Upgrade Catalyst 9400 Dual Supervisors to Cisco IOS® XE v16.6.2

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Introduction

This document describes the upgrade procedure for Catalyst 9400 Dual Supervisors to Cisco IOS XE from v16.6.1 to v16.6.2.

Prerequisites

Requirements

Cisco recommends that you have knowledge of TFTP and FTP.

Components Used

The information in this document is based on these software and hardware versions:

- Hardware: C9410R
- Software: cat9k_iosxe.16.06.01.SPA.bin

In this example, your current image is cat9k_iosxe.16.06.01.SPA.bin and the target image is cat9k_iosxe.16.06.02.SPA.bin. This procedure also works if you have a C9407R chassis instead of a C9410R chassis.

Note: Do not upgrade dual supervisors from Cisco IOS® XE Everest 16.6.1 to 16.6.2 at the same time. Insert one supervisor at a time while you upgrade from 16.6.1 to 16.6.2.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Automatic Boot Loader Upgrade and CPLD Upgrade

Automatic Boot Loader Upgrade

When you upgrade from the current Cisco IOS® XE release on your switch to a later or newer release for the first time, the boot loader can automatically be upgraded based on the hardware version of the switch. If the boot loader is upgraded, the supervisor automatically reloads to enable the new boot loader. If you go back to the older release after this, the boot loader is not downgraded. The updated boot loader supports all previous releases.

For subsequent Cisco IOS® XE Everest 16.x.x releases, if there is a new boot loader in that release, it can automatically be upgraded based on the hardware version of the switch when you boot up your switch with the new image for the first time.

At the time when you upgrade from Cisco IOS® XE Everest 16.6.1 to 16.6.2, the upgrade can take some time while the system resets three times due to the common and Complex Programmable Logic Device (CPLD) upgrade. The stateful switchover is supported from Cisco IOS® XE Everest 16.6.2.

Different Ways to Boot Supervisor

In the Catalyst 9400 switch, you can boot the supervisor with the use of two methods:

1. Install mode
2. Traditional method to boot the device from the .bin file

When the switch runs in install mode, the Cisco IOS® XE package (.pkg) files and provisioning file (packages.conf) are stored in the system board flash memory (flash:). When the switch is booted with the use of the .bin file, the booted Cisco IOS® XE software bundle (.bin) file is stored in the system board flash memory (flash:).

After the 16.6.2 upgrade, the procedure works regardless of which boot method was used to boot the switch on the current 16.6.1 image. However, the procedure here upgrades the supervisor engine to install mode.

Upgrade Steps for Primary Supervisor

Step 1. Remove Unwanted Packages

Note: Do not skip this step and ensure you have at least 1 GB of space in your flash to expand a new image. Clean up the old installation files in case of insufficient space.

```
Switch#install remove inactive

Cleaning up unnecessary package files
No path specified, can use booted path flash:packages.conf
Cleaning flash:
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat9k-cc_srdriver.16.06.01.SPA.pkg
File is in use, cannot delete.
cat9k-espbase.16.06.01.SPA.pkg
File is in use, can not delete.
cat9k-rpbase.16.06.01.SPA.pkg
File is in use, cannot delete.
cat9k-rpboot.16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-sipbase.16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-sipspa.16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-srdriver.B16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-webui.16.06.01.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.16.06.01.SPA.pkg
/flash/cat9k-espbase.16.06.01.SPA.pkg
/flash/cat9k-rpbase.16.06.01.SPA.pkg
/flash/cat9k-rpboot.16.06.01.SPA.pkg
/flash/cat9k-sipbase.16.06.01.SPA.pkg
/flash/cat9k-sipspa.16.06.01.SPA.pkg
/flash/cat9k-srdriver.16.06.01.SPA.pkg
/flash/cat9k-webui.16.06.01.SPA.pkg
/flash/cat9k_1.bin
```

```
/flash/cat9k_1.conf
/flash/cat9k_2.1.conf
/flash/cat9k_2.bin
/flash/cat9k_2.conf
/flash/cat9k_iosxe.16.06.01.SSA.bin
/flash/packages.conf.00-

Do you want to remove the above files? [y/n]y
[R0]:
Deleting file flash:cat9k-cc_srdriver.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-espbase.16.06.01.SPA.pkg ... done.
Deleting file
Deleting file flash:cat9k-rpbase.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpboot.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipbase.B16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipspa.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-srdriver.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-webui.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k_1.bin ... done.
Deleting file flash:cat9k_1.conf ... done.
Deleting file flash:cat9k_2.1.conf ... done.
Deleting file flash:cat9k_2.bin ... done.
Deleting file flash:cat9k_2.conf ... done.
Deleting file flash:cat9k_iosxe.16.06.01.SSA.bin ... done.
Deleting file flash:packages.conf.00- ... done.
SUCCESS: Files deleted.
--- Starting Post_Remove_Cleanup ---
Performing Post_Remove_Cleanup on Active/Standby
[R0] Post_Remove_Cleanup package(s) on R0
[R0] Finished Post_Remove_Cleanup on R0
Checking status of Post_Remove_Cleanup on [R0]
Post_Remove_Cleanup: Passed on [R0]
Finished Post_Remove_Cleanup

SUCCESS: install_remove Tue Jun 20 14:16:29 PDT 2017
```

Step 2. Copy New Image to Flash

In this example, you copy the image from the TFTP server to the supervisors bootflash:

```
Switch#copy tftp: bootflash:
Address or name of remote host []? 172.16.53.46
Source filename []? cat9k_iosxe.16.06.02.SPA.bin
Destination filename [cat9k_iosxe.16.06.02.SPA.bin]?

Accessing tftp://172.16.53.46//cat9k_iosxe.16.06.02.SPA.bin...
Loading /cat9k_iosxe.16.06.02.SPA.bin from 10.8.0.6 (via GigabitEthernet0/0): !!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 601216545 bytes]

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

Step 3. Use the dir flash command to confirm that the image has been successfully copied to flash.

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

```
Directory of flash:/

434184 -rw- 601216545 Jul 26 2017 10:18:11 -07:00 cat9k_iosxe.16.06.02.SPA.bin
11353194496 bytes total (8976625664 bytes free)
```

Step 3. Check the Boot Statement

Ensure that the boot statement is configured to packages.conf before you upgrade to 16.6.2 in install mode. If it is set to the .bin file, you must change it to packages.conf.:

<#root>

```
Switch#show boot
BOOT variable = bootflash:cat9k_iosxe.16.06.01.SPA.bin;
Configuration Register is 0x102
MANUAL_BOOT variable = no
BAUD variable = 9600
ENABLE_BREAK variable does not exist
CONFIG_FILE variable does not exist
```

```
Change boot variable to point to packages.conf

Switch(config)#no boot system
Switch(config)#boot system bootflash:packages.conf
*Nov 14 15:12:50.043: %SYS-5-CONFIG_I: Configured from console by consol
```

Please save the configuration to reflect the new boot variable.

```
Switch#wr mem
Building configuration...
[OK]
Switch#show boot
BOOT variable = bootflash:packages.conf;
Configuration Register is 0x102
MANUAL_BOOT variable =
```

no

```
       >>
```

If manual variable is set to no, it means system is set to auto boot

```
BAUD variable = 9600
ENABLE_BREAK variable does not exist
CONFIG_FILE variable does not exist
```

You can set the system to auto boot or manual boot by setting the variables:

Changing system to auto boot

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

Changing system to manual boot

```
Switch(config)#boot manual

If your switches are configured with auto boot, then the switch will automatically boot up with the new
reloaded. If your switches are not configured with auto boot and the switch is reloaded, you will recei
where you must then manually boot the new image flash:packages.conf

Switch: boot flash:packages.conf"
```

Step 4. Software Install Image to Flash

Use the **install add file activate commit** command to install the target image to flash. You can point to the source image on your TFTP server or in boot flash if you have the image copied to flash. In this example, you have copied the image to the flash already.

<#root>

```
Switch#install add file bootflash:cat9k_iosxe.16.06.02.SPA.bin activate commit install_add_activate_com

This operation requires a reload of the system. Do you want to proceed?
Please confirm you have changed boot config to flash:packages.conf [y/n]y

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

install_add_activate_commit: Activating PACKAGE

*Nov 13 22:37:09.730: %IOSXE-4-PLATFORM: R0/0: kernel: ISOFS: Unable to identify CD-ROM format.Followin
/flash/cat9k-wlc.16.06.02.SPA.pkg
/flash/cat9k-webui.16.06.02.SPA.pkg
/flash/cat9k-srdriver.16.06.02.SPA.pkg
/flash/cat9k-sipspa.16.06.02.SPA.pkg
/flash/cat9k-sipbase.16.06.02.SPA.pkg
```

```
/flash/cat9k-rpboot.16.06.02.SPA.pkg
/flash/cat9k-rpbase.16.06.02.SPA.pkg
/flash/cat9k-guestshell.16.06.02.SPA.pkg
/flash/cat9k-espbase.16.06.02.SPA.pkg
/flash/cat9k-cc_srdriver.16.06.02.SPA.pkg


This operation requires a reload of the system. Do you want to proceed? [y/n]y
--- Starting Activate ---
Performing Activate on Active/Standby
[R0] Finished Activate on R0
Checking status of Activate on [R0]
Activate: Passed on [R0]
Finished Activate

--- Starting Commit ---
Performing Commit on Active/Standby

*Nov 13 22:38:40.654: %IOSXE-5-PLATFORM: R0/0: Nov 13 22:38:40 rollback_timer.sh: %INSTALL-5-INSTALL_AU
[R0] Finished Commit on R0
Checking status of Commit on [R0]
Commit: Passed on [R0]
Finished Commit


Install will reload the system now!


SUCCESS: install_add_activate_commit Mon Nov 13 22:39:07 UTC 2017

*Nov 13 22:39:07.715: %IOSXE-5-PLATFORM: R0/0: Nov 13 22:39:07 install_engine.sh: %INSTALL-5-INSTALL_CO

Initializing Hardware...

System Bootstrap, Version 16.6.1r [FC2], RELEASE SOFTWARE (P)
Compiled Sat 07/15/2017 10:06:12.23 by rel

Current image running:
Primary Rommon Image

Last reset cause: SoftwareResetTrig
C9400-SUP-1 platform with 16777216 Kbytes of main memory

Preparing to autoboot. [Press Ctrl-C to interrupt] 0
attempting to boot from [bootflash:packages.conf]

Located file packages.conf
#
##########################################################################################################

Validate packages: SHA-1 hash:
calculated 550C9730:667B2788:DD6F6B06:D0FFA819:01A315DA
expected 550C9730:667B2788:DD6F6B06:D0FFA819:01A315DA
Warning: ignoring ROMMON var "USER_BOOT_PARAM"

%IOSXEBOOT-4-BOOTLOADER_UPGRADE: (rp/0): ### Mon Nov 13 22:42:05 Universal 2017 PLEASE DO NOT POWER CYCL



%IOSXEBOOT-4-BOOTLOADER_UPGRADE: (rp/0): boot loader upgrade successful <<< Bootloader upgrade done
```

%IOSXEBOOT-4-BOOTLOADER_UPGRADE: (rp/0): Reloading the Supervisor to enable the New BOOTLOADER

```
Initializing Hardware...

Initializing Hardware...

Initializing Hardware...

System Bootstrap, Version 16.6.2r[FC1], RELEASE SOFTWARE (P)
Compiled Tue 10/31/2017 11:38:44.98 by rel

Current image running:
Primary Rommon Image

Last reset cause: SoftwareResetTrig
C9400-SUP-1 platform with 16777216 Kbytes of main memory

Preparing to autoboot. [Press Ctrl-C to interrupt] 0
attempting to boot from [bootflash:packages.conf]

Located file packages.conf
#
################################################################################################################

Validate packages: SHA-1 hash:
calculated 550C9730:667B2788:DD6F6B06:D0FFA819:01A315DA
expected 550C9730:667B2788:DD6F6B06:D0FFA819:01A315DA
Warning: ignoring ROMMON var "USER_BOOT_PARAM"

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Technical Support: http://www.cisco.com/techsupport
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Compiled Wed 01-Nov-17 07:26 by mcpre
```

Step 5. Verify New Packages and Image after Upgrade

After the software has been successfully installed, verify the flash partition has the new .pkg files. Sample output:

```
Switch#dir bootflash:*.pkg
Directory of bootflash:/*.pkg

Directory of bootflash:/

405607 -rw- 5186504 Nov 13 2017 22:36:25 +00:00 cat9k-cc_srdriver.16.06.02.SPA.pkg
405608 -rw- 76649412 Nov 13 2017 22:36:27 +00:00 cat9k-espbase.16.06.02.SPA.pkg
405609 -rw- 1536964 Nov 13 2017 22:36:27 +00:00 cat9k-guestshell.16.06.02.SPA.pkg
405610 -rw- 380625856 Nov 13 2017 22:36:38 +00:00 cat9k-rpbase.16.06.02.SPA.pkg
405616 -rw- 29580684 Nov 13 2017 22:36:48 +00:00 cat9k-rpboot.16.06.02.SPA.pkg
405611 -rw- 27612100 Nov 13 2017 22:36:39 +00:00 cat9k-sipbase.16.06.02.SPA.pkg
405614 -rw- 12268480 Nov 13 2017 22:36:41 +00:00 cat9k-webui.16.06.02.SPA.pkg
405612 -rw- 54981568 Nov 13 2017 22:36:40 +00:00 cat9k-sipspa.16.06.02.SPA.pkg
405613 -rw- 6521796 Nov 13 2017 22:36:40 +00:00 cat9k-srdriver.16.06.02.SPA.pkg
405615 -rw- 1536960 Nov 13 2017 22:36:41 +00:00 cat9k-wlc.16.06.02.SPA.pkg
11250098176 bytes total (8812113920 bytes free)
```

Step 6. Check Version and New Bootloader

When the new image boots up, verify the version of the new image with the use of the **show version** command:

Note: When you boot the new image, the boot loader is automatically upgraded.

<#root>

```
Switch#show version
Cisco IOS® XE Software, Version

16.06.02

Cisco IOS® Software [Everest], Catalyst L3 Switch Software (CAT9K_IOSXE),

 Version 16.6.2

, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
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Compiled Wed 01-Nov-17 07:26 by mcpre


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```

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or the applicable URL provided on the flyer accompanying the IOS-XE
software.

ROM: IOS-XE ROMMON
BOOTLDR: System Bootstrap, Version 16.6.2r[FC1], RELEASE SOFTWARE (P)

Switch uptime is 20 minutes
Uptime for this control processor is 22 minutes
System returned to ROM by reload
System image file is "bootflash:packages.conf"
Last reload reason: EHSA standby down

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States and local country laws governing import, export, transfer and
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http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Technology Package License Information:

```
------------------------------------------------------------------
Technology-package                  Technology-package
Current             Type            Next reboot
------------------------------------------------------------------
network-advantage   Permanent       network-advantage
```

cisco C9410R (X86) processor (revision V01) with 869104K/6147K bytes of memory.
Processor board ID FXS2130Q28F
2 Virtual Ethernet interfaces
192 Gigabit Ethernet interfaces
16 Ten Gigabit Ethernet interfaces
4 Forty Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
15958488K bytes of physical memory.
11161600K bytes of Bootflash at bootflash:.
1638400K bytes of Crash Files at crashinfo:.
0K bytes of WebUI ODM Files at webui:.

Configuration register is 0x2

Switch#show module
Chassis Type: C9410R

```
Mod Ports Card Type                                Model          Serial No.
---+-----+--------------------------------------+--------------+--------------
1 48 48-Port 10/100/1000 (RJ-45)                  C9400-LC-48T   JAE212409NQ
2 48 48-Port 10/100/1000 (RJ-45)                  C9400-LC-48T   JAE212409N2
3 48 48-Port UPOE 10/100/1000 (RJ-45)             C9400-LC-48U   JAE21270C1R
4 48 48-Port UPOE 10/100/1000 (RJ-45)             C9400-LC-48U   JAE21270C1C
5 10 Supervisor 1 Module                          C9400-SUP-1    JAE2124023Z


Mod MAC addresses                   Hw    Fw       Sw    Status
---+--------------------------------+----+-----------+-----------------+--------
1 E4AA.5D59.8420 to E4AA.5D59.844F 1.0 16.6.2r[FC1 16.06.02 ok
2 E4AA.5D59.85AC to E4AA.5D59.85DB 1.0 16.6.2r[FC1 16.06.02 ok
3 E4AA.5D59.BC0C to E4AA.5D59.BC3B 1.0 16.6.2r[FC1 16.06.02 ok
4 E4AA.5D59.B72C to E4AA.5D59.B75B 1.0 16.6.2r[FC1 16.06.02 ok
5 2C5A.0F1C.4F2C to 2C5A.0F1C.4F35 0.6 16.6.2r[FC1 16.06.02 ok


Mod Redundancy Role Operating Redundancy Mode Configured Redundancy Mode
---+------------------+------------------------+---------------------------
5 Active                 active                     sso
```

Upgrade Steps for Secondary Supervisor

Remove the supervisor from slot 5, which was upgraded in the previous steps, and insert the standby supervisor in slot 6 in the chassis. The removal of the first supervisor is important because to upgrade two supervisors while both of are inserted in the chassis; this is not supported as mentioned earlier. You can repeat the same upgrade steps as documented to upgrade the newly inserted supervisor.

Step 1. Remove Unwanted Packages



Note: Do not skip this step. Ensure you have at least 1 GB of space in your flash to expand a new image. Clean up the old installation files in case of insufficient space.

```
Switch#install remove inactive

Cleaning up unnecessary package files
No path specified, will use booted path flash:packages.conf
Cleaning flash:
Scanning boot directory for packages ... done.
Preparing packages list to delete ...
cat9k-cc_srdriver.16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-espbase.16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-rpbase.16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-rpboot.16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-sipbase.16.06.01.SPA.pkg
File is in use, will not delete.
```

```
cat9k-sipspa.16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-srdriver.B16.06.01.SPA.pkg
File is in use, will not delete.
cat9k-webui.16.06.01.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.16.06.01.SPA.pkg
/flash/cat9k-espbase.16.06.01.SPA.pkg
/flash/cat9k-rpbase.16.06.01.SPA.pkg
/flash/cat9k-rpboot.16.06.01.SPA.pkg
/flash/cat9k-sipbase.16.06.01.SPA.pkg
/flash/cat9k-sipspa.16.06.01.SPA.pkg
/flash/cat9k-srdriver.16.06.01.SPA.pkg
/flash/cat9k-webui.16.06.01.SPA.pkg
/flash/cat9k_1.bin
/flash/cat9k_1.conf
/flash/cat9k_2.1.conf
/flash/cat9k_2.bin
/flash/cat9k_2.conf
/flash/cat9k_iosxe.16.06.01.SSA.bin
/flash/packages.conf.00-

Do you want to remove the above files? [y/n]y
[R0]:
Deleting file flash:cat9k-cc_srdriver.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-espbase.16.06.01.SPA.pkg ... done.
Deleting file
Deleting file flash:cat9k-rpbase.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-rpboot.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipbase.B16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-sipspa.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-srdriver.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k-webui.16.06.01.SPA.pkg ... done.
Deleting file flash:cat9k_1.bin ... done.
Deleting file flash:cat9k_1.conf ... done.
Deleting file flash:cat9k_2.1.conf ... done.
Deleting file flash:cat9k_2.bin ... done.
Deleting file flash:cat9k_2.conf ... done.
Deleting file flash:cat9k_iosxe.16.06.01.SSA.bin ... done.
Deleting file flash:packages.conf.00- ... done.
SUCCESS: Files deleted.
--- Starting Post_Remove_Cleanup ---
Performing Post_Remove_Cleanup on Active/Standby
[R0] Post_Remove_Cleanup package(s) on R0
[R0] Finished Post_Remove_Cleanup on R0
Checking status of Post_Remove_Cleanup on [R0]
Post_Remove_Cleanup: Passed on [R0]
Finished Post_Remove_Cleanup

SUCCESS: install_remove Tue Jun 20 14:16:29 PDT 2017
```

Step 2. Copy New Image to Flash

In this example, you copy the image from your TFTP server to the supervisors flash.

```
Switch#copy tftp: bootflash:
Address or name of remote host []? 172.16.53.46
Source filename []? cat9k_iosxe.16.06.02.SPA.bin
Destination filename [cat9k_iosxe.16.06.02.SPA.bin]?

Accessing tftp://172.16.53.46//cat9k_iosxe.16.06.02.SPA.bin...
Loading /cat9k_iosxe.16.06.02.SPA.bin from 10.8.0.6 (via GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 601216545 bytes]

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

Step 3    Use the dir flash command to confirm that the image has been successfully copied to flash.

Switch#dir bootflash:*.bin
Directory of bootflash:/*.bin

Directory of flash:/

434184 -rw- 601216545 Jul 26 2017 10:18:11 -07:00 cat9k_iosxe.16.06.02.SPA.bin
11353194496 bytes total (8976625664 bytes free)
```

Step 3. Check Boot Statement

Ensure the boot statement is configured to the packages.conf before you upgrade to 16.6.2 in install mode. If it is set to the .bin file, you must change it to packages.conf.:

```
Switch#show boot
BOOT variable = bootflash:packages.conf;
Configuration Register is 0x2
MANUAL_BOOT variable = no
BAUD variable = 9600
ENABLE_BREAK variable =
BOOTMODE variable does not exist
IPXE_TIMEOUT variable does not exist
CONFIG_FILE variable =

If your switches are configured with auto boot, then the switch automatically boots up with the new ima
If not, you can manually boot flash:packages.conf
Switch: boot flash:packages.conf
```

Step 4. Software Install Image to Flash

Use the **install add file activate commit** command to install the target image to flash. You can point to the

source image on your TFTP server or in bootflash if you have the image copied to flash. In this example, you have copied the image to the flash already.

```
Switch#install add file bootflash:cat9k_iosxe.16.06.02.SPA.bin activate commit
install_add_activate_commit: START Mon Nov 13 23:24:02 UTC 2017

System configuration has been modified.
Press Yes(y) to save the configuration and proceed.
Press No(n) for proceeding without saving the configuration.
Press Quit(q) to exit, you can save configuration and re-enter the command. [y/n/q]y
Building configuration...
[OK]Modified configuration has been saved

*Nov 13 23:24:09.935: %SYS-2-PRIVCFG_ENCRYPT: Successfully encrypted private config file
*Nov 13 23:24:11.314: %IOSXE-5-PLATFORM:  R1/0: Nov 13 23:24:11 install_engine.sh: %INSTALL-5-INSTALL_S

This operation requires a reload of the system. Do you want to proceed?
Please confirm you have changed boot config to flash:packages.conf [y/n]y

--- Starting Add ---
Performing Add on Active/Standby
  [R1] Add package(s) on R1
  [R1] Finished Add on R1
Checking status of Add on [R1]
Add: Passed on [R1]
Finished Add

install_add_activate_commit: Activating PACKAGE

*Nov 13 23:25:28.589: %IOSXE-4-PLATFORM:  R1/0: kernel: ISOFS: Unable to identify CD-ROM format.Followi
/flash/cat9k-wlc.16.06.02.SPA.pkg
/flash/cat9k-webui.16.06.02.SPA.pkg
/flash/cat9k-srdriver.16.06.02.SPA.pkg
/flash/cat9k-sipspa.16.06.02.SPA.pkg
/flash/cat9k-sipbase.16.06.02.SPA.pkg
/flash/cat9k-rpboot.16.06.02.SPA.pkg
/flash/cat9k-rpbase.16.06.02.SPA.pkg
/flash/cat9k-guestshell.16.06.02.SPA.pkg
/flash/cat9k-espbase.16.06.02.SPA.pkg
/flash/cat9k-cc_srdriver.16.06.02.SPA.pkg

This operation requires a reload of the system. Do you want to proceed? [y/n]y
--- Starting Activate ---
Performing Activate on Active/Standby
  [R1] Activate package(s) on R1
head: invalid number of lines: '/tmp/Activate.rp-1-1-1.20171113232845.out.log'
  [R1] Finished Activate on R1
Checking status of Activate on [R1]
Activate: Passed on [R1]
Finished Activate

--- Starting Commit ---
Performing Commit on Active/Standby

*Nov 13 23:28:47.521: %IOSXE-5-PLATFORM:  R1/0: Nov 13 23:28:47 rollback_timer.sh: %INSTALL-5-INSTALL_A
  [R1] Finished Commit on R1
Checking status of Commit on [R1]
Commit: Passed on [R1]
Finished Commit
```

```
Install will reload the system now!
SUCCESS: install_add_activate_commit  Mon Nov 13 23:29:14 UTC 2017

Switch#
*Nov 13 23:29:14.578: %IOSXE-5-PLATFORM:  R1/0: Nov 13 23:29:14 install_engine.sh: %INSTALL-5-INSTALL_C

Initializing Hardware...

System Bootstrap, Version 16.6.1r [FC2], RELEASE SOFTWARE (P)
Compiled Sat 07/15/2017 10:06:12.23 by rel

Current image running:
Primary Rommon Image

Last reset cause: SoftwareResetTrig
C9400-SUP-1 platform with 16777216 Kbytes of main memory

Preparing to autoboot. [Press Ctrl-C to interrupt]  0
attempting to boot from [bootflash:packages.conf]

Located file packages.conf
#
################################################################################################

Validate packages: SHA-1 hash:
    calculated 550C9730:667B2788:DD6F6B06:D0FFA819:01A315DA
    expected   550C9730:667B2788:DD6F6B06:D0FFA819:01A315DA
%IOSXEBOOT-4-BOOTLOADER_UPGRADE: (rp/1): ### Mon Nov 13 23:32:20 Universal 2017 PLEASE DO NOT POWER CYC
%IOSXEBOOT-4-BOOTLOADER_UPGRADE: (rp/1): boot loader upgrade successful  << Bootloader upgrade done
%IOSXEBOOT-4-BOOTLOADER_UPGRADE: (rp/1): Reloading the Supervisor to enable the New BOOTLOADER

Initializing Hardware...

Initializing Hardware...

Initializing Hardware...

System Bootstrap, Version 16.6.2r[FC1], RELEASE SOFTWARE (P)
Compiled Tue 10/31/2017 11:38:44.98 by rel

Current image running:
Primary Rommon Image

Last reset cause: SoftwareResetTrig
C9400-SUP-1 platform with 16777216 Kbytes of main memory

Preparing to autoboot. [Press Ctrl-C to interrupt]  0
attempting to boot from [bootflash:packages.conf]

Located file packages.conf
#
################################################################################################

Validate packages: SHA-1 hash:
    calculated 550C9730:667B2788:DD6F6B06:D0FFA819:01A315DA
    expected   550C9730:667B2788:DD6F6B06:D0FFA819:01A315DA

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```

Step 5. Verify New Packages and Image After Upgrade

After the software has been successfully installed, verify the flash partition has the new .pkg files. Sample output:

```
Switch#dir bootflash:*.pkg
Directory of bootflash:/*.pkg

Directory of bootflash:/

405607 -rw- 5186504 Nov 13 2017 22:36:25 +00:00 cat9k-cc_srdriver.16.06.02.SPA.pkg
405608 -rw- 76649412 Nov 13 2017 22:36:27 +00:00 cat9k-espbase.16.06.02.SPA.pkg
405609 -rw- 1536964 Nov 13 2017 22:36:27 +00:00 cat9k-guestshell.16.06.02.SPA.pkg
405610 -rw- 380625856 Nov 13 2017 22:36:38 +00:00 cat9k-rpbase.16.06.02.SPA.pkg
405616 -rw- 29580684 Nov 13 2017 22:36:48 +00:00 cat9k-rpboot.16.06.02.SPA.pkg
405611 -rw- 27612100 Nov 13 2017 22:36:39 +00:00 cat9k-sipbase.16.06.02.SPA.pkg
405614 -rw- 12268480 Nov 13 2017 22:36:41 +00:00 cat9k-webui.16.06.02.SPA.pkg
405612 -rw- 54981568 Nov 13 2017 22:36:40 +00:00 cat9k-sipspa.16.06.02.SPA.pkg
405613 -rw- 6521796 Nov 13 2017 22:36:40 +00:00 cat9k-srdriver.16.06.02.SPA.pkg
405615 -rw- 1536960 Nov 13 2017 22:36:41 +00:00 cat9k-wlc.16.06.02.SPA.pkg
11250098176 bytes total (8812113920 bytes free)
```

Since both supervisors are upgraded individually, insert the first supervisor in slot 5 as it must join as the standby supervisor:

```
Checking module status with both supervisors inserted Switch#show module
Chassis Type: C9410R

Mod Ports Card Type                                  Model          Serial No.
---+-----+--------------------------------------+--------------+--------------
1   48   48-Port 10/100/1000 (RJ-45)               C9400-LC-48T   JAE212409NQ
2   48   48-Port 10/100/1000 (RJ-45)               C9400-LC-48T   JAE212409N2
3   48   48-Port UPOE 10/100/1000 (RJ-45)          C9400-LC-48U   JAE21270C1R
4   48   48-Port UPOE 10/100/1000 (RJ-45)          C9400-LC-48U   JAE21270C1C
```

```
5   10   Supervisor 1 Module                          C9400-SUP-1    JAE21240235
6   10   Supervisor 1 Module                          C9400-SUP-1    JAE21240235

Mod MAC addresses                     Hw   Fw           Sw                  Status
---+--------------------------------+----+------------+-------------------+--------
1   E4AA.5D59.8420 to E4AA.5D59.844F 1.0  16.6.2r[FC1 16.06.02              ok
2   E4AA.5D59.85AC to E4AA.5D59.85DB 1.0  16.6.2r[FC1 16.06.02              ok
3   E4AA.5D59.BC0C to E4AA.5D59.BC3B 1.0  16.6.2r[FC1 16.06.02              ok
4   E4AA.5D59.B72C to E4AA.5D59.B75B 1.0  16.6.2r[FC1 16.06.02              ok
5   2C5A.0F1C.4F2C to 2C5A.0F1C.4F35 0.6  16.6.2r[FC1 16.06.02              ok
6   2C5A.0F1C.4F36 to 2C5A.0F1C.4F3F 0.6  16.6.2r[FC1 16.06.02              ok

Mod Redundancy Role     Operating Redundancy Mode Configured Redundancy Mode
---+------------------+-------------------------+---------------------------
5   Standby             standby hot               sso
6   Active              active                    sso
```

Check Redundancy

The supervisor modules in the Catalyst 9400 (hardware) support redundancy. Software redundancy is supported in Cisco IOS ® XE Everest 16.6.2. In the 16.6.2 software version, the Route Processor Redundancy (RPR) feature is not supported. Use the **show redundancy** and **show platform software iomd redundancy** commands to ensure that both Stateful Switchover (SSO) formed and IOMD is ready before you complete any switchovers.

RPR Redundancy

When a standby supervisor engine runs in RPR mode, it starts up in a partially-initialized state and is synchronized with the persistent configuration of the active supervisor engine. RPR is not supported in 16.6.2.

In the event of supervisor engine switchover, traffic is disrupted because in RPR mode all physical ports restart since there is no state maintained between supervisor engines which relates to module types and statuses. Upon switchover, when the standby supervisor engine completes its initialization, it reads hardware information directly from the module and becomes the active supervisor engine.

SSO Redundancy

When a standby supervisor engine runs in SSO mode, the standby supervisor engine starts up in a fully-initialized state and synchronizes with the persistent configuration and the running configuration of the active supervisor engine. It subsequently maintains the state on the protocols listed here, and all changes in hardware and software states for features that support stateful switchover are kept in synchronization.

Consequently, it offers zero interruption to Layer 2 sessions in a redundant supervisor engine configuration.

Because the standby supervisor engine recognizes the hardware link status of every link, ports that were active before the switchover remain active, which includes the uplink ports. However, because uplink ports are physically on the supervisor engine, they can be disconnected if the supervisor engine is removed.

If the active supervisor engine fails, the standby supervisor engine becomes active. This newly active supervisor engine uses existing Layer 2 switching information to continue to forward the traffic.

<#root>

IOMD is Input Output Module Driver software process. Check if IOMds are ready and have initialized Softw

```
Switch# show platform software iomd redundancy
    Configured Redundancy Mode = sso
     Operating Redundancy Mode = sso
                Local RF state = ACTIVE
                 Peer RF state = STANDBY HOT

slot PSM STATE   SPA INTF   HA_STATE HA_ACTIVE
   1     ready   started     ready    00:10:49
   2     ready   started     ready    00:10:49
   3     ready   started     ready    00:10:48
   4     ready   started     ready    00:10:49
   5     ready   started     ready    00:10:54
   6     ready   started     ready    00:10:53 ***active RP


Switch#show redundancy
Redundant System Information :
------------------------------
 Available system uptime = 31 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

Current Processor Information :
------------------------------
 Active Location = slot 6
 Current Software state = ACTIVE
 Uptime in current state = 31 minutes
 Image Version = Cisco IOS ®Software [Everest], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.6
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 BOOT = bootflash:packages.conf;
 CONFIG_FILE =
 Configuration register = 0x2

Peer Processor Information :
----------------------------
 Standby Location = slot 5
```

```
 Current Software state = STANDBY HOT
 Uptime in current state = 26 minutes
 Image Version = Cisco IOS ®Software [Everest], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.6
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Compiled Wed 01-Nov-17 07:26 by mcpre
 BOOT = bootflash:packages.conf;
 CONFIG_FILE =
 Configuration register = 0x2
```