



## **Upgrading the Software on the Cisco NCS 4200 Series Routers**

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# CHAPTER 1

## Feature History

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The following table lists the new and modified features supported in the Upgrading the Software on the Cisco NCS 4200 Series Routers in Cisco IOS XE 17 releases.

Feature	Description
<b>Cisco IOS XE Bengaluru 17.6.1</b>	
<a href="#">Secure eUSB Configuration</a>	Use the <b>platform secure-cfg</b> command to provide enhanced security to the routers.
<b>Cisco IOS XE Bengaluru 17.4.1</b>	
<a href="#">Secondary ROMMON Partition Auto Upgrade</a>	This feature supports secondary ROMMON partition auto upgrade after a successful primary ROMMON partition is complete.





## CHAPTER 2

# Software Packaging on the Router

- [Software Package Modes, on page 3](#)
- [Understanding Software Packages, on page 3](#)
- [Provisioning Files, on page 4](#)
- [File Systems on the Router, on page 4](#)
- [System Requirements, on page 6](#)
- [Autogenerated Files and Directories, on page 7](#)
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## Software Package Modes

The router can be booted using any of the following:

- **Consolidated**—A single software image containing a full collection of software packages. This mode provides a simplified installation and can be stored in the bootflash, a TFTP server, or a network server.
- **Sub-package**—One or more sub-images that are extracted from the consolidated image. This mode provides optimized memory usage and requires that you store files in the bootflash directory.

## Understanding Software Packages

*Table 1: Individual Sub-Packages*

Sub-Package	Purpose
RPBase	Route Switch Processor (RSP) operating system
RPControl	Control plane processes between IOS process and the rest of the platform.
RPAccess	Handles security features including Secure Socket Layer (SSL) and Secure Shell (SSH)
RPIOS	Cisco IOS kernel, which is where IOS features are stored and run. <b>Note</b> Each consolidated image has a unique RPIOS package.
FP Pkg	Controls FP daemons.

Sub-Package	Purpose
IO Pkg	Controls input/output driver daemons.
LC Base	Controls basic kernel functions including runtime, initialization scripts, and chassis control daemons.

*Table 2: Individual Sub-Packages*

Sub-Package	Purpose
RPBase	Route Switch Processor (RSP) operating system
RPControl	Control plane processes between IOS process and the rest of the platform.
RPAccess	Handles security features including Secure Socket Layer (SSL) and Secure Shell (SSH)
RPIOS	Cisco IOS kernel, which is where IOS features are stored and run. <b>Note</b> Each consolidated image has a unique RPIOS package.
SIPSPA Base	Controls interface module daemons.

## Provisioning Files

Provisioning files manage the boot process when the router is configured to boot in sub-packages. The provisioning file manages the bootup of each individual sub-package. Provisioning files are extracted automatically when individual sub-package files are extracted from a consolidated package. Provisioning files are not necessary for running the router using the complete consolidated package.

## File Systems on the Router

*Table 3: File Systems*

File System	Description
bootflash:	The boot flash memory file system on the active RSP.
cns:	The Cisco Networking Services file directory.
nvrn:	Router NVRAM. You can copy the startup configuration to NVRAM or from NVRAM.
stby-bootflash:	The boot flash memory file system on the standby RSP.
stby-harddisk:	The hard disk file system on the standby RSP.
stby-usb0:	The Universal Serial Bus (USB) flash drive file systems on the standby RSP. <b>Note</b> stby-usb1: is an internal port.



File System	Description
system:	The system memory file system, which includes the running configuration.
tar:	The archive file system.
tmpsys:	The temporary system files file system.
usb0:	The Universal Serial Bus (USB) flash drive file systems on the active RSP. <b>Note</b> usb1: is an internal port.

If you see a file system not listed in the above table, enter the ? help option or see the **copy** command reference for additional information on that file system.

# System Requirements

## RP Memory Recommendations

Table 4: Memory Recommendations for the Cisco NCS 4200 RSP2 Module - Consolidated Package Image

Platform	Image Name	Software Image	Individual Sub-package Contents	DRAM Memory			
NCS 4200 RSP2 Module	Cisco ncs4200 Series RSP2 UNIVERSAL W/O CRYPTO	ncs4200rsp2-universal.version .bin	ncs4200rsp2-rpbase.version .pkg	8 GB (RSP3-400)			
			ncs4200rsp2-rpcontrol.version .pkg				
			ncs4200rsp2-rpaccess.version .pkg				
			ncs4200rsp2-rpios-universal.version .pkg				
			ncs4200rsp2-espbase.version .pkg				
			ncs4200rsp2-sipbase.version .pkg				
			ncs4200rsp2-sipspa.version .pkg				
			ncs4200rsp2-packages-universal.version.conf				
ncs4200 RSP2 Module	Cisco ncs4200 Series RSP2 UNIVERSAL NPE	ncs4200rsp2-universalk9_npe.version .bin	ncs4200-hw-programmables.version .pkg	8 GB (RSP3-400)			
			ncs4200rsp2-espbase.version .pkg				
			ncs4200rsp2-packages-universalk9.version .pkg				
			ncs4200sp2-rpaccess.version .pkg				
						ncs4200rsp2-rpbase.version .pkg	
						ncs4200rsp2-rpcontrol.version .pkg	
						ncs4200rsp2-rpios-universalk9_npe.version .pkg	
						ncs4200rsp2-sipbase.version .pkg	
			ncs4200rsp2-sipspa.version .pkg				
			packages.conf				

Table 5: Memory Recommendations for the NCS 4200 RSP3 Module - Consolidated Package Image

Platform	Image Name	Software Image	Individual Sub-package Contents	DRAM Memory
NCS 4200 RSP3 Module	Cisco NCS 4200 Series RSP3 UNIVERSAL W/O CRYPTO	ncs4200rsp3-universal.version.bin	ncs4200rsp3-rpbase.version.pkg	8 GB (RSP3-400)
			ncs4200rsp3-rpcontrol.version.pkg	
			ncs4200rsp3-rpaccess.version.pkg	
			ncs4200rsp3-rpios-universal.version.pkg	
			ncs4200rsp3-espbase.version.pkg	
			ncs4200rsp3-sipbase.version.pkg	
			ncs4200rsp3-sipspace.version.pkg	
			ncs4200rsp3-packages-universal.version.conf	
		packages.conf		
NCS 4200 RSP3 Module	Cisco NCS 4200 Series RSP3 UNIVERSAL NPE	ncs4200rsp3-universalk9_npe.version.bin	ncs4200-hw-programmables.version.pkg	8 GB (RSP3-400)
			ncs4200rsp3-espbase.version.pkg	
			ncs4200rsp3-packages-universalk9.version.pkg	
			ncs4200rsp3-rpaccess.version.pkg	
			ncs4200rsp3-rpbase.version.pkg	
			ncs4200rsp3-rpcontrol.version.pkg	
			ncs4200rsp3-rpios-universalk9_npe.version.pkg	
			ncs4200rsp3-sipbase.version.pkg	
			ncs4200rsp3-sipspace.version.pkg	

## Autogenerated Files and Directories



### Caution

Any autogenerated file in the bootflash: directory should not be deleted, renamed, moved, or altered in any way unless directed by customer support; altering these files can have unpredictable consequences for system performance.

Table 6: Autogenerated Files

File or Directory	Description
crashinfo files	A crashinfo file may appear in the bootflash: file system. Crashinfo files are useful for tuning and troubleshooting, but are not related to router operations: you can erase them without impacting the router's performance.
core files	The bootflash/core directory is the storage area for .core files. <b>Warning</b> Do not erase or move the core directory.
lost+found directory	This directory is created on bootup if a system check is performed. Its appearance is completely normal and does not indicate any issues with the router.
tracelogs files	The storage area for trace files is bootflash/tracelogs. Trace files are useful for troubleshooting; you can access trace files using diagnostic mode to gather information related to the IOS failure. <b>Warning</b> Do not erase or move the tracelog directory.

## Additional References

### Related Documents

Related Topic	Document Title
Cisco IOS master command list	<a href="#">Cisco IOS Master Command List</a> , All Releases
Cisco IOS High Availability commands	<i>Cisco IOS High Availability Command Reference</i>

### Standards

Standard	Title
No new or modified standards are supported, and support for existing standards has not been modified.	--

### MIBs

MIB	MIBs Link
No new or modified MIBs are supported, and support for existing MIBs has not been modified.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**RFCs**

RFC	Title
No new or modified RFCs are supported, and support for existing RFCs has not been modified.	--

**Technical Assistance**

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>





## CHAPTER 3

# Downloading an Image

Download the image to the same partition of the bootflash where the base image exists. For information on downloading images see, [Loading and Managing System Images Configuration Guide, Cisco IOS XE Release 3S](#).



**Note** Ensure that you have chosen an upgrade image that is supported by your current software version.

- [Bootflash Space Requirements, on page 11](#)
- [Restrictions for Upgrading from Cisco IOS XE Release 3.x to Cisco IOS XE Release 16.x, on page 11](#)
- [Upgrading from Cisco IOS XE Release 3.x to Cisco IOS XE 16.x, on page 12](#)
- [Installing Workflow Based ISSU, on page 13](#)
- [Secure eUSB Configuration, on page 14](#)

## Bootflash Space Requirements

The ISSU software upgrade process requires a minimum of 2X image size available space in bootflash memory.

## Restrictions for Upgrading from Cisco IOS XE Release 3.x to Cisco IOS XE Release 16.x

- Upgrading from Cisco IOS Release 3.x to Cisco IOS Release 16.x is only supported with consolidated mode.
- Upgrading from Cisco IOS Release 3.x to to Cisco IOS Release 16.x using sub-package mode is *not* supported and vice-versa.
- ISSU is *not* supported on upgrade from Cisco IOS XE Release 3.x to 16.x .
- RSP1 Module is *not* supported in Cisco IOS XE Releases 16.x.
- Extracting the Cisco IOS XE Release 16.x image in Cisco IOS XE Release 3.x is not supported, and vice versa.

# Upgrading from Cisco IOS XE Release 3.x to Cisco IOS XE 16.x




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**Note** A full upgrade procedure may require reloading the system repeatedly (around two times). Use the **show version** command, after each reload to verify the image version and license level.

---

## Before you begin

- Download the Cisco IOS XE 16.x image from Cisco.com.




---

**Note** Cisco IOS XE Release 16.5.1 and onwards is supported.

---

- Download the ROMMON release from Cisco.com.




---

**Note** The system automatically reboots twice, on a FPGA upgrade.

---

## Procedure

---

**Step 1** Backup the running configuration.

### Example:

```
Router# copy running-config bootflash:demo.cfg
Destination filename [demo.cfg]?
1834 bytes copied in 0.112 secs (16375 bytes/sec)
```

**Step 2** Upgrade the ROMMON image.

### Example:

```
Router# upgrade rom-monitor filename bootflash:<rommon-file-name>.pkg all
```

```
Upgrade rom-monitor on Router-Processor 0
Target copying rom-monitor image file
. . .
```

```
ROMMON upgrade complete
```

To make the new ROMMON permanent, you must restart the linecard

```
Router# reload <-- Reloads the active and standby router processor and boot the IOS 3.x
image
```

```
. . .
Router# show platform
. . .
```

Slot	CPLD Version	Firmware Version
R0	16040627	15.6(14r)S

□--- Rommon version depends on the type of system



```
R1      16112128      15.6(14r)S
F0      16040627      15.6(14r)S
F1      16112128      15.6(14r)S
```

**Step 3** Install the IOS XE 16.x universal image, save the configuration, and reload the device.

**Example:**

```
Router# configure terminal
Router(config)# no boot system bootflash:previous_image.bin <-- Removes the previous boot
statement
Router(config)# boot system bootflash:16.x-universal-image.bin <-- Adds the new boot statement
Router(config)# end
Router# write
Building configuration...
[OK]
Router# reload <-- Reload the active and standby router processor and boot the IOS XE 16.x
Universal image
```

**Step 4** Restore the backup configuration to the running configuration.

**Example:**

```
Router# copy bootflash:demo.cfg running-config
Destination filename [running-config]?

Router# config terminal
Router(config)# no boot system bootflash:previous_image.bin <-- Removes the previous boot
statement
Router(config)# end
Router# write
Building configuration...
[OK]
```

## Installing Workflow Based ISSU

Starting from release Cisco IOS XE Amsterdam 17.3.1, the RSP3 platform supports installing workflow-based ISSU. So ISSU from release Cisco IOS XE Amsterdam 17.3.1 and later is supported, but it can't support ISSU downgrade to versions prior to release Cisco IOS XE Amsterdam 17.3.1.

Following is the syntax to install workflow-based ISSU:

```
install add file bootflash:<path>/<binary> activate issu commit
```

**Example**

```
install add file bootflash:Image/asr903rsp3-adventerprisek9.upgrade.bin activate issu
linecard-delay 150 commit
```

# Secure eUSB Configuration

*Table 7: Feature History*

Feature Name	Release Information	Description
Secure eUSB Configuration	Cisco IOS XE Bengaluru 17.6.1	Use the <b>platform secure-cfg</b> command to provide enhanced security to the routers.

Effective with Cisco IOS XE Bengaluru Release 17.6.1, use the **platform secure-cfg** command to provide enhanced security to the routers. When you enable the command, the router does not boot if the eUSB is replaced, swapped, or modified externally. Thus, you cannot format the eUSB externally and this prevents the misuse of the router.

This feature is applicable on the Cisco A900-RSP3C-400-W, Cisco A900-RSP3C-400-S, and Cisco A900-RSP3C-200-S routers.

This feature is applicable on the Cisco NCS4216-RSP routers.

To enable the **platform secure-cfg** command:

```
Router#enable
Router#configure terminal
Router(conf)#platform secure-cfg
Router(conf)#end
Router# write memory
```

Use the following command to verify that the **platform secure-cfg** command is enabled.

```
Router#show running-config | i secure-cfg
platform secure-cfg
```



## CHAPTER 4

# Upgrading ROMMON on RSP modules

---

This section shows the details of upgrading ROMMON on RSP modules .

- [Upgrading the ROMMON on the RSP2 Module, on page 15](#)
- [Upgrading the ROMMON on the RSP3 Module, on page 18](#)

## Upgrading the ROMMON on the RSP2 Module

The RSP2 router has two ROMMON regions (ROM0 and ROM1). We recommend you to perform upgrade on both ROMMON regions. The ROMMON upgrade procedures are applicable to Cisco ASR 903, NCS 4206-16, and Cisco ASR 907 routers.



---

**Caution** To avoid actions that might make your system unable to boot, read this entire section before starting the upgrade.

---

Use the following methods to upgrade ROMMON:

1. Upgrade ROMMON Using Commands
2. Auto Upgrade

## Upgrade ROMMON Using Commands

### Procedure

---

- Step 1** Check the RSP bootup ROMMON region (ROM0 or ROM1). The example, shows the RSP boots up from ROM0 region.

**Example:**

```
System Bootstrap, Version 15.2(1r)S1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2011 by cisco Systems, Inc.
Compiled Wed 07-Dec-11 07:33 by tinhuang
Current image running: Boot ROM0
```

**Step 2** Copy the ROMMON image to the bootflash on the Cisco router.

**Example:**

```
copy bootflash:asr900_15_6_48r_s_rommon.pkg
```

**Step 3** Use the **upgrade rom-monitor filename** *asr900\_15\_6\_48r\_s\_rommon.pkg* command to upgrade the ROMMON on both active and standby RSPs.

**Note** Step 3 upgrades the ROMMON region of the RSP that is not used (ROM 1 region).

**Step 4** Reload the router. Ensure that the device is booted from the upgraded region ROM1.

**Example:**

```
System Bootstrap, Version 15.6(12r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2016 by cisco Systems, Inc.
Compiled Sun 29-May-16 08:45 by sabind
Starting Initialization of FMAN0
Loading ucode for FMAN0, size: 31424, ver: 106.04.14
fixup address:7ffff278 contentsoffixup:7ffff000
DCFG_CCSR_PORSR1(cfg_0_9 pins):22FB7F7F
RC Vendor ID[0x8241957]
PEX up stream Vendor ID[0x860910b5]
PEX down stream vendor ID [0x860910b5]
FPGA vendor ID[0x5f1137]
PCI Configuration done..
IOFPGA version[16040627]
```

```
Current image running: Boot ROM0
Last reset cause: RSP-Board
Rommon upgrade requested
Flash upgrade reset 1 in progress
.....BootPage Setting Done - Next DDR-init
```

```
System Bootstrap, Version 15.6(48r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2017 by cisco Systems, Inc.
Compiled Sat 07-Jan-17 10:23 by sabind
Starting Initialization of FMAN0
Loading ucode for FMAN0, size: 31424, ver: 106.04.14
fixup address:7ffff278 contentsoffixup:7ffff000
DCFG_CCSR_PORSR1(cfg_0_9 pins):22FB7F7F
RC Vendor ID[0x8241957]
PEX up stream Vendor ID[0x860910b5]
PEX down stream vendor ID [0x860910b5]
FPGA vendor ID[0x5f1137]
PCI Configuration done..
IOFPGA version[16040627]
```

```
Current image running: *Upgrade in progress* Boot ROM1
Last reset cause: BootRomUpgrade
Configuring zarlink...
We're coming up from a flash upgrade reset cookie
C-Inlet temp 32C
ARAD-0 temp 44C
UEA platform with 3670016 Kbytes of main memory

We're coming up from a flash upgrade reset cookie
```

**Step 5** After successful boot up of the IOS XE image, repeat Step 3 to Step 4 to update the other region on the Cisco router (ROM0) region in this procedure.

**Note** We recommend that both region ROM0 and ROM1 are upgraded.

**Note** Starting with Cisco IOS XE Amsterdam 17.3.1, secondary partition upgrade should be performed only after loading version 17.3.1.

## Example: Verifying ROMMON Upgrade on the RSP2 Module

Use the show platform command to verify the ROMMON upgrade.

```
Router# show platform
Chassis type: NCS4206-SA
```

Slot	Type	State	Insert time (ago)
0/0	A900-IMA2Z	ok	00:00:47
0/1	A900-IMA8T1Z	booting	00:00:47
0/2	A900-IMA8T1Z	booting	00:00:47
0/3	A900-IMA1X	ok	00:00:47
0/4	A900-IMA8T	ok	00:00:47
R0	NCS420X-RSP-128	ok, active	00:00:47
R1	NCS420X-RSP-128	ok, standby	00:00:47
F0		init, active	00:03:11
F1		init, standby	00:03:11
P0	A900-PWR550-A	ok	00:02:29
P1	Unknown	N/A	never
P2	A903-FAN	ok	00:02:26

Slot	CPLD Version	Firmware Version
R0	16032304	15.6(48r)S
R1	16032304	15.6(48r)S
F0	16032304	15.6(48r)S
F1	16032304	15.6(48r)S

## Auto Upgrade on the RSP2 Module

**Table 8: Feature History**

Secondary ROMMON Version Auto Upgrade	Cisco IOS XE Bengaluru 17.5.1	After primary ROMMON version is auto upgraded, secondary ROMMON version auto upgrade process takes place. The secondary ROMMON upgrade is only completed during the next planned manual reload of the router.
---------------------------------------	-------------------------------	---

The router running ROMMON version that is lower than the version bundled in Cisco IOS XE is auto upgraded to the bundled version during a router restart. However, if a Cisco IOS XE release with ROMMON image is bundled with a version lower than the running ROMMON version, the ROMMON is not auto downgraded.




---

**Caution** To avoid actions that might make your system unable to boot, read this entire section before starting the upgrade.

---

- The ROMMON auto upgrade process starts when the router is booted with Cisco IOS XE version that supports ROMMON auto upgrade. Routers are automatically reloaded during the ROMMON auto upgrade process.
- The auto upgrade process does not occur once the upgrade of ROMMON is complete.
- The running ROMMON version is not auto downgraded if ROMMON image in Cisco IOS XE is bundled with a version lower than that of the running ROMMON version.
- A minimum disk space of 2 MB is required in the boot flash memory file system for a successful ROMMON auto upgrade process. For a disk space lesser than 2 MB, ROMMON auto upgrade fails and the router reboots.
- For Cisco IOS XE Amsterdam Release 17.3.x, Cisco IOS XE Bengaluru Release 17.4.x, and earlier, the secondary ROMMON partition is *not* auto upgraded. You must manually upgrade it using the **upgrade rom-mon filename** command.
- Any future secure ROMMON upgrade or downgrade is only possible from Cisco IOS XE Amsterdam Release 17.3.1 onwards.
- Starting with ROMMON release version 15.6(43r)S, ROMMON version is secure. Once the ROMMON version is upgraded, it cannot be downgraded to a non-secure ROMMON version.
- Starting with Cisco IOS XE Bengaluru release, 17.5.1, after primary ROMMON version is auto upgraded, secondary ROMMON version auto upgrade process takes place. The secondary ROMMON upgrade is only completed during the next planned manual reload of the router.
- Any non-secure FPGA bundled releases moving to Cisco IOS XE Bengaluru Release 17.3.x or future releases can result in an FPGA upgrade and a ROMMON upgrade. If FPGA upgrade happens parallelly with the ROMMON upgrade, you can only expect a single reload. If FPGA upgrade gets delayed and happens post ROMMON upgrade, two reloads are expected to complete both the upgrade processes. This is followed by a successful bootup of the target release image.

## Upgrading the ROMMON on the RSP3 Module

The RSP3 router has two ROMMON regions (ROM0 and ROM1). We recommend you to perform upgrade on both ROMMON regions. The ROMMON upgrade procedures are applicable to Cisco NCS 4206 and Cisco NCS 4216.routers.




---

**Caution** To avoid actions that might make your system unable to boot, read this entire section before starting the upgrade.

---




---

**Note** Starting with Cisco IOS XE Bengaluru Release 17.6.1, the 15.6(49r)S ROMMON version filters the restricted ROMMON variables during the bootup. This helps to restrict the privileged mode of operations that can impact the router.

---

Use the following methods to upgrade ROMMON:

1. Upgrade ROMMON Using Commands
2. Auto Upgrade

## Upgrading ROMMON Using Commands

Cisco IOS-XE supports the usual ROMMON upgrade procedure where both the RPs can be upgraded at the same time or can be done on each RP separately. Use the following command to upgrade the ROMMON:

- **upgrade rom-monitor file bootflash:<file> all/R0/R1**




---

**Note** You must reload the router manually to complete the upgrade process.

---

To upgrade ROMMON using commands:

1. Check the RSP bootup ROMMON region (ROM0 or ROM1). The example, shows the RSP boots up from ROM0 region.

**Example:**

```
System Bootstrap, Version 15.2(1r)S1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2011 by Cisco Systems, Inc.
Compiled Wed 07-Dec-11 07:33 by tinhuang
Current image running: Boot ROM0
```

2. Copy the ROMMON image to the bootflash on the active and standby RSP.

**Example:**

```
copy bootflash:rsp3_15_6_33r_s_rommon.pkg
```

3. Use the **upgrade rom-monitor filename** *rsp3\_15\_6\_33r\_s\_rommon.pkg* **R0** command to upgrade the version.




---

**Note** R0 represents RSP in slot 0 of the router. Step 3 upgrades the ROMMON region of the RSP that is not used (ROM1 region) as ROM 0 region is used in Step 1 to boot up the RSP.

---

4. Upgrade the ROMMON on the Standby RSP (for high availability) using the **upgrade rom-monitor filename** *bootflash:rsp3\_15\_6\_33r\_s\_rommon.pkg* **R1** command.



**Note** R1 represents the RSP in slot 1 of the router. Step 4 upgrades the ROMMON region of the RSP that is not used (ROM 1 region).

5. Reload the router. Ensure that the device is booted from the upgraded region ROM1.

**Example:**

```
System Bootstrap, Version 15.6(12r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2016 by cisco Systems, Inc.
Compiled Sun 29-May-16 08:45 by sabind
Starting Initialization of FMAN0
Loading ucode for FMAN0, size: 31424, ver: 106.04.14
fixup address:7ffff278 contentsoffixup:7ffff000
DCFG_CCSR_PORSR1(cfg_0_9 pins):22FB7F7F
RC Vendor ID[0x8241957]
PEX up stream Vendor ID[0x860910b5]
PEX down stream vendor ID [0x860910b5]
FPGA vendor ID[0x5f1137]
PCI Configuration done..
IOFPGA version[16040627]
Current image running: Boot ROM0
Last reset cause: RSP-Board
Rommon upgrade requested
Flash upgrade reset 1 in progress
.....BootPage Setting Done - Next DDR-init
```

```
System Bootstrap, Version 15.6(33r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2017 by cisco Systems, Inc.
Compiled Sat 07-Jan-17 10:23 by sabind
Starting Initialization of FMAN0
Loading ucode for FMAN0, size: 31424, ver: 106.04.14
fixup address:7ffff278 contentsoffixup:7ffff000
DCFG_CCSR_PORSR1(cfg_0_9 pins):22FB7F7F
RC Vendor ID[0x8241957]
PEX up stream Vendor ID[0x860910b5]
PEX down stream vendor ID [0x860910b5]
FPGA vendor ID[0x5f1137]
PCI Configuration done..
IOFPGA version[16040627]
Current image running: *Upgrade in progress* Boot ROM1
Last reset cause: BootRomUpgrade
Configuring zarlink...
We're coming up from a flash upgrade reset cookie
C-Inlet temp 32C
ARAD-0 temp 44C
UEA platform with 3670016 Kbytes of main memory

We're coming up from a flash upgrade reset cookie
```

6. After successful boot up of the IOS XE image, repeat from step 3 to step 5 to update the other region on the RSP (ROM 0) region in this procedure.

## Example: Verifying ROMMON Upgrade on the RSP3 Module

Use the show platform command to verify the ROMMON upgrade.



```

Router# show platform
Chassis type: NCS4206-SA

Slot      Type                State                Insert time (ago)
-----
 0/0      A900-IMA1X          ok                   18:23:52
 0/1      A900-IMA8S          ok                   18:23:52
 0/2      A900-IMA8S1Z       ok                   18:22:19
 0/3      A900-IMA2Z         ok                   18:21:43
 0/4      A900-IMA8Z         ok                   18:23:52
 0/5      A900-IMA8T         ok                   18:23:52
R0        NCS420X-RSP        ok, active           18:25:38
R1                            unknown              18:25:38
F0        ok, active           18:25:38
F1                            unknown              18:25:38
P0        A900-PWR550-A      ok                   18:24:54
P1        A900-PWR550-D      ps, fail             18:24:52
P2        A903-FAN           ok                   18:24:50

Slot      CPLD Version        Firmware Version
-----
R0        16040627            15.6(33r)S
R1        16040627            15.6(33r)S
F0        16040627            15.6(33r)S
F1        16040627            15.6(33r)S

```



**Note** We recommend you to upgrade both the regions, ROM0 and ROM1.

## Auto Upgrade on the RSP3 Module

**Table 9: Feature History**

Feature Name	Release Information	Description
Secondary ROMMON Partition Auto Upgrade	Cisco IOS XE Bengaluru 17.4.1	This feature supports secondary ROMMON partition auto upgrade after a successful primary ROMMON partition is complete.

Router running ROMMON version that is lower than version bundled in Cisco IOS XE is auto upgraded to the bundled version during a router restart. However, if a Cisco IOS XE release with ROMMON image is bundled with a version lower than the running ROMMON version, the ROMMON is not auto downgraded.

**Table 10: Supported Bundled ROMMON Versions on Cisco IOS XE Release Versions**

Cisco IOS XE Version	Bundled ROMMON Version
Cisco IOS XE Fuji Release 16.9.5, Cisco IOS XE Gibraltar Release 16.12.3, Cisco IOS XE Amsterdam Release 17.2.1, and higher	15.6(33r)S

Cisco IOS XE Version	Bundled ROMMON Version
Cisco IOS XE Amsterdam Release 17.3.1, Cisco IOS XE Bengaluru Release 17.4.1, Cisco IOS XE Bengaluru Release 17.5.1, and higher	15.6(42r)S

- The ROMMON auto upgrade process starts when the router is booted with Cisco IOS XE version that supports ROMMON auto upgrade. Routers are automatically reloaded during the ROMMON auto upgrade process.
- The auto upgrade process does not occur once the upgrade of ROMMON is complete.
- The running ROMMON version is not auto downgraded if ROMMON image in Cisco IOS XE is bundled with a version lower than that of the running ROMMON version.
- A minimum disk space of 2 MB is required in the boot flash memory file system for a successful ROMMON auto upgrade process. For a disk space lesser than 2 MB, ROMMON auto upgrade fails and the router reboots.
- Starting with Cisco IOS XE Amsterdam Release 17.3.2 and Cisco IOS XE Bengaluru Release 17.4.1, secondary ROMMON partition is also auto upgraded after a successful primary ROMMON partition upgrade is complete. You can reload the router at the next planned reload to complete the secondary ROMMON upgrade.
- For Cisco IOS XE Amsterdam Release 17.3.1 and earlier, the secondary ROMMON partition is not auto upgraded. You must manually upgrade it using the **upgrade rom-mon filename** command.
- Starting with ROMMON release version 15.6(42r)S, ROMMON is secure. Once the ROMMON version is upgraded, it cannot be downgraded to a non-secure ROMMON version.



## CHAPTER 5

# Upgrading the ROMMON on Cisco NCS 4201 and NCS 4202 Routers

Table 11: Feature History

Feature Name	Release Information	Description
Secondary ROMMON Version Auto Upgrade	Cisco IOS XE Bengaluru 17.5.1	After primary ROMMON version is auto upgraded, secondary ROMMON version auto upgrade process takes place. The secondary ROMMON upgrade is only completed during the next planned manual reload of the router.

Starting with Cisco IOS XE Bengaluru release 17.5.1, after primary ROMMON version is auto upgraded, secondary ROMMON version auto upgrade process takes place. The secondary ROMMON upgrade is only completed during the next planned manual reload of the router.



**Note** If the secondary ROMMON version is lesser than that of the primary ROMMON version, the secondary ROMMON gets auto upgraded.

The router has two ROMMON regions (ROM0 and ROM1). We recommend that the upgrade is performed on both the regions.



**Caution** To avoid actions that might make your system unable to boot, read this entire section before starting the upgrade.

1. Check the booted ROMMON region (ROM0 or ROM1). The example, shows the device booting up from ROM0 region.

**Example:**

```
System Bootstrap, Version 15.6(32r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2018 by cisco Systems, Inc.
Compiled Thu 30-Aug-18 06:23 by pallavik
```

```
*Upgrade in progress* Boot ROM1
Last reset cause: BootRomUpgrade
link status 0
link status 0
UEA platform with 3670016 Kbytes of main memory
```

- Copy the ROMMON pkg file `asr920_15_6_43r_s_rommon.pkg` to the bootflash.
- Use the **upgrade rom-monitor filename asr920\_15\_6\_43r\_s\_rommon.pkg all** command to upgrade the version.
- Reload the router and ensure device is booted from upgrade region ROM0.

**Example:**

```
System Bootstrap, Version 15.6(32r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2018 by cisco Systems, Inc.
Compiled Thu 30-Aug-18 06:23 by pallavik
Boot ROM1
Last reset cause: RSP-Board
Rommon upgrade requested
Flash upgrade reset 1 in progress
.....
System Bootstrap, Version 15.6(43r)S, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2020 by cisco Systems, Inc.
Compiled Tue 19-May-20 22:55 by pallavik
*Upgrade in progress* Boot ROM0
Last reset cause: BootRomUpgrade
link status 0
link status 0
UEA platform with 3670016 Kbytes of main memory

We're coming up from a flash upgrade reset cookie
rommon 1 >
```

- Repeat steps 3 and 4 to update the other region router (ROM1) region in this procedure.



**Note** We recommend you to upgrade that both ROM0 and ROM1 regions.

Starting with Cisco IOS XE Amsterdam 17.3.1 and higher, secondary partition upgrade is performed only after loading version 17.3.1 or higher.

- [Verifying ROMMON Upgrade on the Cisco NCS 4202, on page 24](#)
- [Auto Upgrade, on page 25](#)

## Verifying ROMMON Upgrade on the Cisco NCS 4202

Use the **show platform** command to verify the ROMMON upgrade.

```
Router#show platform
Chassis type: NCS4202-SA
```

Slot	Type	State	Insert time (ago)
0/0	12xGE-4x10GE-FIXED	ok	00:40:35
0/1	NCS4200-3GMS	ok	00:40:35

```

R0      NCS4202-SA      ok, active      00:47:43
F0      ASR920-PSU0    ok              00:47:43
P0      ASR920-PSU0    ok              00:45:37
P1      ASR920-PSU1    N/A            never
P2      ASR920-FAN     ok              00:45:36

```

```

Slot    CPLD Version      Firmware Version
-----
R0      2008241E           15.6(54r)S
F0      2008241E           15.6(54r)S

```

```
Router#
```

## Auto Upgrade

Table 12: Feature History

Feature Name	Release Information	Description
Secondary ROMMON Version Auto Upgrade	Cisco IOS XE Bengaluru 17.5.1	After primary ROMMON version is auto upgraded, secondary ROMMON version auto upgrade process takes place. The secondary ROMMON upgrade is only completed during the next planned manual reload of the router.

- The ROMMON image upgrade from Cisco IOS XE Release 3.x to Cisco IOS XE Everest Release 16.5.1 is *not* mandatory. We recommend a ROMMON upgrade for effective utilization of the new features delivered in Cisco IOS XE Everest 16.5.1 and later releases.
- We recommend you to reload the router two times for successful ROMMON and software image upgrade.
- You cannot expand the Cisco IOS XE Release 16.x image into the Cisco IOS XE Release 3.x images. The bin. file may be used to reload the image.
- Before installing the Cisco IOS XE Amsterdam Release 17.3.1, you *must* upgrade the ROMMON to version 15\_6\_43r\_s or higher to avoid bootup failure. Booting in sub package mode takes care of auto upgrade to ROMMON version 15\_6\_43r\_s on bootup. This workaround is not applicable to devices installed with ROMMON version 15.6(9r)S.
- For Cisco IOS XE Amsterdam Release 17.3.x, a minimum disk space of 2 MB is required in the boot flash memory file system for a successful ROMMON auto upgrade process. For a disk space lesser than 2 MB, ROMMON auto upgrade fails and the router reboots.
- For Cisco IOS XE Amsterdam Release 17.3.x, Cisco IOS XE Bengaluru Release 17.4.x, and earlier, the secondary ROMMON partition is *not* auto upgraded. You must manually upgrade it using the **upgrade rom-mon filename** command.
- Secure ROMMON is supported from Cisco IOS XE Amsterdam Release 17.3.1 onwards. However, it is compatible with all the releases.
- Any future secure ROMMON upgrade or downgrade is only possible from Cisco IOS XE Amsterdam Release 17.3.1 onwards.

- Starting with Cisco IOS XE Bengaluru Release 17.4.1, Cisco NCS 4201 and Cisco NCS 4202 routers are auto upgraded to ROMMON version 15\_6\_44r\_s.
- Starting with ROMMON release version 15.6(43r)S, ROMMON version is secure. Once the ROMMON version is upgraded, it cannot be downgraded to a non-secure ROMMON version.
- Starting with Cisco IOS XE Bengaluru Release 17.5.1, secondary ROMMON partition is also auto upgraded after a successful primary ROMMON partition upgrade is complete. You can reload the router at the next planned reload to complete the secondary ROMMON upgrade.



---

**Note** If the secondary ROMMON version is lesser than that of the primary ROMMON version, the secondary ROMMON gets auto upgraded.

---

- Any non-secure FPGA bundled releases moving to Cisco IOS XE Bengaluru Release 17.3.x or future releases can result in an FPGA upgrade and a ROMMON upgrade. If FPGA upgrade happens parallelly with the ROMMON upgrade, you can only expect a single reload. If FPGA upgrade gets delayed and happens post ROMMON upgrade, two reloads are expected to complete both the upgrade processes. This is followed by a successful bootup of the target release image.

However, starting with Cisco IOS XE Bengaluru Release 17.5.1, for Cisco NCS 4201 and Cisco NCS 4202 routers, ROMMON and FPGA upgrade are synchronized to happen in a single reload.