.1.lib32_n9000
switch(config)#
```

Installing the RPMs Using Two Steps Procedure

The CLIs for both install and upgrade RPMs are the same. See the following steps to install the RPMs using two steps procedure:

SUMMARY STEPS

1. **install add** *<rpm>*
2. **install activate** *<rpm>*

DETAILED STEPS

	Command or Action	Purpose
Step 1	<pre>install add <rpm> Example: switch# install add bootflash:vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm</pre>	Installs the RPM.

	Command or Action	Purpose
	<pre>[#####] 100% Install operation 892 completed successfully at Thu Jun 7 13:56:38 2018 switch(config)# sh install inactive grep vxlan vxlan-2.0.1.0-9.2.1.lib32_n9000</pre>	
Step 2	install activate <rpm> Example:	Activates the RPM.

Example

```
switch#install activate vxlan

[#####] 100%
Install operation 891 completed successfully at Thu Jun  7 13:53:07 2018

switch# show install active | grep vxlan

vxlan-2.0.0.0-9.2.1.lib32_n9000

switch# sh install inactive | grep vxlan

switch#
```

Upgrading the RPMs Using One Step

The CLIs for both install and upgrade RPMs are the same. See the following steps to upgrade the RPMs:

Procedure

	Command or Action	Purpose
Step 1	install add <rpm>activate upgrade Example: <pre>switch(config)# install add bootflash:bgp-2.0.2.0-9.2.1.lib32_n9000.rpm activate upgrade Adding the patch (/bgp-2.0.2.0-9.2.1.lib32_n9000.rpm) [#####] 100% Install operation 870 completed successfully at Tue May 8 11:22:30 2018</pre>	Installs the RPM.

	Command or Action	Purpose
	<pre> Activating the patch (/bgp-2.0.2.0-9.2.1.lib32_n9000.rpm) [#####] 100% Install operation 871 completed successfully at Tue May 8 11:22:40 2018 </pre>	

Example

```
switch(config)# show install active
```

```

Boot Image:
  NXOS Image: bootflash:/nxos.9.2.1.bin

```

```

Active Packages:
bgp-2.0.2.0-9.2.1.lib32_n9000
chef-12.0.0.alpha.2+20150319234423.git.1608.b6eb10f-1.el5.x86_64

```

```

Active Base Packages:
lACP-2.0.0.0-9.2.1.lib32_n9000
lldp-2.0.0.0-9.2.1.lib32_n9000
mtx-device-2.0.0.0-9.2.1.lib32_n9000
mtx-grpc-agent-2.0.0.0-9.2.1.lib32_n9000
mtx-infra-2.0.0.0-9.2.1.lib32_n9000
mtx-netconf-agent-2.0.0.0-9.2.1.lib32_n9000
mtx-restconf-agent-2.0.0.0-9.2.1.lib32_n9000
mtx-telemetry-2.0.0.0-9.2.1.lib32_n9000
ntp-2.0.0.0-9.2.1.lib32_n9000
nxos-ssh-2.0.0.0-9.2.1.lib32_n9000
snmp-2.0.0.0-9.2.1.lib32_n9000
svi-2.0.0.0-9.2.1.lib32_n9000
tacacs-2.0.0.0-9.2.1.lib32_n9000
vtp-2.0.0.0-9.2.1.lib32_n9000

```

Downgrading the RPMs

The downgrade procedure needs a special CLI attribute. See the following step to downgrade the RPMs using the one step procedure:

Procedure

	Command or Action	Purpose
Step 1	<pre> install add <rpm>activate downgrade </pre> <p>Example:</p> <pre> switch(config)# install add bootflash:bgp-2.0.1.0-9.2.1.lib32_n9000.rpm activate downgrade </pre> <p>Adding the patch</p>	Downgrades the RPM.

	Command or Action	Purpose
	<pre>(/bgp-2.0.1.0-9.2.1.lib32_n9000.rpm) [#####] 100% Install operation 872 completed successfully at Tue May 8 11:24:43 2018 Activating the patch (/bgp-2.0.1.0-9.2.1.lib32_n9000.rpm) [#####] 100% Install operation 873 completed successfully at Tue May 8 11:24:52 2018</pre>	

Example

```
switch(config)# show install active
Boot Image:
  NXOS Image: bootflash:/nxos.9.2.1.bin

Active Packages:
  bgp-2.0.1.0-9.2.1.lib32_n9000
  chef-12.0.0alpha.2+20150319234423.git.1608.b6eb10f-1.e15.x86_64

Active Base Packages:
  lacp-2.0.0.0-9.2.1.lib32_n9000
  lldp-2.0.0.0-9.2.1.lib32_n9000
  mtx-device-2.0.0.0-9.2.1.lib32_n9000
  mtx-grpc-agent-2.0.0.0-9.2.1.lib32_n9000
  mtx-infra-2.0.0.0-9.2.1.lib32_n9000
  mtx-netconf-agent-2.0.0.0-9.2.1.lib32_n9000
  mtx-restconf-agent-2.0.0.0-9.2.1.lib32_n9000
  mtx-telemetry-2.0.0.0-9.2.1.lib32_n9000
  ntp-2.0.0.0-9.2.1.lib32_n9000
  nxos-ssh-2.0.0.0-9.2.1.lib32_n9000
  snmp-2.0.0.0-9.2.1.lib32_n9000
  svi-2.0.0.0-9.2.1.lib32_n9000
  tacacs-2.0.0.0-9.2.1.lib32_n9000
  vtp-2.0.0.0-9.2.1.lib32_n9000
switch(config)#
```

Uninstalling the RPMs

See the following steps to uninstall the RPMs:

SUMMARY STEPS

1. **install deactivate** *<rpm>*

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>install deactivate <rpm></p> <p>Example:</p> <pre>switch(config)# install deactivate bgp Base RPM found. Do you want to downgrade to base version(y/n) [n] y Downgrading to the base version [#####] 100% Install operation 190 completed successfully at Tue Nov 17 04:10:40 2020</pre> <p>Example:</p> <pre>switch(config)# install deactivate bgp Base RPM found. Do you want to downgrade to base version(y/n) [n] n</pre> <hr/> <p>WARNING!! This operation will remove 'bgp-3.0.0.0-9.4.1.lib32_n9000' related configuration from running-configuration on successful completion. Update startup-configuration accordingly.</p> <hr/> <pre>[#####] 100% Install operation 9 completed successfully at Tue Nov 17 05:05:59 2020</pre>	<p>Downgrades to the base version of RPM, if one exists in the groups-repo (/rpms), or uninstalls the RPM completely from the switch.</p> <p>To downgrade to the base version, enter y. To completely uninstall the RPM, enter n in the command prompt.</p>

Removing the RPMs

See the following steps to remove the RPMs:

SUMMARY STEPS

1. **install remove** <rpm>

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>install remove <rpm></p> <p>Example:</p> <pre>switch(config)# show install inactive grep vxlan vxlan-2.0.0.0-9.2.1.lib32_n9000 switch(config)# install remove vxlan Proceed with removing vxlan? (y/n)? [n] y [#####] 100%</pre>	Removes the RPM from the repository.

Command or Action	Purpose
Install operation 890 Removal of base rpm package is not permitted at Thu Jun 7 13:52:15 2018	

Information About DNF Commands

See the following sections for more information about DNF commands.



Note DNF commands do not support ctrl+c. Install commands do support ctrl+c. If DNF commands are aborted using ctrl+c, manual cleanup must be performed using "/isan/bin/patching_utils.py --unlock".

Performing Package Operations Using the DNF Commands

See the following sections for performing package operations using the DNF commands:



Note DNF commands are accessed only from the BASH shell on the box and they are not allowed from the NXOS VSH terminal.



Note Make sure that as a sudo user, you have access to the super user privileges.

Finding the Base Version RPM of the Image

Use the **ls /rpms** command to find the base version RPM of the image. The base RPM version is the pre-installed RPM that is archived in the system image.

```
#ls /rpms
```

```
bfd-2.0.0.0-9.2.1.lib32_n9000.rpm
ins_tor_sdk_t2-1.0.0.0-9.2.0.77.lib32_n9000.rpm
mtx-netconf-agent-2.0.0.0-9.2.1.lib32_n9000.rpm    snmp-2.0.0.0-9.2.1.lib32_n9000.rpm
bgp-2.0.0.0-9.2.1.lib32_n9000.rpm
ins_tor_sdk_t3-1.0.0.0-9.2.0.77.lib32_n9000.rpm
mtx-restconf-agent-2.0.0.0-9.2.1.lib32_n9000.rpm  sr-2.0.0.0-9.2.1.lib32_n9000.rpm
container-tracker-2.0.0.0-9.2.1.lib32_n9000.rpm  isis-2.0.0.0-9.2.1.lib32_n9000.rpm
        mtx-telemetry-2.0.0.0-9.2.1.lib32_n9000.rpm    svi-2.0.0.0-9.2.1.lib32_n9000.rpm
eigrp-2.0.0.0-9.2.1.lib32_n9000.rpm                lacp-2.0.0.0-9.2.1.lib32_n9000.rpm
        nbproxy-2.0.0.0-9.2.1.lib32_n9000.rpm
tacacs-2.0.0.0-9.2.1.lib32_n9000.rpm
ext-eth-2.0.0.0-9.2.1.lib32_n9000.rpm              lldp-2.0.0.0-9.2.1.lib32_n9000.rpm
        ntp-2.0.0.0-9.2.1.lib32_n9000.rpm
telemetry-2.3.4.0-9.2.1.lib32_n9000.rpm
fcoe-2.0.0.0-9.2.1.lib32_n9000.rpm                mcast-2.0.0.0-9.2.1.lib32_n9000.rpm
        nxos-ssh-2.0.0.0-9.2.1.lib32_n9000.rpm
virtualization-2.0.0.0-9.2.1.lib32_n9000.rpm
```

Checking the List of the Installed RPMs

```
fex-2.0.0.0-9.2.1.lib32_n9000.rpm
ospf-2.0.0.0-9.2.1.lib32_n9000.rpm
fhrp-2.0.0.0-9.2.1.lib32_n9000.rpm
  repodata
vxlan-2.0.0.0-9.2.1.lib32_n9000.rpm
guestshell-2.0.0.0-9.2.1.lib32_n9000.rpm
  rip-2.0.0.0-9.2.1.lib32_n9000.rpm
icam-2.0.0.0-9.2.1.lib32_n9000.rpm
  services-2.0.0.0-9.2.1.lib32_n9000.rpm
mpls-2.0.0.0-9.2.1.lib32_n9000.rpm
  vtp-2.0.0.0-9.2.1.lib32_n9000.rpm
mtx-device-2.0.0.0-9.2.1.lib32_n9000.rpm
mtx-grpc-agent-2.0.0.0-9.2.1.lib32_n9000.rpm
mtx-infra-2.0.0.0-9.2.1.lib32_n9000.rpm
```

Checking the List of the Installed RPMs

Use the **dnf list installed** command to query the feature and third party RPMs and grep a specific RPM. See the following example for feature RPMs:

```
bash-4.2# dnf list installed | grep lib32_n9000

bfd.lib32_n9000                2.0.0.0-9.2.1          @groups-repo
core.lib32_n9000              2.0.0.0-9.2.1          installed
eth.lib32_n9000               2.0.0.0-9.2.1          installed
guestshell.lib32_n9000        2.0.0.0-9.2.1          @groups-repo
lacp.lib32_n9000              2.0.0.0-9.2.1          installed
linecard2.lib32_n9000         2.0.0.0-9.2.1          installed
lldp.lib32_n9000              2.0.0.0-9.2.1          installed
mcast.lib32_n9000             2.0.0.0-9.2.1          @groups-repo
mtx-device.lib32_n9000         2.0.0.0-9.2.1          installed
mtx-grpc-agent.lib32_n9000    2.0.0.0-9.2.1          installed
mtx-infra.lib32_n9000         2.0.0.0-9.2.1          installed
mtx-netconf-agent.lib32_n9000 2.0.0.0-9.2.1          installed
mtx-restconf-agent.lib32_n9000 2.0.0.0-9.2.1          installed
mtx-telemetry.lib32_n9000     2.0.0.0-9.2.1          installed
nbproxy.lib32_n9000           2.0.0.0-9.2.1          installed
ntp.lib32_n9000               2.0.0.0-9.2.1          installed
nxos-ssh.lib32_n9000          2.0.0.0-9.2.1          installed
ospf.lib32_n9000              2.0.0.0-9.2.1          @groups-repo
platform.lib32_n9000          2.0.0.0-9.2.1          installed
snmp.lib32_n9000              2.0.0.0-9.2.1          installed
svi.lib32_n9000               2.0.0.0-9.2.1          installed
tacacs.lib32_n9000            2.0.0.0-9.2.1          installed
tor.lib32_n9000               2.0.0.0-9.2.0.77       installed
virtualization.lib32_n9000     2.0.1.0-9.2.1          @localdb
vtp.lib32_n9000               2.0.0.0-9.2.1          installed
vxlan.lib32_n9000             2.0.0.0-9.2.1          @groups-repo
...
```

Getting Details of the Installed RPMs

The **dnf info <rpmname>** command lists out the detailed info of the installed RPM.

```
dnf info vxlan
```

```
Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching,
protect-packages
groups-repo
```

```

| 1.1 kB    00:00 ...
localdb
| 951 B     00:00 ...
```

```

patching
| 951 B    00:00 ...
thirdparty
| 951 B    00:00 ...

Installed Packages
Name       : vxlan
Arch      : lib32_n9000
Version   : 2.0.0.0
Release   : 9.2.1
Size      : 6.4 M
Repo      : installed
From repo : groups-repo
Summary   : Cisco NXOS VxLAN
URL       : http://cisco.com/
License   : Proprietary
Description : Provides VxLAN support

```

Installing the RPMs

Installing the RPMs downloads the RPMs and copies the respective program to the switches. See the following example for installing the RPMs from a remote server (that is reachable in the network):

```

bash-4.3# dnf install
http://10.0.0.2/modularity/rpms/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm

Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching,
protect-packages
groups-repo
| 1.1 kB    00:00 ...
localdb
| 951 B     00:00 ...
localdb/primary
| 886 B     00:00 ...
localdb
| 1/1
patching
| 951 B     00:00 ...
thirdparty
| 951 B     00:00 ...

Setting up Install Process
vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm
| 1.6 MB    00:00
Examining /var/tmp/yum-root-RaANgb/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm:
vxlan-2.0.1.0-9.2.1.lib32_n9000
Marking /var/tmp/yum-root-RaANgb/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm to be installed
Resolving Dependencies
--> Running transaction check
---> Package vxlan.lib32_n9000 0:2.0.1.0-9.2.1 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

```

Package	Repository	Arch	Version	Size
Installing:				
vxlan		lib32_n9000	2.0.1.0-9.2.1	6.4 M
	/vxlan-2.0.1.0-9.2.1.lib32_n9000			

Transaction Summary

```

=====
Install          1 Package

Total size: 6.4 M
Installed size: 6.4 M
Is this ok [y/N]: y
Downloading Packages:
Running Transaction Check
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : vxlan-2.0.1.0-9.2.1.lib32_n9000                1/1

starting pre-install package version mgmt for vxlan
pre-install for vxlan complete
starting post-install package version mgmt for vxlan
post-install for vxlan complete

Installed:
  vxlan.lib32_n9000 0:2.0.1.0-9.2.1

```

Complete!

See the following example for installing the RPMs from local bootflash:

```
sudo dnf install /bootflash/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm
```

```

Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching,
protect-packages
groups-repo

```

```

localdb                | 1.1 kB    00:00 ...
patching                | 951 B     00:00 ...
thirdparty              | 951 B     00:00 ...
                        | 951 B     00:00 ...

```

```

Setting up Install Process
Examining /bootflash/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm: vxlan-2.0.1.0-9.2.1.lib32_n9000
Marking /bootflash/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm as an update to
vxlan-2.0.0.0-9.2.1.lib32_n9000
Resolving Dependencies
--> Running transaction check
---> Package vxlan.lib32_n9000 0:2.0.0.0-9.2.1 will be updated
---> Package vxlan.lib32_n9000 0:2.0.1.0-9.2.1 will be an update
--> Finished Dependency Resolution

```

Dependencies Resolved

```

=====
Package                Arch
Version                Size      Repository
=====
Updating:
  vxlan                  lib32_n9000
  2.0.1.0-9.2.1         /vxlan-2.0.1.0-9.2.1.lib32_n9000

```

6.4 M

Transaction Summary

Upgrade 1 Package

Total size: 6.4 M

Is this ok [y/N]: y

Downloading Packages:

Running Transaction Check

Running Transaction Test

Transaction Test Succeeded

Running Transaction

Updating : vxlan-2.0.1.0-9.2.1.lib32_n9000

1/2

starting pre-install package version mgmt for vxlan

pre-install for vxlan complete

starting post-install package version mgmt for vxlan

post-install for vxlan complete

Cleanup : vxlan-2.0.0.0-9.2.1.lib32_n9000

2/2

Updated:

vxlan.lib32_n9000 0:2.0.1.0-9.2.1

Complete!

See the following example for installing the RPM if it is available in a repository:

dnf install eigrp

Upgrading the RPMs

See the following example for upgrading the RPMs from a remote server (that is reachable in the network):

bash-4.3# **dnf upgrade****http://10.0.0.2/modularity/rpms/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm**Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching,
protect-packages
groups-repo

localdb | 1.1 kB 00:00 ...

patching | 951 B 00:00 ...

thirdparty | 951 B 00:00 ...

vxlan-2.0.1.0-9.2.1.lib32_n9000 | 951 B 00:00 ...

Setting up Upgrade Process

vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm

| 1.6 MB 00:00

Examining /var/tmp/yum-root-RaANgb/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm:

vxlan-2.0.1.0-9.2.1.lib32_n9000

Marking /var/tmp/yum-root-RaANgb/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm as an update to

vxlan-2.0.0.0-9.2.1.lib32_n9000

Resolving Dependencies

--> Running transaction check

```

---> Package vxlan.lib32_n9000 0:2.0.0.0-9.2.1 will be updated
---> Package vxlan.lib32_n9000 0:2.0.1.0-9.2.1 will be an update
--> Finished Dependency Resolution

```

Dependencies Resolved

Package	Repository	Arch	Version	Size
Updating:				
vxlan		lib32_n9000	2.0.1.0-9.2.1	
	/vxlan-2.0.1.0-9.2.1.lib32_n9000			6.4 M
Transaction Summary				

Upgrade 1 Package

Total size: 6.4 M

Is this ok [y/N]: y

Downloading Packages:

Running Transaction Check

Running Transaction Test

Transaction Test Succeeded

Running Transaction

** Found 1 pre-existing rpmdb problem(s), 'yum check' output follows:

busybox-1.23.2-r0.0.x86_64 has missing requires of busybox-syslog

Updating : vxlan-2.0.1.0-9.2.1.lib32_n9000

1/2

starting pre-install package version mgmt for vxlan

pre-install for vxlan complete

starting post-install package version mgmt for vxlan

post-install for vxlan complete

Cleanup : vxlan-2.0.0.0-9.2.1.lib32_n9000

2/2

Updated:

vxlan.lib32_n9000 0:2.0.1.0-9.2.1

Complete!

See the following example for upgrading the RPMs from local bootflash:

```
sudo dnf upgrade /bootflash/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm
```

```

Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching,
protect-packages
groups-repo

```

```

localdb          | 1.1 kB    00:00 ...

```

```

patching        | 951 B     00:00 ...

```

```

thirdparty     | 951 B     00:00 ...

```

```

                | 951 B     00:00 ...

```

Setting up Upgrade Process

Examining /bootflash/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm: vxlan-2.0.1.0-9.2.1.lib32_n9000


```

Marking /bootflash/vxlan-2.0.1.0-9.2.1.lib32_n9000.rpm as an update to
vxlan-2.0.0.0-9.2.1.lib32_n9000
Resolving Dependencies
--> Running transaction check
---> Package vxlan.lib32_n9000 0:2.0.0.0-9.2.1 will be updated
---> Package vxlan.lib32_n9000 0:2.0.1.0-9.2.1 will be an update
--> Finished Dependency Resolution

```

Dependencies Resolved

Package Version	Arch	Repository
	Size	
Updating:		
vxlan 2.0.1.0-9.2.1	lib32_n9000	/vxlan-2.0.1.0-9.2.1.lib32_n9000
	6.4 M	

Transaction Summary

Upgrade 1 Package

Total size: 6.4 M

Is this ok [y/N]: y

Downloading Packages:

Running Transaction Check

Running Transaction Test

Transaction Test Succeeded

Running Transaction

Updating : vxlan-2.0.1.0-9.2.1.lib32_n9000

1/2

starting pre-install package version mgmt for vxlan

pre-install for vxlan complete

starting post-install package version mgmt for vxlan

post-install for vxlan complete

Cleanup : vxlan-2.0.0.0-9.2.1.lib32_n9000

2/2

Updated:

vxlan.lib32_n9000 0:2.0.1.0-9.2.1

Complete!

See the following example for upgrading the RPMs if it is available in any repository:

```
dnf upgrade eigrp
```

Downgrading the RPMs

See the following example for downgrading the RPMs from a remote server (that is reachable in the network):

```
sudo dnf  
downgrade vxlan-2.0.0.0-9.2.1.lib32_n9000
```

```
Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching,
protect-packages
Setting up Downgrade Process
groups-repo
```

```
localdb          | 1.1 kB    00:00 ...
localdb/primary  | 951 B     00:00 ...
localdb          | 1.3 kB    00:00 ...
patching                2/2
thirdparty          | 951 B     00:00 ...
                    | 951 B     00:00 ...
```

```
Resolving Dependencies
--> Running transaction check
---> Package vxlan.lib32_n9000 0:2.0.0.0-9.2.1 will be a downgrade
---> Package vxlan.lib32_n9000 0:2.0.1.0-9.2.1 will be erased
--> Finished Dependency Resolution
```

Dependencies Resolved

Package	Version	Size	Arch	Repository
Downgrading:				
vxlan	2.0.0.0-9.2.1	1.6 M	lib32_n9000	groups-repo
Transaction Summary				

Downgrade 1 Package

```
Total download size: 1.6 M
Is this ok [y/N]: y
Downloading Packages:
Running Transaction Check
Running Transaction Test
Transaction Test Succeeded
Running Transaction
Installing : vxlan-2.0.0.0-9.2.1.lib32_n9000
```

```
1/2
starting pre-install package version mgmt for vxlan
pre-install for vxlan complete
starting post-install package version mgmt for vxlan
post-install for vxlan complete
Cleanup : vxlan-2.0.1.0-9.2.1.lib32_n9000
```

```
2/2

Removed:
vxlan.lib32_n9000 0:2.0.1.0-9.2.1
```

```
Installed:
  vxlan.lib32_n9000 0:2.0.0.0-9.2.1
```

```
Complete!
```

See the following example for downgrading the RPMs from local bootflash:

```
dnf downgrade /bootflash/eigrp-2.0.0-9.2.1.lib32_n9000.rpm
```

See the following example for downgrading the RPMs if it is available in any repository:

```
dnf downgrade eigrp
```

Deleting the RPMs

Deleting the RPMs de-installs the RPMs and removes any configuration CLI of the feature. Use the **dnf erase** *<rpm>* command to delete the RPMs.

```
bash-4.2# sudo dnf erase vxlan
```

```
Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching,
protect-packages
Setting up Remove Process
Resolving Dependencies
--> Running transaction check
---> Package vxlan.lib32_n9000 0:2.0.1.0-9.2.1 will be erased
--> Finished Dependency Resolution
```

```
Dependencies Resolved
```

Package	Arch	Repository	Version	Size
Removing:				
vxlan	lib32_n9000	@/vxlan-2.0.1.0-9.2.1.lib32_n9000	2.0.1.0-9.2.1	6.4 M

```
Transaction Summary
```

```
Remove      1 Package
```

```
Installed size: 6.4 M
Is this ok [y/N]: y
Downloading Packages:
Running Transaction Check
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Erasing      : vxlan-2.0.1.0-9.2.1.lib32_n9000

                               1/1
starting pre-remove package version mgmt for vxlan
```

```
pre-remove for vxlan complete

Removed:
  vxlan.lib32_n9000 0:2.0.1.0-9.2.1

Complete!
```

Support for DNF Groups

The support for DNF groups is part of the package management. It simplifies the management of the packages for the administrators and it provides greater flexibility.

The administrators can group a list of packages (RPMs) into a logical group and they can perform various operations. DNF supports the following group commands:

- grouplist
- groupinfo
- groupinstall
- groupremove
- groupupdate

DNF groups can be broadly classified as L2, L3, routing, and management.

Using the grouplist Command

In Linux, number of packages are bundled to particular group. Instead of installing individual packages with `dnf`, you can install particular group that will install all the related packages that belongs to the group. For example to list all the available groups, use the **`dnf grouplist`** command:

```
bash-4.4# dnf grouplist
Last metadata expiration check: 0:00:00 ago on Fri 08 Mar 2024 12:26:33 PM UTC.
] --- B/s | 0 B    --:-- ETA
Available Groups:
  management
  routing
  L2
  L3
bash-4.4#
```

Using the groupmembers Command

Use **`dnf groupinfo`** command to display the description and the contents of a package group. The command lists out the feature members of the group.

```
bash-4.4# dnf groupinfo l2
Last metadata expiration check: 0:00:00 ago on Fri 08 Mar 2024 12:27:44 PM UTC.
] --- B/s | 0 B    --:-- ETA

Group: L2
Mandatory Packages:
  lacp
  lldp
  svi
```

```
vtp
bash-4.4#
```

Using the groupinstall Command

This command is for both install and upgrade of the members RPM. If the member is not installed, it will install the highest version available. If the member is already installed and higher RPM is available, it will upgrade that member.

```
bash-4.4# dnf groupinstall 13
Last metadata expiration check: 0:00:00 ago on Fri 08 Mar 2024 12:38:05 PM UTC.
] --- B/s | 0 B    --- ETA
Not a redundant system. Nothing todo
Dependencies resolved.
```

Group	Packages
-------	----------

```
Marking packages as installed by the group:
@L3                                     bfd
```

```
Is this ok [y/N]: y
Complete!
```

```
Install operation 10 completed successfully at Fri Mar 8 12:38:08 2024.
```

```
[#####] 100%
```

Using the groupupdate Command

Use the **dnf groupupdate** command to update any existing installed group packages.

```
bash-4.4# dnf groupupdate 13
```

```
Last metadata expiration check: 0:00:00 ago on Wed 13 Mar 2024 12:30:11 PM UTC.
] --- B/s | 0 B    --- ETA
Dependencies resolved.
```

Group	Packages
-------	----------

```
Marking packages as installed by the group:
@L3                                     bfd
```

Package	Arch Repository	Size	Version
---------	--------------------	------	---------

```
Installing group packages:
```

bfd	lib32_64_n9000		2.0.0.0-10.4.3
	groups-repo	562 k	

```
Transaction Summary
```

```
Install 1 Package
```

```
Total size: 562 k
Installed size: 2.3 M
Is this ok [y/N]: y
Downloading Packages:
Running transaction check
Transaction check succeeded.
```

```

Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                               1/1
  Running scriptlet: bfd-2.0.0.0-10.4.3.lib32_64_n9000 1/1
starting pre-install package version mgmt for bfd
pre-install for bfd complete
  Installing      : bfd-2.0.0.0-10.4.3.lib32_64_n9000 1/1
  Running scriptlet: bfd-2.0.0.0-10.4.3.lib32_64_n9000 1/1
starting post-install package version mgmt for bfd
post-install for bfd complete
  Verifying      : bfd-2.0.0.0-10.4.3.lib32_64_n9000 1/1

Installed:
  bfd.lib32_64_n9000 2.0.0.0-10.4.3

Complete!
Install operation 14 completed successfully at Wed Mar 13 12:30:23 2024.

[#####] 100%
bash-4.4#

```

Using the grouperase Command

Use the **dnf grouperase** command to delete the groups or all the RPM members of the group.

```

bash-4.4# dnf grouperase l3
Dependencies resolved.

```

```

=====
Group                                     Packages
=====
Marking packages as removed by the group:
@L3                                       bfd
=====

Package      Repository      Arch      Size      Version
=====
Removing:
bfd          @System        lib32_64_n9000 2.3 M     2.0.0.0-10.4.3

Transaction Summary
=====
Remove 1 Package

Freed space: 2.3 M
Is this ok [y/N]: y
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                               1/1
  Running scriptlet: bfd-2.0.0.0-10.4.3.lib32_64_n9000

```

```

starting pre-remove package version mgmt for bfd
pre-remove for bfd complete
  Erasing          : bfd-2.0.0.0-10.4.3.lib32_64_n9000
                    1/1
  Running scriptlet: bfd-2.0.0.0-10.4.3.lib32_64_n9000
                    1/1
starting post-remove package version mgmt for bfd
post-remove for bfd complete

  Verifying        : bfd-2.0.0.0-10.4.3.lib32_64_n9000
                    1/1

Removed:
  bfd.lib32_64_n9000 2.0.0.0-10.4.3
                                          Complete!
Install operation 11 completed successfully at Fri Mar  8 12:38:41 2024.

[#####] 100%
bash-4.4#

```

Finding Repositories

This command lists the repositories that the switch has along with the number of RPMs it has to those repositories.

```

bash-4.3# dnf repolist all

Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching,
protect-packages
groups-repo

localdb          | 1.1 kB    00:00 ...
patching         | 951 B     00:00 ...
thirdparty      | 951 B     00:00 ...
repo id         | 951 B     00:00 ...
repo id         |
repo name
status
groups-repo     Groups-RPM Database
enabled: 37
localdb         Local RPM Database
enabled: 6
patching        Patch-RPM Database
enabled: 0
thirdparty      Thirdparty RPM Database
enabled: 0
open-nxos       open-nxos
disabled
repolist: 43

```

Finding the Installed DNF Version

See the following example for listing the installed DNF version:

```
dnf --version
```

```
3.4.3
  Installed: rpm-5.4.14-r0.0.x86_64 at 2018-06-02 13:04
  Built    : Wind River <info@windriver.com> at 2018-04-27 08:36
  Committed: Wind River <info@windriver.com> at 2018-04-27

  Installed: yum-3.4.3-r9.0.x86_64 at 2018-06-02 13:05
  Built    : Wind River <info@windriver.com> at 2018-04-27 08:36
  Committed: Wind River <info@windriver.com> at 2018-04-27
```

Mapping the NX-OS CLI to the DNF Commands

See the following table for mapping the NX-OS CLI to the DNF commands:

Table 6: Patching Command Reference

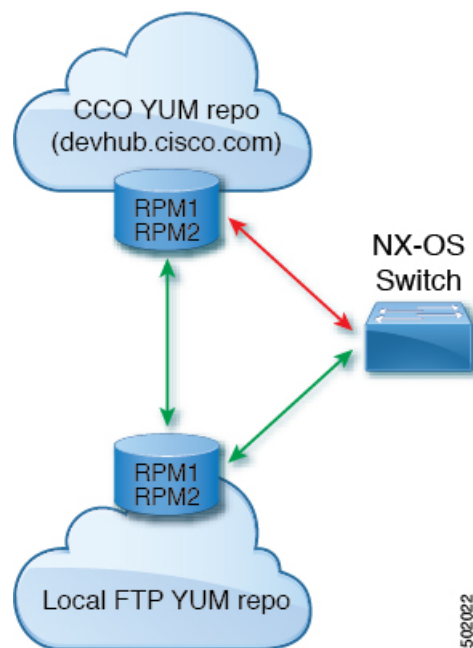
NX-OS CLI Commands	DNF Commands
show install inactive	dnf list --patch-only available
show install active	dnf list --patch-only installed
show install committed	dnf list --patch-only committed
show install packages	dnf list --patch-only
show install pkg-info	dnf info --patch-only
show install log	dnf history --show-patch-log where log_cmd: <ul style="list-style-type: none"> • opid= - Log that is specific to an operation ID. • last - Shows the latest operation log. • reverse – Shows the log in reverse order. • detail – Show detailed log. • from= - Shows logging from a specific operation ID.
clear install log	dnf history --clear-patch-log= where clear_log_cmd: <ul style="list-style-type: none"> • all - Clears the complete log. • - Clears the logs above this operation ID.
install add	dnf install --add bootflash:/

NX-OS CLI Commands	DNF Commands
install remove	<code>dnf install --remove</code>
install remove inactive	<code>dnf install --remove all</code>
install activate	<code>dnf install --no-persist --nocommit</code> Note By default, all packages are activated and committed.
install deactivate	<code>dnf erase --nocommit</code> Note By default, all packages are de-activated and committed.
install commit	<code>dnf install --commit</code>
Install commit	<code>dnf install --commit all</code>

Configuring an FTP server and Setting up a Local FTP YUM Repository

For setting up a local FTP YUM repository, you have to first create an FTP server, create a local FTP YUM repository, and configure the Cisco NX-OS switch to reach the FTP server as outlined in the following illustration.

Figure 2: Configuring an FTP server and Setting up a Local FTP YUM Repository





Note For Cisco NX-OS Release 10.1(1), visit <https://devhub.cisco.com/artifactory/open-nxos/10.1.1/> for Cisco open-nxos repository.

Creating an FTP Server on Red Hat Enterprise Linux 7 (RHEL7) Virtual Machine

Complete the following steps to create an FTP server on Red Hat Enterprise Linux 7 (RHEL7) Virtual Machine (VM):

SUMMARY STEPS

1. `dnf install vsftpd`
2. `systemctl start vsftpd`
3. `systemctl status vsftpd`
4. `firewall-cmd --zone=public --permanent --add-port=21/tcp`
5. `firewall-cmd --zone=public --permanent --add-service=ftp`
6. `firewall-cmd --reload`
7. `wget ftp:// <ip of FTP server> /test.txt`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>dnf install vsftpd</code>	Installs vsftpd, an FTP server.
Step 2	<code>systemctl start vsftpd</code>	Starts the FTP Server.
Step 3	<code>systemctl status vsftpd</code>	Checks the status of the FTP Server.
Step 4	<code>firewall-cmd --zone=public --permanent --add-port=21/tcp</code>	Allows access to the FTP services from the external systems and opens port 21.
Step 5	<code>firewall-cmd --zone=public --permanent --add-service=ftp</code>	Adds the FTP service.
Step 6	<code>firewall-cmd --reload</code>	Reloads the server.
Step 7	<code>wget ftp:// <ip of FTP server> /test.txt</code>	Hosts a file in the FTP server (for example, test.txt) and attempts Wget of that file. Note Note that <code>/var/ftp/</code> is the default home directory of the FTP server.

Creating a Local FTP YUM Repository

Complete the following steps to synchronize the external repository RPMs to the FTP server and create a local FTP YUM repository:

SUMMARY STEPS

1. **touch /etc/yum.repos.d/local.repo**
2. **vim /etc/yum.repos.d/local.repo**
3. **cat /etc/yum.repos.d/local.repo**
4. **dnf repolist**
5. **nohup reposync -r <repo-name mentioned in the local.repo> -p <directory path to sync>&**
6. **tail -f nouhup.out**

DETAILED STEPS

	Command or Action	Purpose
Step 1	touch /etc/yum.repos.d/local.repo Example: <pre>bash-4.3#touch /etc/yum.repos.d/local.repo</pre>	Creates a repository file under /etc/yum.repos.d/ , for example, creates local.repo repository and adds the base URL.
Step 2	vim /etc/yum.repos.d/local.repo Example: <pre>bash-4.3#vim /etc/yum.repos.d/local.repo [localrepo] name=localrepo baseurl= https://devhub.cisco.com/artifactory/open-nxos/7.0-3-I2-1/x86_64/ enabled=1 gpgcheck=0 ssilverify=0</pre>	Edit the repository file and copy the localrepo details. Note Modify the base URL to the required repository URL.
Step 3	cat /etc/yum.repos.d/local.repo Example: <pre>bash-4.3#cat /etc/yum.repos.d/local.repo [localrepo] name=localrepo baseurl= https://devhub.cisco.com/artifactory/open-nxos/7.0-3-I2-1/x86_64/ enabled=1 gpgcheck=0 ssilverify=0</pre>	Verify the local repository data to proceed further.
Step 4	dnf repolist Example: <pre>bash-4.3# dnf repolist Loaded plugins: fastestmirror, langpacks Loading mirror speeds from cached hostfile * base: mirror.dhakacom.com * extras: mirror.dhakacom.com * updates: mirror.dhakacom.com repo id repo name status base/7/x86_64 CentOS-7 - Base 9,911 extras/7/x86_64 CentOS-7 - Extras 313 localrepo localrepo 687</pre>	Checks the reachability of the repository.

	Command or Action	Purpose
	updates/7/x86_64 CentOS-7 - Updates 711 repolist: 11,622	
Step 5	<p>nohup reposync -r <repo-name mentioned in the local.repo> -p <directory path to sync>&</p> <p>Example:</p> <pre>nohup reposync -r localrepo -p /var/ftp/ &</pre> <p>This command creates a directory with the name local.repo inside /var/ftp/ and downloads all the packages from devhub.cisco.com to the directory.</p>	Synchronizes all the packages from the external repository to the FTP server home directory.
Step 6	tail -f nouhup.out	Checks the status of the synchronization.

Configuring a Switch to Reach an FTP Server

Complete the following steps to configure a switch to reach an FTP server:

SUMMARY STEPS

1. **run bash sudo su**
2. **ip netns exec management ping** <ip_address>
3. **touch /etc/yum/repos.d/ftp.repo**
4. **vim /etc/yum/repos.d/ftp.repo**
5. **cat /etc/yum/repos.d/ftp.repo**
6. **ip netns exec management bash**
7. **dnf repolist**
8. **dnf list available**

DETAILED STEPS

	Command or Action	Purpose
Step 1	run bash sudo su	Logs in as a sudo user.
Step 2	ip netns exec management ping <ip_address>	Checks the reachability of the FTP server address from the switch using the ping command.
Step 3	<p>touch /etc/yum/repos.d/ftp.repo</p> <p>Example:</p> <pre>bash-4.3#touch /etc/yum/repos.d/ftp.repo</pre>	Creates a repository file under /etc/yum/repos.d/ , for example, creates ftp.repo repository.
Step 4	<p>vim /etc/yum/repos.d/ftp.repo</p> <p>Example:</p> <pre>bash-4.3#vim /etc/yum/repos.d/ftp.repo</pre> <pre>[ftp] name=ftp baseurl=</pre>	<p>Edit the repository file and copy the ftp repo details.</p> <p>Note Modify the base URL to the required ftp server IP.</p>

	Command or Action	Purpose
	ftp://198.51.100.1/localrepo/ enabled=1 gpgcheck=0 ssilverify=0	
Step 5	cat /etc/yum/repos.d/ftp.repo Example: bash-4.3# cat /etc/yum/repos.d/ftp.repo [ftp] name=ftp baseurl=ftp://198.51.100.1/localrepo/ enabled=1 gpgcheck=0 ssilverify=0	Creates a repository file on the switch with the FTP server address as the URL.
Step 6	ip netns exec management bash	Uses the Bash shell prompt.
Step 7	dnf repolist Example: bash-4.3# dnf repolist Loaded plugins: downloadonly, importpubkey, localrpmDB, patchaction, patching, : protect-packages groups-repo 1.1 kB 00:00 ... localdb 951 B 00:00 ... patching 951 B 00:00 ... thirdparty 951 B 00:00 ... thirdparty/primary 758 B 00:00 ... thirdparty 1/1 repo id repo name status groups-repo Groups-RPM Database 37 localdb Local RPM Database 0 patching Patch-RPM Database 0 thirdparty Thirdparty RPM Database 1 ftp ftp 686 repolist: 724	Checks the reachability of newly created repository.
Step 8	dnf list available	Lists the available packages in the new repository.

Creating User Roles for Install Operation

The **install** command is only available to the users of admin role. The **install** command can be available to a user by RBAC. See *Guidelines and Limitations for User Accounts and RBAC* for the same in the *Cisco Nexus 3600 NX-OS Security Configuration Guide*.

Compacting Cisco NX-OS Software Images

Cisco NX-OS software image compaction reduces the size of the image file before completing a copy request. Use SCP, HTTP, or HTTPS as the source and bootflash or USB as the destination. The following example uses SCP and bootflash:

```
switch# copy scp://user@scpserver.cisco.com/download/nxos64.10.1.1.bin
bootflash:nxos64.10.1.1.bin compact vrf management use-kstack

user1@10.65.42.196's password:
nxos64.10.1.1.bin 100% 1501MB 8.4MB/s 02:58
Copy complete, now saving to disk (please wait)...
Copy complete.
```

The **compact** keyword compacts the NX-OS image before copying the file to the supervisor module.



Note Software image compaction is only supported on SCP, HTTP, or HTTPS. If you attempt compaction with any other protocol, the system returns the following error:

```
Compact option is allowed only with source as scp/http/https and destination
as bootflash or usb
```



Note Compacted images are not supported with LXC boot mode.



Note Software image compaction is only supported on Cisco Nexus 9300-series platform switches.
