Upgrading the Switch Software

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Finding the Software Version

The package files for the Cisco IOS XE software are stored on the system board flash device (flash:).

You can use the **show version** privileged EXEC command to see the software version that is running on your switch.

Note Although the **show version** output always shows the software image running on the switch, the model name shown at the end of this display is the factory configuration and does not change if you upgrade the software license.

You can also use the **dir** *filesystem:* privileged EXEC command to see the directory names of other software images that you might have stored in flash memory.

Software Images

Release	Image Type	File Name
Cisco IOS XE Dublin 17.12.8	CAT9K_IOSXE	cat9k_iosxe.17.12.08.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.12.08.SPA.bin

Release	Image Type	File Name
Cisco IOS XE Dublin 17.12.7	CAT9K_IOSXE	cat9k_iosxe.17.12.07.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.12.07.SPA.bin
Cisco IOS XE Dublin 17.12.6	CAT9K_IOSXE	cat9k_iosxe.17.12.06.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.12.06.SPA.bin
Cisco IOS XE Dublin 17.12.5	CAT9K_IOSXE	cat9k_iosxe.17.12.05.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.12.05.SPA.bin
Cisco IOS XE Dublin 17.12.4	CAT9K_IOSXE	cat9k_iosxe.17.12.04.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.12.04.SPA.bin
Cisco IOS XE Dublin 17.12.3	CAT9K_IOSXE	cat9k_iosxe.17.12.03.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.12.03.SPA.bin
Cisco IOS XE Dublin 17.12.2	CAT9K_IOSXE	cat9k_iosxe.17.12.02.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.12.02.SPA.bin
Cisco IOS XE Dublin 17.12.1	CAT9K_IOSXE	cat9k_iosxe.17.12.01.SPA.bin
	No Payload Encryption (NPE)	cat9k_iosxe_npe.17.12.01.SPA.bin

Upgrading the ROMMON

To know the ROMMON or bootloader version that applies to every major and maintenance release, see ROMMON Versions.

You can upgrade the ROMMON before, or, after upgrading the software version. If a new ROMMON version is available for the software version you are upgrading to, proceed as follows:

- Upgrading the ROMMON in the primary SPI flash device

  This ROMMON is upgraded automatically. When you upgrade from an existing release on your switch to a later or newer release for the first time, and there is a new ROMMON version in the new release, the system automatically upgrades the ROMMON in the primary SPI flash device, based on the hardware version of the switch.

- Upgrading the ROMMON in the golden SPI flash device

  You must manually upgrade this ROMMON. The manual upgrade applies to all models in the series. Enter the **upgrade rom-monitor capsule golden switch** command in privileged EXEC mode.

Note

- In case of a Cisco StackWise Virtual setup, upgrade the active and standby switch.

After the ROMMON is upgraded, it will take effect on the next reload. If you go back to an older release after this, the ROMMON is not downgraded. The updated ROMMON supports all previous releases.

Software Installation Commands

Summary of Software Installation Commands **Supported starting from Cisco IOS XE Everest 16.6.2 and later releases**	
To install and activate the specified file, and to commit changes to be persistent across reloads: **`install add file`** *`filename`* [**`activate commit`**] To separately install, activate, commit, cancel, or remove the installation file: **`install ?`**	
add file tftp: *filename*	Copies the install file package from a remote location to the device and performs a compatibility check for the platform and image versions.
activate [**auto-abort-timer**]	Activates the file, and reloads the device. The **auto-abort-timer** keyword automatically rolls back image activation.
commit	Makes changes persistent over reloads.
rollback to committed	Rolls back the update to the last committed version.
abort	Cancels file activation, and rolls back to the version that was running before the current installation procedure started.
remove	Deletes all unused and inactive software installation files.

Note The **request platform software** commands are deprecated starting from Cisco IOS XE Gibraltar 16.10.1. The commands are visible on the CLI in this release and you can configure them, but we recommend that you use the **install** commands to upgrade or downgrade.

Summary of request platform software Commands **Note** **This table of commands is not supported on Cisco Catalyst 9500 Series Switches - High Performance.**	
`Device#` **`request platform software package ?`**	
clean	Cleans unnecessary package files from media
copy	Copies package to media
describe	Describes package content
expand	Expands all-in-one package to media
install	Installs the package
uninstall	Uninstalls the package

Summary of request platform software Commands Note This table of commands is not supported on Cisco Catalyst 9500 Series Switches - High Performance.	
verify	Verifies In Service Software Upgrade (ISSU) software package compatibility

Upgrading in Install Mode

Follow these instructions to upgrade from one release to another, using **install** commands, in install mode. To perform a software image upgrade, you must be booted into IOS through **boot flash:packages.conf**.

Before you begin

When upgrading from ...	Use these commands...	To upgrade to...
Cisco IOS XE Everest 16.5.1a or Cisco IOS XE Everest 16.6.1	Only **request platform software** commands	Cisco IOS XE Dublin 17.12.x
Cisco IOS XE Everest 16.6.2 and all later releases	On Cisco Catalyst 9500 Series Switches, either **install** commands or **request platform software** commands[1]. On Cisco Catalyst 9500 Series Switches - High Performance, only install commands[2].	

[1] The **request platform software** commands are deprecated. So although they are still visible on the CLI, we recommend that you use **install** commands.
[2] Introduced in Cisco IOS XE Fuji 16.8.1a.

The sample output in this section displays upgrade from Cisco IOS XE Dublin 17.11.1 to Cisco IOS XE Dublin 17.12.1 using **install** commands only.

Procedure

Step 1 Clean-up

install remove inactive

Use this command to clean-up old installation files in case of insufficient space and to ensure that you have at least 1GB of space in flash, to expand a new image.

The following sample output displays the cleaning up of unused files, by using the **install remove inactive** command:

```
Switch# install remove inactive

install_remove: START Mon Jul 24 19:51:48 UTC 2023
Cleaning up unnecessary package files
```

```
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
    cat9k-cc_srdriver.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-espbase.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-guestshell.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-rpbase.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-rpboot.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-sipbase.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-sipspa.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-srdriver.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-webui.17.11.01.SPA.pkg
      File is in use, will not delete.
    cat9k-wlc.17.11.01.SPA.pkg
      File is in use, will not delete.
    packages.conf
      File is in use, will not delete.
  done.
The following files will be deleted:
[R0]:
/flash/cat9k-cc_srdriver.17.11.01.SPA.pkg
/flash/cat9k-espbase.17.11.01.SPA.pkg
/flash/cat9k-guestshell.17.11.01.SPA.pkg
/flash/cat9k-rpbase.17.11.01.SPA.pkg
/flash/cat9k-rpboot.17.11.01.SPA.pkg
/flash/cat9k-sipbase.17.11.01.SPA.pkg
/flash/cat9k-sipspa.17.11.01.SPA.pkg
/flash/cat9k-srdriver.17.11.01.SPA.pkg
/flash/cat9k-webui.17.11.01.SPA.pkg
/flash/cat9k-wlc.17.11.01.SPA.pkg
/flash/packages.conf

Do you want to remove the above files? [y/n]y
[R0]:
Deleting file flash:cat9k-cc_srdriver.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-espbase.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-guestshell.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpbase.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpboot.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipbase.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipspa.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-srdriver.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-webui.17.11.01.SPA.pkg ... done.
Deleting file flash:cat9k-wlc.17.11.01.SPA.pkg ... done.
Deleting file flash:packages.conf ... done.
SUCCESS: Files deleted.
--- Starting Post_Remove_Cleanup ---
Performing Post_Remove_Cleanup on all members
[1] Post_Remove_Cleanup package(s) on switch 1
[1] Finished Post_Remove_Cleanup on switch 1
Checking status of Post_Remove_Cleanup on [1]
Post_Remove_Cleanup: Passed on [1]
Finished Post_Remove_Cleanup

SUCCESS: install_remove Mon Jul 24 19:52:25 UTC 2023
Switch#
```

Step 2 Copy new image to flash

a) **copy tftp:***[[//location]/directory]/filename* **flash:**

Use this command to copy the new image from a TFTP server to flash memory. The location is either an IP address or a host name. The filename is specified relative to the directory used for file transfers. Skip this step if you want to use the new image from a TFTP server.

```
Switch# copy tftp://10.8.0.6/image/cat9k_iosxe.17.12.01.SPA.bin flash:
destination filename [cat9k_iosxe.17.12.01.SPA.bin]?
Accessing tftp://10.8.0.6/image/cat9k_iosxe.17.12.01.SPA.bin...
Loading /cat9k_iosxe.17.12.01.SPA.bin from 10.8.0.6 (via GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 601216545 bytes]

601216545 bytes copied in 50.649 secs (11870255 bytes/sec)
```

b) **dir flash:**

Use this command to confirm that the image has been successfully copied to flash.

```
Switch# dir flash:*.bin
Directory of flash:/*.bin

Directory of flash:/

434184 -rw- 601216545    Jul 24 2023 10:18:11 -07:00 cat9k_iosxe.17.12.01.SPA.bin
11353194496 bytes total (8976625664 bytes free)
```

Step 3 Set boot variable

a) **boot system flash:packages.conf**

Use this command to set the boot variable to **flash:packages.conf**.

```
Switch(config)# boot system flash:packages.conf
```

b) **no boot manual**

Use this command to configure the switch to auto-boot. Settings are synchronized with the standby switch, if applicable.

```
Switch(config)# no boot manual
Switch(config)# exit
```

c) **write memory**

Use this command to save boot settings.

```
Switch# write memory
```

d) **show bootvar** or **show boot**

Use this command to verify the boot variable (packages.conf) and manual boot setting (no):

```
Switch# show bootvar              <<on the C9500-24Y4C,C9500-32C, C9500-32QC, and
C9500-48Y4C models
BOOT variable = bootflash:packages.conf
MANUAL_BOOT variable = no
BAUD variable = 9600
ENABLE_BREAK variable = yes
BOOTMODE variable does not exist
IPXE_TIMEOUT variable does not exist
```

```
CONFIG_FILE variable =

Standby BOOT variable = bootflash:packages.conf
Standby MANUAL_BOOT variable = no
Standby BAUD variable = 9600
Standby ENABLE_BREAK variable = yes
Standby BOOTMODE variable does not exist
Standby IPXE_TIMEOUT variable does not exist
Standby CONFIG_FILE variable =
```

```
Switch# show boot                          <<on the C9500-12Q,C9500-16X C9500-24Q, and
C9500-40X models
Current Boot Variables:
BOOT variable = flash:packages.conf;

Boot Variables on next reload:
BOOT variable = flash:packages.conf;
Manual Boot = no
Enable Break = yes
Boot Mode = DEVICE
iPXE Timeout = 0
```

Step 4 Install image to flash

install add file activate commit

Use this command to install the image.

We recommend that you point to the source image on your TFTP server or the flash drive of the *active* switch, if you have copied the image to flash memory. If you point to an image on the flash or USB drive of a member switch (instead of the active), you must specify the exact flash or USB drive - otherwise installation fails. For example, if the image is on the flash drive of member switch 3 (flash-3): `Switch# install add file flash-3:cat9k_iosxe.17.12.01.SPA.bin activate commit`.

The following sample output displays installation of the Cisco IOS XE Dublin 17.12.1 software image in the flash memory:

```
Switch# install add file flash:cat9k_iosxe.17.12.01.SPA.bin activate commit
install_add_activate_commit: Adding PACKAGE
install_add_activate_commit: Checking whether new add is allowed ....
--- Starting Add ---
Performing Add on Active/Standby
 [1] Add package(s) on R0
 [1] Finished Add on R0

Checking status of Add on [R0]
Add: Passed on [R0]
Finished Add

Image added. Version: 17.12.01

install_add_activate_commit: Activating PACKAGE
Following packages shall be activated:
/flash/cat9k-wlc.17.12.01.SPA.pkg
/flash/cat9k-webui.17.12.01.SPA.pkg
/flash/cat9k-srdriver.17.12.01.SPA.pkg
/flash/cat9k-sipspa.17.12.01.SPA.pkg
/flash/cat9k-sipbase.17.12.01.SPA.pkg
/flash/cat9k-rpboot.17.12.01.SPA.pkg
/flash/cat9k-rpbase.17.12.01.SPA.pkg
/flash/cat9k-guestshell.17.12.01.SPA.pkg
/flash/cat9k-espbase.17.12.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.12.01.SPA.pkg
```

```
This operation may require a reload of the system. Do you want to proceed? [y/n] y

--- Starting Activate ---

Performing Activate on Active/Standby
[1] Activate package(s) on R0
    --- Starting list of software package changes ---
    Old files list:
      Removed cat9k-cc_srdriver.17.11.01.SPA.pkg
      Removed cat9k-espbase.17.11.01.SPA.pkg
      Removed cat9k-guestshell.17.11.01.SPA.pkg
      Removed cat9k-rpbase.17.11.01.SPA.pkg
      Removed cat9k-rpboot.17.11.01.SPA.pkg
      Removed cat9k-sipbase.17.11.01.SPA.pkg
      Removed cat9k-sipspa.17.11.01.SPA.pkg
      Removed cat9k-srdriver.17.11.01.SPA.pkg
      Removed cat9k-webui.17.11.01.SPA.pkg
      Removed cat9k-wlc.17.11.01.SPA.pkg
    New files list:
      Added cat9k-cc_srdriver.17.12.01.SSA.pkg
      Added cat9k-espbase.17.12.01.SSA.pkg
      Added cat9k-guestshell.17.12.01.SSA.pkg
      Added cat9k-lni.17.12.01.SSA.pkg
      Added cat9k-rpbase.17.12.01.SSA.pkg
      Added cat9k-rpboot.17.12.01.SSA.pkg
      Added cat9k-sipbase.17.12.01.SSA.pkg
      Added cat9k-sipspa.17.12.01.SSA.pkg
      Added cat9k-srdriver.17.12.01.SSA.pkg
      Added cat9k-webui.17.12.01.SSA.pkg
      Added cat9k-wlc.17.12.01.SSA.pkg
    Finished list of software package changes
  [1] Finished Activate on R0
Checking status of Activate on [R0]
Activate: Passed on [R0]
Finished Activate

--- Starting Commit ---
Performing Commit on Active/Standby
  [1] Commit package(s) on R0
  [1] Finished Commit on R0
Checking status of Commit on [R0]
Commit: Passed on [R0]
Finished Commit
Send model notification for install_add_activate_commit before reload
Install will reload the system now!
SUCCESS: install_add_activate_commit  Mon Jul 24 12:13:05 IST 2023

Switch#Jul 24 12:13:11.023: %PMANTACTION: F0/0vp: Process manager is exiting: n requested
Jul 24 12:13:11.028: %PMAN-5-EXITACTION: C1/0: pvp: Process manager is exiting: reload fru
 action requested
Jul 24 12:13:11.825: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: reload
action requested

Initializing Hardware...
System Bootstrap, Version 17.4.1r[FC2], RELEASE SOFTWARE (P)

Compiled 18-07-2022 12:00:00.00 by rel
Current ROMMON image : Primary Rommon Image
Last reset cause:LocalSoft
C9500-32QC platform with 16777216 Kbytes of main memory
Preparing to autoboot. [Press Ctrl-C to interrupt]  5     5     /-\|/-\|/-4     \|/-\|/-\|3
     /-\|/-\|/-2     \|/-\|/-\|1     /-\|/-\|/-0

boot: attempting to boot from [bootflash:packages.conf]
```

```
boot: reading file packages.conf
<output truncated>
```

Note
The system reloads automatically after executing the **install add file activate commit** command. You do not have to manually reload the system.

Step 5 Verify installation

After the software has been successfully installed, use the **dir flash:** command to verify that the flash partition has ten new `.pkg` files and two `.conf` files.

a) **dir flash:*.pkg**

The following is sample output of the **dir flash:*.pkg** command:

```
Switch# dir flash:*.pkg

Directory of flash:/
475140 -rw- 2012104   Mar 9 2023 09:52:41 -07:00 cat9k-cc_srdriver.17.11.01.SPA.pkg
475141 -rw- 70333380  Mar 9 2023 09:52:44 -07:00 cat9k-espbase.17.11.01.SPA.pkg
475142 -rw- 13256     Mar 9 2023 09:52:44 -07:00 cat9k-guestshell.17.11.01.SPA.pkg
475143 -rw- 349635524 Mar 9 2023 09:52:54 -07:00 cat9k-rpbase.17.11.01.SPA.pkg
475149 -rw- 24248187  Mar 9 2023 09:53:02 -07:00 cat9k-rpboot.17.11.01.SPA.pkg
475144 -rw- 25285572  Mar 9 2023 09:52:55 -07:00 cat9k-sipbase.17.11.01.SPA.pkg
475145 -rw- 20947908  Mar 9 2023 09:52:55 -07:00 cat9k-sipspa.17.11.01.SPA.pkg
475146 -rw- 2962372   Mar 9 2023 09:52:56 -07:00 cat9k-srdriver.17.11.01.SPA.pkg
475147 -rw- 13284288  Mar 9 2023 09:52:56 -07:00 cat9k-webui.17.11.01.SPA.pkg
475148 -rw- 13248     Mar 9 2023 09:52:56 -07:00 cat9k-wlc.17.11.01.SPA.pkg

491524 -rw- 25711568  Jul 24 2023 11:49:33 -07:00 cat9k-cc_srdriver.17.12.01.SPA.pkg
491525 -rw- 78484428  Jul 24 2023 11:49:35 -07:00 cat9k-espbase.17.12.01.SPA.pkg
491526 -rw- 1598412   Jul 24 2023 11:49:35 -07:00 cat9k-guestshell.17.12.01.SPA.pkg
491527 -rw- 404153288 Jul 24 2023 11:49:47 -07:00 cat9k-rpbase.17.12.01.SPA.pkg
491533 -rw- 31657374  Jul 24 2023 11:50:09 -07:00 cat9k-rpboot.17.12.01.SPA.pkg
491528 -rw- 27681740  Jul 24 2023 11:49:48 -07:00 cat9k-sipbase.17.12.01.SPA.pkg
491529 -rw- 52224968  Jul 24 2023 11:49:49 -07:00 cat9k-sipspa.17.12.01.SPA.pkg
491530 -rw- 31130572  Jul 24 2023 11:49:50 -07:00 cat9k-srdriver.17.12.01.SPA.pkg
491531 -rw- 14783432  Jul 24 2023 11:49:51 -07:00 cat9k-webui.17.12.01.SPA.pkg
491532 -rw- 9160      Jul 24 2023 11:49:51 -07:00 cat9k-wlc.17.12.01.SPA.pkg
11353194496 bytes total (9544245248 bytes free)
Switch#
```

b) **dir flash:*.conf**

The following is sample output of the **dir flash:*.conf** command. It displays the .conf files in the flash partition; note the two .conf files:

- `packages.conf`—the file that has been re-written with the newly installed .pkg files
- `cat9k_iosxe.17.12.01.SPA.conf`—a backup copy of the newly installed packages.conf file

```
Switch# dir flash:*.conf

Directory of flash:/*.conf
Directory of flash:/

434197 -rw- 7406 Jul 24 2023 10:59:16 -07:00 packages.conf
516098 -rw- 7406 Jul 24 2023 10:58:08 -07:00 cat9k_iosxe.17.12.01.SPA.conf
11353194496 bytes total (8963174400 bytes free)
```

Step 6 **show version**

After the image boots up, use this command to verify the version of the new image.

The following sample output of the **show version** command displays the Cisco IOS XE Dublin 17.12.1 image on the device:

```
Switch# show version

Cisco IOS XE Software, Version 17.12.01
Cisco IOS Software [Dublin], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.12.1,
RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2023 by Cisco Systems, Inc.
<output truncated>
```

Downgrading in Install Mode

Follow these instructions to downgrade from one release to another, in install mode.

Before you begin

Note that you can use this procedure for the following downgrade scenarios:

When downgrading from ...	Use these commands...	To downgrade to...
Cisco IOS XE Dublin 17.12.x	• On Cisco Catalyst 9500 Series Switches, either **install** commands or **request platform software** commands[3]. • On Cisco Catalyst 9500 Series Switches - High Performance, only **install** commands	Cisco IOS XE Dublin 17.11.x or earlier releases.

[3] The **request platform software** commands are deprecated. So although they are still visible on the CLI, we recommend that you use **install** commands.

Note New switch models that are introduced in a release cannot be downgraded. The release in which a switch model is introduced is the minimum software version for that model.

The sample output in this section shows downgrade from Cisco IOS XE Dublin 17.12.1 to Cisco IOS XE Dublin 17.11.1, using **install** commands.

Procedure

Step 1 Clean-up

install remove inactive

Use this command to clean-up old installation files in case of insufficient space and to ensure that you have at least 1GB of space in flash, to expand a new image.

The following sample output displays the cleaning up of unused files, by using the **install remove inactive** command:

```
Switch# install remove inactive
 install_remove: START Mon Jul 24 11:42:27 IST 2023

Cleaning up unnecessary package files

No path specified, will use booted path bootflash:packages.conf

Cleaning bootflash:
  Scanning boot directory for packages ... done.
  Preparing packages list to delete ...
    cat9k-cc_srdriver.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-espbase.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-guestshell.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-rpbase.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-rpboot.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-sipbase.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-sipspa.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-srdriver.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-webui.17.12.01.SSA.pkg
      File is in use, will not delete.
    cat9k-wlc.17.12.01.SSA.pkg
      File is in use, will not delete.
    packages.conf
      File is in use, will not delete.
  done.
SUCCESS: No extra package or provisioning files found on media. Nothing to clean.

SUCCESS: install_remove  Mon Jul 24 11:42:39 IST 2023
```

Step 2 Copy new image to flash

a) **copy tftp:***[[//location]/directory]/filename* **flash:**

Use this command to copy the new image from a TFTP server to flash memory. The location is either an IP address or a host name. The filename is specified relative to the directory used for file transfers. Skip this step if you want to use the new image from a TFTP server.

```
Switch# copy tftp://10.8.0.6/image/cat9k_iosxe.17.11.01.SPA.bin flash:
Destination filename [cat9k_iosxe.17.11.01.SPA.bin]?
Accessing tftp://10.8.0.6//cat9k_iosxe.17.11.01.SPA.bin...
Loading /cat9k_iosxe.17.11.01.SPA.bin from 10.8.0.6 (via GigabitEthernet0/0):
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 508584771 bytes]
508584771 bytes copied in 101.005 secs (5035244 bytes/sec)
```

b) **dir flash:**

Use this command to confirm that the image has been successfully copied to flash.

```
Switch# dir flash:*.bin
Directory of flash:/*.bin

Directory of flash:/

434184 -rw- 508584771 Jul 24 2023 13:35:16 -07:00 cat9k_iosxe.17.11.01.SPA.bin
11353194496 bytes total (9055866880 bytes free)
```

Step 3 Set boot variable

a) **boot system flash:packages.conf**

Use this command to set the boot variable to **flash:packages.conf**.

```
Switch(config)# boot system flash:packages.conf
```

b) **no boot manual**

Use this command to configure the switch to auto-boot. Settings are synchronized with the standby switch, if applicable.

```
Switch(config)# no boot manual
Switch(config)# exit
```

c) **write memory**

Use this command to save boot settings.

```
Switch# write memory
```

d) **show bootvar** or **show boot**

Use this command to verify the boot variable (packages.conf) and manual boot setting (no):

```
Switch# show bootvar               <<on the C9500-24Y4C,C9500-32C, C9500-32QC, and
C9500-48Y4C models
BOOT variable = bootflash:packages.conf
MANUAL_BOOT variable = no
BAUD variable = 9600
ENABLE_BREAK variable = yes
BOOTMODE variable does not exist
IPXE_TIMEOUT variable does not exist
CONFIG_FILE variable =

Standby BOOT variable = bootflash:packages.conf
Standby MANUAL_BOOT variable = no
Standby BAUD variable = 9600
Standby ENABLE_BREAK variable = yes
Standby BOOTMODE variable does not exist
Standby IPXE_TIMEOUT variable does not exist
Standby CONFIG_FILE variable =

Switch# show boot                        <<on the C9500-12Q,C9500-16X C9500-24Q, and
C9500-40X models
Current Boot Variables:
BOOT variable = flash:packages.conf;
```

```
Boot Variables on next reload:
BOOT variable = flash:packages.conf;
Manual Boot = no
Enable Break = yes
Boot Mode = DEVICE
iPXE Timeout = 0
```

Step 4 Downgrade software image

install add file activate commit

Use this command to install the image.

We recommend that you point to the source image on your TFTP server or the flash drive of the *active* switch, if you have copied the image to flash memory. If you point to an image on the flash or USB drive of a member switch (instead of the active), you must specify the exact flash or USB drive - otherwise installation fails. For example, if the image is on the flash drive of member switch 3 (flash-3): `Switch# install add file flash-3:cat9k_iosxe.17.11.01.SPA.bin activate commit`.

The following example displays the installation of the Cisco IOS XE Dublin 17.11.1 software image to flash, by using the **install add file activate commit** command.

```
Switch# install add file flash:cat9k_iosxe.17.11.01.SPA.bin activate commit
install_add_activate_commit: Adding PACKAGE
install_add_activate_commit: Checking whether new add is allowed ....
--- Starting Add ---
Performing Add on Active/Standby
[1] Add package(s) on R0
[1] Finished Add on R0
Checking status of Add on [R0]
Add: Passed on [R0]
Finished Add
Image added. Version: 17.11.01.0.269
install_add_activate_commit: Activating PACKAGE

Following packages shall be activated:
/flash/cat9k-wlc.17.11.01.SPA.pkg
/flash/cat9k-webui.17.11.01.SPA.pkg
/flash/cat9k-srdriver.17.11.01.SPA.pkg
/flash/cat9k-sipspa.17.11.01.SPA.pkg
/flash/cat9k-sipbase.17.11.01.SPA.pkg
/flash/cat9k-rpboot.17.11.01.SPA.pkg
/flash/cat9k-rpbase.17.11.01.SPA.pkg
/flash/cat9k-guestshell.17.11.01.SPA.pkg
/flash/cat9k-espbase.17.11.01.SPA.pkg
/flash/cat9k-cc_srdriver.17.11.01.SPA.pkg

This operation may require a reload of the system. Do you want to proceed? [y/n] y


Performing Activate on Active/Standby
1] Activate package(s) on R0
    --- Starting list of software package changes ---
    Old files list:
      Removed cat9k-cc_srdriver.17.12.01.SSA.pkg
      Removed cat9k-espbase.17.12.01.SSA.pkg
      Removed cat9k-guestshell.17.12.01.SSA.pkg
      Removed cat9k-lni.17.12.01.SSA.pkg
      Removed cat9k-rpbase.17.12.01.SSA.pkg
      Removed cat9k-rpboot.17.12.01.SSA.pkg
      Removed cat9k-sipbase.17.12.01.SSA.pkg
      Removed cat9k-sipspa.17.12.01.SSA.pkg
      Removed cat9k-srdriver.17.12.01.SSA.pkg
```

```
      Removed cat9k-webui.17.12.01.SSA.pkg
      Removed cat9k-wlc.17.12.01.SSA.pkg
    New files list:
      Added cat9k-cc_srdriver.17.11.01.SPA.pkg
      Added cat9k-espbase.17.11.01.SPA.pkg
      Added cat9k-guestshell.17.11.01.SPA.pkg
      Added cat9k-rpbase.17.11.01.SPA.pkg
      Added cat9k-rpboot.17.11.01.SPA.pkg
      Added cat9k-sipbase.17.11.01.SPA.pkg
      Added cat9k-sipspa.17.11.01.SPA.pkg
      Added cat9k-srdriver.17.11.01.SPA.pkg
      Added cat9k-webui.17.11.01.SPA.pkg
      Added cat9k-wlc.17.11.01.SPA.pkg
    Finished list of software package changes
  [1] Finished Activate on R0
Checking status of Activate on [R0]
Activate: Passed on [R0]
Finished Activate

--- Starting Commit ---
Performing Commit on Active/Standby
 [1] Commit package(s) on R0
 [1] Finished Commit on R0
Checking status of Commit on [R0]
Commit: Passed on [R0]
Finished Commit

Send model notification for install_add_activate_commit before reload
Install will reload the system now!
SUCCESS: install_add_activate_commit  Mon Jul 24 11:51:01 IST 2023

Jul 24 11:51:07.505: %PMANTvp: Process manager is exiting: ren requested
Jul 24 11:51:07.505: %PMAN-5-EXITACTION: F0/0: pvp: Process manager is exiting: reload fru
 action requested
Jul 24 11:51:07.834: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: reload
action requested

Initializing Hardware...

System Bootstrap, Version 17.3.1r[FC2], RELEASE SOFTWARE (P)
Compiled 30-03-2023 12:00:00.00 by rel
Current ROMMON image : Primary Rommon Image

Last reset cause:LocalSoft
C9500-32QC platform with 16777216 Kbytes of main memory
Preparing to autoboot. [Press Ctrl-C to interrupt]  5     5     /-\|/-\|/-4     \|/-\|/-\|3
     /-\|/-\|/-2     \|/-\|/-\|1     /-\|/-\|/-0
boot: attempting to boot from [bootflash:packages.conf]
boot: reading file packages.conf

<output truncated>
```

Note
The system reloads automatically after executing the **install add file activate commit** command. You do not have to manually reload the system.

Step 5 Verify version

show version

After the image boots up, use this command to verify the version of the new image.

Note
When you downgrade the software image, the ROMMON version does not downgrade. It remains updated.

The following sample output of the **show version** command displays the Cisco IOS XE Dublin 17.11.1 image on the device:

```
Switch# show version
Cisco IOS XE Software, Version 17.11.01
Cisco IOS Software [Dublin], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.11.1,
RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2023 by Cisco Systems, Inc.
<output truncated>
```

In Service Software Upgrade (ISSU) with Cisco StackWise Virtual

Follow the instructions described here to perform an In Service Software Upgrade (ISSU) upgrade. Use the procedure described here, only for the releases indicated in the table below. For more general information about ISSU release support and recommended releases, see this technical reference document: In-Service Software Upgrade (ISSU).

Before you begin

Note that you can use this ISSU procedure only for the following scenarios:

When upgrading from...	Use these commands...	To...
Cisco IOS XE Cupertino 17.9.x	**install add file activate issu commit**	Cisco IOS XE Dublin 17.12.x
Not applicable	ISSU does not support downgrade. To downgrade, see Downgrading in Install Mode, on page 10.	Not applicable

Procedure

Step 1 **enable**

Enables privileged EXEC mode. Enter your password if prompted.

```
Switch# enable
```

Step 2 **show version | in INSTALL** or **show version | in System image**

On the Catalyst 9500 Series Switches, use **show version | in INSTALL** command to check the boot mode. ISSU is supported only in install mode. You cannot perform ISSU if the switch is booted in bundle mode.

```
Switch# show version | in INSTALL
Switch Ports Model              SW Version        SW Image              Mode
------ ----- -----              ----------        ----------            ----
*     1 12    C9500-12Q          17.12.1             CAT9K_IOSXE         INSTALL
      2 12    C9500-12Q          17.12.1             CAT9K_IOSXE         INSTALL
```

On Catalyst 9500 Series Switches - High Performance, use **show version | in System image** to check if the switch booted into IOS via " boot flash:packages.conf ". The output should display the following:

```
Switch# show version | in System image
System image file is "flash:packages.conf"
```

You cannot perform ISSU if the switch is booted in bundle mode. If you perform ISSU in bundle mode, you will see the following error.

```
*Jul 10 14:55:57.338: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R1/0: install_engine: Started
 install one-shot ISSU flash:cat9k_iosxe.17.12.01.SPA.bininstall_add_activate_commit: Adding
 ISSU
ERROR: install_add_activate_commit: One-Shot ISSU operation is not supported in bundle boot
 mode
FAILED: install_add_activate_commit  exit(1) Tue Jul 10 14:56:03 UTC 2023
```

Step 3 **dir flash: | in free**

Use this command to check if there is sufficient available memory on flash. Ensure that you have at least 1GB of space in flash to expand a new image.

```
Switch# dir flash: | in free
11353194496 bytes total (8565174272 bytes free)
```

Step 4 **show redundancy**

Use this command to check if the switch is in SSO mode.

```
Switch# show redundancy
Redundant System Information :
------------------------------
       Available system uptime = 4 minutes
Switchovers system experienced = 0
              Standby failures = 0
        Last switchover reason = none

                 Hardware Mode = Duplex
    Configured Redundancy Mode = sso
     Operating Redundancy Mode = sso
              Maintenance Mode = Disabled
                Communications = Up
<output truncated>
```

Step 5 **show boot system**

Use this command to verify that the manual boot variable is set to **no**.

```
Switch# show boot system
Current Boot Variables:
BOOT variable = flash:packages.conf;
MANUAL_BOOT variable = no

Boot Variables on next reload:
BOOT variable = flash:packages.conf;
MANUAL_BOOT variable = no
Enable Break = no
Boot Mode = DEVICE
iPXE Timeout = 0
```

If the manual boot variable is set to **yes**, use the **no boot manual** command in global configuration mode to set the switch for autoboot.

Step 6 **show issu state** [*detail*]

Use this command to verify that no other ISSU process is in progress.

```
Switch# show issu state detail
--- Starting local lock acquisition on chassis 2 ---
Finished local lock acquisition on chassis 2

No ISSU operation is in progress

Switch#
```

Step 7 show install summary

Use this command to verify that the state of the image is *Activated & Committed*. Clear the install state if the state is not *Activated & Committed*.

```
Switch# show install summary
[ Switch 1 2 ] Installed Package(s) Information:
State (St): I - Inactive, U - Activated & Uncommitted,
            C - Activated & Committed, D - Deactivated & Uncommitted
--------------------------------------------------------------------------------
Type  St   Filename/Version
--------------------------------------------------------------------------------
IMG   C    17.12.1.0.2433
```

Step 8 install add file activate issu commit

Use this command to automate the sequence of all the upgrade procedures, including downloading the images to both the switches, expanding the images into packages, and upgrading each switch as per the procedures.

```
Switch# install add file tftp:cat9k_iosxe.17.12.01.SPA.bin activate issu commit
```

The following sample output displays installation of Cisco IOS XE Dublin 17.12.1 software image with ISSU procedure.

```
Switch# install add file tftp:cat9k_iosxe.17.12.01.SPA.bin activate issu commit
install_add_activate_commit: START Thu Jul 19 06:16:32 UTC 2023
Downloading file tftp://172.27.18.5//cat9k_iosxe.17.12.01.SPA.bin

*Jul 19 06:16:34.064: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0: install_engine: Started
 install one-shot ISSU tftp://172.27.18.5//cat9k_iosxe.17.12.01.SPA.bin
Finished downloading file tftp://172.27.18.5//cat9k_iosxe.17.12.01.SPA.bin to
flash:cat9k_iosxe.17.12.01.SPA.bin
install_add_activate_commit: Adding ISSU

--- Starting initial file syncing ---
[1]: Copying flash:cat9k_iosxe.17.12.01.SPA.bin from switch 1 to switch 2
[2]: Finished copying to switch 2
Info: Finished copying flash:cat9k_iosxe.17.12.01.SPA.bin to the selected switch(es)
Finished initial file syncing

--- Starting Add ---
Performing Add on all members
  [1] Add package(s) on switch 1
  [1] Finished Add on switch 1
  [2] Add package(s) on switch 2
  [2] Finished Add on switch 2
Checking status of Add on [1 2]
Add: Passed on [1 2]
Finished Add

install_add_activate_commit: Activating ISSU

NOTE: Going to start Oneshot ISSU install process

STAGE 0: Initial System Level Sanity Check before starting ISSU
=======================================================
```

```
--- Verifying install_issu supported ---
--- Verifying standby is in Standby Hot state ---
--- Verifying booted from the valid media ---
--- Verifying AutoBoot mode is enabled ---
Finished Initial System Level Sanity Check


STAGE 1: Installing software on Standby
================================================
--- Starting install_remote ---
Performing install_remote on Chassis remote
[2] install_remote package(s) on switch 2
[2] Finished install_remote on switch 2
install_remote: Passed on [2]
Finished install_remote


STAGE 2: Restarting Standby
================================================
--- Starting standby reload ---
Finished standby reload

--- Starting wait for Standby to reach terminal redundancy state ---

*Jul 19 06:24:16.426: %SMART_LIC-5-EVAL_START: Entering evaluation period
*Jul 19 06:24:16.426: %SMART_LIC-5-EVAL_START: Entering evaluation period
*Jul 19 06:24:16.466: %HMANRP-5-CHASSIS_DOWN_EVENT: Chassis 2 gone DOWN!
*Jul 19 06:24:16.497: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_NOT_PRESENT)
*Jul 19 06:24:16.498: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault (PEER_DOWN)
*Jul 19 06:24:16.498: %REDUNDANCY-3-STANDBY_LOST: Standby processor fault
(PEER_REDUNDANCY_STATE_CHANGE)
*Jul 19 06:24:16.674: %RF-5-RF_RELOAD: Peer reload. Reason: EHSA standby down
*Jul 19 06:24:16.679: %IOSXE_REDUNDANCY-6-PEER_LOST: Active detected switch 2 is no longer
 standby
*Jul 19 06:24:16.416: %NIF_MGR-6-PORT_LINK_DOWN: Switch 1 R0/0: nif_mgr: Port 1 on front
side stack link 0 is DOWN.
*Jul 19 06:24:16.416: %NIF_MGR-6-PORT_CONN_DISCONNECTED: Switch 1 R0/0: nif_mgr: Port 1 on
 front side stack link 0 connection has DISCONNECTED: CONN_ERR_PORT_LINK_DOWN_EVENT
*Jul 19 06:24:16.416: %NIF_MGR-6-STACK_LINK_DOWN: Switch 1 R0/0: nif_mgr: Front side stack
 link 0 is DOWN.
*Jul 19 06:24:16.416: %STACKMGR-6-STACK_LINK_CHANGE: Switch 1 R0/0: stack_mgr: Stack port
1 on Switch 1 is down

<output truncated>

*Jul 19 06:29:36.393: %IOSXE_REDUNDANCY-6-PEER: Active detected switch 2 as standby.
*Jul 19 06:29:36.392: %STACKMGR-6-STANDBY_ELECTED: Switch 1 R0/0: stack_mgr: Switch 2 has
been elected STANDBY.
*Jul 19 06:29:41.397: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion
 (raw-event=PEER_FOUND(4))
*Jul 19 06:29:41.397: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion
 (raw-event=PEER_REDUNDANCY_STATE_CHANGE(5))
*Jul 19 06:29:42.257: %REDUNDANCY-3-IPC: IOS versions do not match.
*Jul 19 06:30:24.323: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeededFinished
wait for Standby to reach terminal redundancy state


*Jul 19 06:30:25.325: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
STAGE 3: Installing software on Active
================================================
--- Starting install_active ---
Performing install_active on Chassis 1

<output truncated>
```

```
[1] install_active package(s) on switch 1
[1] Finished install_active on switch 1
install_active: Passed on [1]
Finished install_active


STAGE 4: Restarting Active (switchover to standby)
================================================
--- Starting active reload ---
New software will load after reboot process is completed
SUCCESS: install_add_activate_commit  Thu Jul 19 23:06:45 UTC 2023
Jul 19 23:06:45.731: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
install one-shot ISSU flash:cat9k_iosxe.17.12.01.SPA.bin
Jul 19 23:06:47.509: %PMAN-5-EXITACTION: F0/0: pvp: Process manager is exiting: reload fp
action requested
Jul 19 23:06:48.776: %PM

Initializing Hardware...

System Bootstrap, Version 17.12.1r[FC2], RELEASE SOFTWARE (P)
Compiled Fri 07/19/2023 10:48:42.68 by rel

Current ROMMON image : Primary
Last reset cause     : PowerOn
C9500-40X platform with 16777216 Kbytes of main memory

boot: attempting to boot from [flash:packages.conf]
boot: reading file packages.conf
#
################################################################################################################################


Jul 19 23:08:30.238: %PMAN-5-EXITACTION: C0/0: pvp: Process manager is exiting:

Waiting for 120 seconds for other switches to boot
######################
Switch number is 1
All switches in the stack have been discovered. Accelerating discovery



Switch console is now available


Press RETURN to get started.




Jul 19 23:14:17.080: %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install
commit
Jul 19 23:15:48.445: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed
install commit ISSU
```

Step 9 **show version**

Use this command to verify the version of the new image.

The following sample output of the **show version** command displays the Cisco IOS XE Dublin 17.12.1 image on the device:

```
Switch# show version
Cisco IOS XE Software, Version 17.12.01
Cisco IOS Software [Amsterdam], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.12.1,
 RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2023 by Cisco Systems, Inc.
<output truncated>
```

Step 10 **show issu state** [*detail*]

Use this command to verify that no ISSU process is in pending state.

```
Switch# show issu state detail
--- Starting local lock acquisition on chassis 2 ---
Finished local lock acquisition on chassis 2

No ISSU operation is in progress

Switch#
```

Step 11 **exit**

Exits privileged EXEC mode and returns to user EXEC mode.

Field-Programmable Gate Array Version Upgrade

A field-programmable gate array (FPGA) is a type of programmable memory device that exists on Cisco switches. They are re-configurable logic circuits that enable the creation of specific and dedicated functions.

To check the current FPGA version, enter the **version -v** command in ROMMON mode. For Cisco Catalyst 9500X Series Switches, enter the **show firmware version all** command in privileged EXEC mode.

Note

- Not every software release has a change in the FPGA version.
- The version change occurs as part of the regular software upgrade and you do not have to perform any other additional steps.