



Upgrading Software on the Cisco 6400

This appendix describes how to upgrade the software images on the Cisco 6400 carrier-class broadband aggregator, and contains the following sections:

- [Recommendations, page B-1](#)
- [Upgrading Software on Nonredundant NRP-1s, page B-2](#)
- [Upgrading Software on Nonredundant NRP-2s and NRP-2SVs, page B-4](#)
- [Upgrading Software on Nonredundant NSPs, page B-5](#)
- [Upgrading Software on Redundant NRP-1s, page B-8](#)
- [Upgrading Software on Redundant NSPs, page B-14](#)

For general information on Cisco IOS software, see the “Cisco IOS File Management” chapter of the *Cisco IOS Configuration Fundamentals Configuration Guide* for your software release level.

Recommendations

Cisco highly recommends that all images used on your Cisco 6400 system have the same version level, specifically:

- Use the same release versions for the system images on the NRP and the NSP.
- Use the same version level for the system and boothelper images for both the NRP and NSP.

The NSP uses the same file (c6400s-wp-mz) as both the system image and boothelper image. Make sure you download the new NSP image to boot flash and a PCMCIA disk (disk0: or disk1:).

The NRPs use two separate images for the system and boothelper images:

- c6400r-boot-mz—Boothelper image to load in boot flash
- c6400r-g4p5-mz—NRP-1 system image to load in Flash
- c6400r2sp-g4p5-mz—NRP-2 system image to load in Flash

- If you are using the Web Console, use the same version level for the NSP system image and the Web Console image.

Upgrading Software on Nonredundant NRP-1s

This section describes how to upgrade software on an NRP-1 that is not configured for redundancy. To upgrade software on redundant NRP-1s, see the [“Upgrading Software on Redundant NRP-1s” section on page B-8](#).

To upgrade the software images on the NRP-1, complete the following steps:

- Step 1** Use the **dir EXEC** command to locate and identify the system and boothelper images you will replace.

```
Router# dir flash:
Router# dir bootflash:
```

- Step 2** Use the **copy EXEC** command to back up the system and boothelper images to a TFTP server.

```
Router# copy flash:c6400r-g4p5-mz.120-7.DC tftp://10.1.1.1/c6400r-g4p5-mz.120-7.DC
Router# copy bootflash:c6400r-boot-mz.120-7.DC tftp://10.1.1.1/c6400r-boot-mz.120-7.DC
```

- Step 3** Use the **delete EXEC** command to mark the images you want to replace for deletion.

```
Router# delete flash:c6400r-g4p5-mz.120-7.DC
Router# delete bootflash:c6400r-boot-mz.120-7.DC
```

- Step 4** Use the **squeeze EXEC** command to permanently delete the images marked for deletion.

```
Router# squeeze flash:
Router# squeeze bootflash:
```

- Step 5** Use the **copy EXEC** command to load the new images.

```
Router# copy tftp://10.1.1.1/c6400r-g4p5-mz.122-13.T flash:c6400r-g4p5-mz.122-13.T
Router# copy tftp://10.1.1.1/c6400r-boot-mz.122-13.T bootflash:c6400r-boot-mz.122-13.T
```

- Step 6** Use the **no boot system** global configuration command to remove the old startup image configuration.

```
Router(config)# no boot system flash:c6400r-g4p5-mz.120-7.DC
```

- Step 7** Use the **boot system** global configuration command to add the new startup image configuration.

```
Router(config)# boot system flash:c6400r-g4p5-mz.122-13.T
```

- Step 8** Use the **config-register** global configuration command to do one of the following:

- a. Set the config register to 0x2 for automatic boot.

```
Router(config)# config-register 0x2
```

- b. Set the config register to 0x0 to boot manually from the ROM monitor (ROMMON) prompt.

```
Router(config)# config-register 0x0
```

- Step 9** Use the **copy system:running-config nvram:startup-config EXEC** command to save the running configuration.

```
Router# copy system:running-config nvram:startup-config
```

- Step 10** Use the **reload EXEC** command to reload the NRP-1. This will automatically reboot the NRP-1 if you set the config register to 0x2 in [Step 8](#).

```
Router# reload
```

Step 11 If you set the config register to 0x0 in [Step 8](#), you will see the `rommon` prompt after completion of the NRP-1 reload. Complete the following steps to manually boot the NRP-1 and set it up for automatic reboot.

- a. Use the `dir` command to locate and identify the new image.

```
rommon 1 > dir flash:
```

- b. Use the `boot` command to manually boot the NRP-1.

```
rommon 2 > boot flash:c6400r-g4p5-mz.122-13.T
```

Example—Upgrading the Nonredundant NRP-1

In the following example, the NRP-1 system image is upgraded from Cisco IOS Release 12.0(7)DC to Cisco IOS Release 12.2(13)T:

```
Router# dir flash:
Directory of flash:/

 1 -rw-          94074   Jul 26 2000 17:11:46  lns.cfg
 2 -rw-          96278   Jul 26 2000 17:14:46  ip_route.cfg
 3 -rw-         190480   Jul 27 2000 10:14:08  work.cfg
 4 -rw-        5018040   Aug 08 2000 15:23:34  c6400r-g4p5-mz.120-7.DC

15990784 bytes total (10591396 bytes free)
Router# ping 10.2.16.99

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.2.16.99, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/2/4 ms
Router# delete flash:c6400r-g4p5-mz.120-7.DC
Delete filename [c6400r-g4p5-mz.120-7.DC]?
Delete flash:c6400r-g4p5-mz.120-7.DC? [confirm]
Router# squeeze flash:
All deleted files will be removed. Continue? [confirm]
Squeeze operation may take a while. Continue? [confirm]
Squeezing...Erasing squeeze bufferWriting squeeze bufferErasing sector:2      Writing
sector:2Erasing squeeze log
Squeeze of flash complete
Router# copy tftp:flash:
Address or name of remote host []? 10.2.16.99
Source filename []? c6400r-g4p5-mz.122-13.T
Destination filename [c6400r-g4p5-mz.122-13.T]?
Accessing tftp://10.2.16.99/c6400r-g4p5-mz.122-13.T...
Loading c6400r-g4p5-mz.122-13.T from 10.2.16.99 (via
Ethernet0/0/1):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[snip]
!!!!!!!!!!
[OK - 5215272/10430464 bytes]

5215272 bytes copied in 87.740 secs (59945 bytes/sec)
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# no boot system flash c6400r-g4p5-mz.120-7.DC
Router(config)# boot system flash c6400r-g4p5-mz.122-13.T
Router(config)# config-register 0x2
```

```

Router(config)# end
Router# copy system:running-config nvram:startup-config
00:03:03:%SYS-5-CONFIG_I:Configured from console by console mem
Warning:Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
Router# reload
Proceed with reload? [confirm]

00:03:16:%SYS-5-RELOAD:Reload requested
System Bootstrap
Copyright (c) 1998 by cisco Systems, Inc.

Reset Reason Register = REASON_WARM (0x2)
C6400R platform with 131072 Kbytes of main memory

Self decompressing the image [snip]

Press RETURN to get started!

```

Upgrading Software on Nonredundant NRP-2s and NRP-2SVs

This section describes how to upgrade software on nonredundant NRP-2s and NRP-2SVs.



Note

Unless a clear distinction is made, all references to the NRP-2 also apply to the NRP-2SV.

Remember that the NSP controls and manages the NRP-2 image download process. Although Cisco recommends that you store all NRP-2 images on the NSP PCMCIA disk, you can also store NRP-2 images on a TFTP, FTP, or rcp server.

To upgrade the software images on the NRP-2, complete the following steps, beginning in EXEC mode on the NSP:

Step 1 (Optional) Use the **copy EXEC** command to back up the NRP-2 images to a TFTP server.

```

Switch# copy disk0:c6400r2sp-g4p5-mz.121-4.DC1 tftp://10.1.1.1/c6400r2sp-g4p5-mz.121-4.DC1
Switch# copy bootflash:c6400r-boot-mz.121-4.DC1 tftp://10.1.1.1/c6400r-boot-mz.121-4.DC1

```

Step 2 (Optional but recommended) Use the **copy EXEC** command to load the NRP-2 images to the “images” directory on the PCMCIA disk in NSP disk slot 0.

```

Switch# copy tftp://10.2.2.2/c6400r2sp-g4p5-mz.122-13.T
disk0:/images/c6400r2sp-g4p5-mz.122-13.T
Switch# copy tftp://10.2.2.2/c6400r-boot-mz.122-13.T disk0:/images/c6400r-boot-mz.122-13.T

```

- Step 3** Use the **more system:running-config** EXEC command to view the current NRP-2 image configuration.

```
Switch# more system:running-config
...
hw-module slot 2 image c6400r2sp-g4p5-mz.121-4.DC1 priority 2
hw-module slot 2 image tftp://10.1.1.1/c6400r2sp-g4p5-mz.121-4.DC1 priority 3
hw-module slot 2 image disk0:MyDir/c6400r2sp-g4p5-mz.121-4.DC1 priority 4
hw-module slot 3 image c6400r2sp-g4p5-mz.121-4.DC1 priority 2
...
```

- Step 4** Use the **hw-module (image)** global configuration command to add to, replace, or delete the NRP-2 image configuration.

```
Switch# configure terminal
Switch(config)# hw-module slot 2 image c6400r2sp-g4p5-mz.122-13.T priority 2
Switch(config)# no hw-module slot 2 image tftp://10.1.1.1/c6400r2sp-g4p5-mz.122-13.T
Switch(config)# hw-module slot 2 image disk0:MyDir/c6400r2sp-g4p5-mz.122-13.T priority 4
```

Without the **hw-module (image)** command in the NSP configuration, the NRP-2 attempts to load the default image (c6400r2sp-g4p5-mz) from the disk0:/images/ directory.

- Step 5** Use the **hw-module (reset)** EXEC configuration command to reload the NRP-2.

```
Switch(config)# end
Switch# hw-module slot 2 reset
```



Timesaver

If you do not use all the priority values for NRP-2 images, leave priority 1 free for new or temporary images. Otherwise, you will have to adjust the priority levels of the other images for your NRP-2 to accommodate the new image.

Upgrading Software on Nonredundant NSPs

This section describes how to upgrade software on an NSP that is not configured for redundancy. To upgrade software on redundant NSPs, see the [“Upgrading Software on Redundant NSPs”](#) section on page B-14.

To upgrade the software images on the NSP, complete the following steps:

- Step 1** Use the **dir** EXEC command to locate and identify the images you will replace.

```
Switch# dir disk0:
Switch# dir disk1:
Switch# dir bootflash:
```

- Step 2** Use the **copy** EXEC command to back up the images to a TFTP server.

```
Switch# copy disk0:c6400s-wp-mz.120-7.DB tftp://10.1.1.1/c6400s-wp-mz.120-7.DB
Switch# copy disk0:c6400s-html.tar.120-5.DB tftp://10.1.1.1/c6400s-html.tar.120-5.DB
Switch# copy bootflash:c6400s-wp-mz.120-5.DB tftp://10.1.1.1/c6400s-wp-mz.120-5.DB
```

- Step 3** Use the **delete**, and for boot flash, the **squeeze** EXEC commands to delete the old images.

```
Switch# delete disk0:c6400s-wp-mz.120-7.DB
Switch# delete disk0:c6400s-html.tar.120-5.DB
Switch# delete bootflash:c6400s-wp-mz.120-5.DB
Switch# squeeze bootflash
```

Step 4 Use the **copy EXEC** command to load the new images.

```
Switch# copy tftp://10.1.1.1/c6400s-wp-mz.DB1 disk0:c6400s-wp-mz.DB1
Switch# copy tftp://10.1.1.1/c6400s-html.tar.DB1 disk0:c6400s-html.tar.DB1
Switch# copy tftp://10.1.1.1/c6400s-wp-mz.DB1 bootflash:c6400s-wp-mz.DB1
```

Step 5 Use the **no boot system** global configuration command to remove the old startup image configuration.

```
Switch(config)# no boot system flash:c6400s-wp-mz.120-7.DB
```

Step 6 Use the **boot system** global configuration command to add the new startup image configuration.

```
Switch(config)# boot system flash:c6400s-wp-mz.122-13.T
```

Step 7 Use the **config-register** global configuration command to do one of the following:

- a. Set the config register to 0x2 for automatic boot.

```
Switch(config)# config-register 0x2
```

- b. Set the config register to 0x0 to boot manually from the ROMMON prompt.

```
Switch(config)# config-register 0x0
```

Step 8 Use the **copy EXEC** command to save the running configuration as the startup configuration.

```
Switch# copy system:running-config nvram:startup-config
```

Step 9 Use the **reload EXEC** command to reload the NSP. This will automatically reboot the NSP if you set the config register to 0x2 in [Step 7](#).

```
Switch# reload
```

Step 10 If you set the config register to 0x0 in [Step 7](#), you will see the `rommon` prompt after completion of the NSP reload. Complete the following steps to manually boot the NSP and set it up for automatic reboot:

- a. Use the **dir** command to locate and identify the new image.

```
rommon 1 > dir flash:
```

- b. Use the **boot** command to manually boot the NSP.

```
rommon 2 > boot flash:c6400s-wp-mz.122-13.T
```

Example—Upgrading the Nonredundant NSP

In the following example, the NSP image is upgraded from Cisco IOS Release 12.0(7)DB to Cisco IOS Release 12.2(13)T:

```
Switch# ping 10.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
Switch# dir disk0:
Directory of disk0:/

2222  -rw-          1944   Jul 27 2000 09:41:45  pvp-config
2254  -rw-          91833  Jul 27 2000 10:24:47  running-config
```

```

2277 -rw-          91833   Jul 27 2000 10:25:19  pvc-config
2223 -rw-          4504276  Aug 03 2000 09:44:01  c6400s-wp-mz.120-7.DB

20819968 bytes total (16121856 bytes free)
Switch# show version
Cisco Internetwork Operating System Software
IOS (tm) C6400 Software (C6400S-WP-M), Version 12.0(7)DB, EARLY DEPLOYMENT RELEASE
SOFTWARE (fcl)
TAC:Home:SW:IOS:Specials for info
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Wed 22-Mar-00 11:47 by beliu
Image text-base:0x60010908, data-base:0x6081E000

ROM:System Bootstrap, Version 12.0(1)DB [gmgreen-fcs 102], RELEASE SOFTWARE
ROM:C6400 Software (C6400S-WP-M), Version 12.0(7)DB, EARLY DEPLOYMENT RELEASE SOFTWARE
(fcl)

nsp uptime is 2 minutes
System returned to ROM by reload
System image file is "disk0:c6400s-wp-mz.120-7.DB"

cisco C6400S (R4600) processor with 131072K bytes of memory.
R4700 CPU at 100Mhz, Implementation 33, Rev 1.0
Last reset from s/w peripheral
Bridging software.
2 Ethernet/IEEE 802.3 interface(s)
8 ATM network interface(s)
507K bytes of non-volatile configuration memory.
--More--
20480K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0

2254 -rw-          91833   Jul 27 2000 10:24:47  running-config
2277 -rw-          91833   Jul 27 2000 10:25:19  pvc-config
2223 -rw-          4504276  Aug 03 2000 09:44:01  c6400s-wp-mz.120-7.DB

20819968 bytes total (16121856 bytes free)
Switch# copy tftp:disk0:
Address or name of remote host []? 10.1.1.1
Source filename []? c6400s-wp-mz.122-13.T
Accessing tftp://10.1.1.1/c6400s-wp-mz.DB1...
Loading c6400s-wp-mz.121-1.DB1 from 10.1.1.1 (via
BV11):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[snip]
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!
[OK - 4575296/9150464 bytes]
4575296 bytes copied in 141.700 secs (32448 bytes/sec)
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# no boot system disk0:c6400s-wp-mz.120-7.DB
Switch(config)# boot system disk0:c6400s-wp-mz.122-13.T
Switch(config)# config-register 0x2
Switch(config)# end

Switch# copy system:running-config nvram:startup-config
Building configuration...
[OK]
Switch# reload
Proceed with reload? [confirm]

```

Upgrading Software on Redundant NRP-1s

This section describes how to upgrade software on redundant NRP-1s. To upgrade software on a nonredundant NRP-1, see the “Upgrading Software on Nonredundant NRP-1s” section on page B-2.

To upgrade the software images on redundant NRP-1s, perform the following tasks in the specified order. Each task in the list identifies the device used to perform the task:

1. [Upgrade the Images on the Secondary NRP-1](#) (primary NRP-1)
2. [Identify the New System Image as the Startup Image for the Secondary NRP-1](#) (primary NRP-1)
3. [Reload the Secondary NRP-1](#) (NSP)
4. [Upgrade the Images on the Primary NRP-1](#) (primary NRP-1)
5. [Identify the New System Image as the Startup Image for the Primary NRP-1](#) (primary NRP-1)
6. [Switch the Primary and Secondary NRP-1s](#) (NSP)

In the following instructions and examples, NRPslot5 is the device in slot 5 of the Cisco 6400 chassis, and NRP slot6 is the device in slot 6.

Upgrade the Images on the Secondary NRP-1

Complete the following steps from the primary NRP-1 to upgrade the secondary NRP-1 images. NRPslot5 is currently the primary device, and NRPslot6 is currently the secondary device.

-
- Step 1** Use the **dir EXEC** command to locate and identify the system and boothelper images you will replace on the secondary NRP-1.

```
NRPslot5# dir sec-flash:
NRPslot5# dir sec-bootflash:
```

- Step 2** Use the **copy EXEC** command to back up the secondary NRP-1’s system and boothelper images to a TFTP server.

```
NRPslot5# copy sec-flash:c6400r-g4p5-mz.120-7.DC tftp://10.1.1.1/c6400r-g4p5-mz.120-7.DC
NRPslot5# copy sec-bootflash:c6400r-boot-mz.120-7.DC
tftp://10.1.1.1/c6400r-boot-mz.120-7.DC
```

- Step 3** Use the **delete EXEC** command to mark the secondary NRP-1’s old images for deletion.

```
NRPslot5# delete sec-flash:c6400r-g4p5-mz.120-7.DC
NRPslot5# delete sec-bootflash:c6400r-boot-mz.120-7.DC
```

- Step 4** Use the **squeeze EXEC** command to permanently delete the secondary NRP-1’s images marked for deletion.

```
NRPslot5# squeeze sec-flash:
NRPslot5# squeeze sec-bootflash:
```

- Step 5** Use the **copy EXEC** command to load the new images to the secondary NRP-1.

```
NRPslot5#copy tftp://10.1.1.1/c6400r-g4p5-mz.122-13.T sec-flash:c6400r-g4p5-mz.122-13.T
NRPslot5#copy tftp://10.1.1.1/c6400r-boot-mz.122-13.T
sec-bootflash:c6400r-boot-mz.122-13.T
```

Identify the New System Image as the Startup Image for the Secondary NRP-1

To ensure that the new image is used upon system reload, choose one of the following methods:

- [Ensuring That the New System Image Is the First File in the Flash Memory, page B-9](#)
or
- [Updating the Boot System Variable, page B-10](#)

Ensuring That the New System Image Is the First File in the Flash Memory

Complete the following steps to make sure that the new image is the first file in the secondary NRP-1's Flash memory. NRPslot5 is still the primary device, and NRPslot6 is still the secondary device.

-
- Step 1** Use the **dir** EXEC command to list all files in the secondary NRP-1's Flash memory.
- ```
NRPslot5# dir sec-flash:
```
- Step 2** If the new system image is the first file listed, the image is already the startup image. Continue with the [“Reload the Secondary NRP-1”](#) section on page B-10.
- If the new system image is not at the top of the list, and you want to save the files that are listed above the new image, continue with [Step 3](#).
- If you want to delete the files listed above the new image, continue with [Step 4](#).
- Step 3** Use the **copy** EXEC command to back up the secondary NRP-1 Flash files to a TFTP server.
- ```
NRPslot5# copy sec-flash:filename tftp://10.1.1.1/filename1
NRPslot5# copy sec-flash:filename tftp://10.1.1.1/filename2
NRPslot5# copy sec-flash:filename tftp://10.1.1.1/filename3
...
```
- Step 4** Use the **delete** EXEC command to mark the unwanted secondary NRP-1 files for deletion.
- ```
NRPslot5# delete sec-flash:filenames
```
- Step 5** Use the **squeeze** EXEC command to permanently delete the secondary NRP-1 images that are marked for deletion.
- ```
NRPslot5# squeeze sec-flash:
NRPslot5# squeeze sec-bootflash:
```
- Step 6** If you performed [Step 3](#), use the **copy** EXEC command to transfer the files back from the TFTP server to the secondary NRP-1's Flash memory.
- ```
NRPslot5# copy tftp://10.1.1.1/filename1 sec-flash:filename1
NRPslot5# copy tftp://10.1.1.1/filename2 sec-flash:filename2
NRPslot5# copy tftp://10.1.1.1/filename3 sec-flash:filename3
...
```
- Step 7** Use the **dir** EXEC command to verify that the new system image is the first file listed in the secondary NRP-1 Flash memory.
- ```
NRPslot5# dir sec-flash:
```
-

Updating the Boot System Variable

If you completed the steps described in the [“Ensuring That the New System Image Is the First File in the Flash Memory”](#) section on page B-9, skip this section and continue with the [“Reload the Secondary NRP-1”](#) section on page B-10.

Complete the following steps from the primary NRP-1 to update both the primary and secondary NRP-1 configurations to reflect the new startup image. NRPslot5 is still the primary device, and NRPslot6 is still the secondary device.

-
- Step 1** Use the **no boot system** global configuration command to remove the old startup image configuration from the primary NRP-1.
- ```
NRPslot5# no boot system flash:c6400r-g4p5-mz.120-7.DC
```
- Step 2** Use the **boot system** global configuration command to add the new startup image configuration to the primary NRP-1.
- ```
NRPslot5# boot system flash:c6400r-g4p5-mz.122-13.T
```
- Step 3** Use the **copy EXEC** command to save the primary NRP-1 running configuration as the startup configuration. This step also updates the startup configuration on the secondary NRP-1.
- ```
NRPslot5# copy system:running-config nvram:startup-config
```
- 

## Reload the Secondary NRP-1

Complete the following step from the NSP to reload the secondary NRP-1. NRPslot5 is still the primary device, and NRPslot6 is still the secondary device.

- 
- Step 1** Use the **hw-module EXEC** or global configuration command to reload the secondary NRP-1.
- ```
Switch# hw-module slot 6 reset
```
-

The secondary NRP-1 is now running the new image in standby mode.

Upgrade the Images on the Primary NRP-1

Complete the following steps from the primary NRP-1 to upgrade the primary NRP-1 images. NRPslot5 is still the primary device, and NRPslot6 is still the secondary device.

-
- Step 1** Use the **dir EXEC** command to locate and identify the system and boothelper images you will replace.
- ```
NRPslot5# dir flash:
NRPslot5# dir bootflash:
```
- Step 2** Use the **copy EXEC** command to back up the system and boothelper images to a TFTP server.
- ```
NRPslot5# copy flash:c6400r-g4p5-mz.120-7.DC tftp://10.1.1.1/c6400r-g4p5-mz.120-7.DC
NRPslot5# copy bootflash:c6400r-boot-mz.120-7.DC tftp://10.1.1.1/c6400r-boot-mz.120-7.DC
```

Step 3 Use the **delete** EXEC command to mark the old images for deletion.

```
NRPslot5# delete flash:c6400r-g4p5-mz.120-7.DC
NRPslot5# delete bootflash:c6400r-boot-mz.120-7.DC
```

Step 4 Use the **squeeze** EXEC command to permanently delete the images marked for deletion.

```
NRPslot5# squeeze flash:
NRPslot5# squeeze bootflash:
```

Step 5 Use the **copy** EXEC command to load the new images from the secondary NRP-1.

```
NRPslot5# copy sec-flash:c6400r-g4p5-mz.122-13.T flash:c6400r-g4p5-mz.122-13.T
NRPslot5# copy sec-bootflash:c6400r-boot-mz.122-13.T bootflash:c6400r-boot-mz.122-13.T
```

Identify the New System Image as the Startup Image for the Primary NRP-1

To ensure that the new image is used at system reload, choose the same method that you used in the “[Identify the New System Image as the Startup Image for the Secondary NRP-1](#)” section on page B-9, specifically:

- [Ensuring That the New System Image Is the First File in Flash Memory](#), page B-11
- or
- [Updating the Boot System Variable](#), page B-12

Ensuring That the New System Image Is the First File in Flash Memory

Complete the following steps to make sure that the new image is the first file in the primary NRP-1’s Flash memory. NRPslot5 is still the primary device, and NRPslot6 is still the secondary device.

Step 1 Use the **dir** EXEC command to list all files in the primary NRP-1’s Flash memory.

```
NRPslot5# dir flash:
```

Step 2 If the new system image is the first file listed, the image is already the startup image. Continue with the “[Switch the Primary and Secondary NRP-1s](#)” section on page B-12.

If the new system image is not at the top of the list, and you want to save the files that are listed above the new image, continue with [Step 3](#).

If you want to delete the files listed above the new image, continue with [Step 4](#).

Step 3 Use the **copy** EXEC command to back up the primary NRP-1 Flash files to a TFTP server.

```
NRPslot5# copy flash:filename tftp://10.1.1.1/filename1
NRPslot5# copy flash:filename tftp://10.1.1.1/filename2
NRPslot5# copy flash:filename tftp://10.1.1.1/filename3
...
```

Step 4 Use the **delete** EXEC command to mark the unwanted primary NRP-1 files for deletion.

```
NRPslot5# delete flash:filename1
NRPslot5# delete flash:filename2
NRPslot5# delete flash:filename3
...
```

- Step 5** Use the **squeeze** EXEC command to permanently delete the primary NRP-1 images that are marked for deletion.

```
NRPs1ot5# squeeze flash:
NRPs1ot5# squeeze bootflash:
```

- Step 6** If you performed [Step 3](#), use the **copy** EXEC command to transfer the files back from the TFTP server to the primary NRP-1's Flash memory.

```
NRPs1ot5# copy tftp://10.1.1.1/filename1 flash:filename1
NRPs1ot5# copy tftp://10.1.1.1/filename2 flash:filename2
NRPs1ot5# copy tftp://10.1.1.1/filename3 flash:filename3
...
```

- Step 7** Use the **dir** EXEC command to verify that the new system image is the first file listed in the primary NRP-1's Flash memory.

```
NRPs1ot5# dir flash:
```

Updating the Boot System Variable

If you completed the instructions in the [“Updating the Boot System Variable”](#) section on page B-10, then both the primary and secondary NRP-1 configurations already reflect the new startup image.

Switch the Primary and Secondary NRP-1s

Complete the following step from the NSP to switch the primary and secondary NRP-1s. Before you begin this task, NRPs1ot5 is still the primary device, and NRPs1ot6 is still the secondary device.

- Step 1** Use the **redundancy force-failover** EXEC command to switch the primary and secondary devices.

```
Switch# redundancy force-failover slot 5
```

NRPs1ot5 is now the secondary device, and NRPs1ot6 is the primary device. NRPs1ot5 automatically resets itself, and runs the new image in standby mode. Both the primary and secondary NRP-1s are now running the new image.

Example—Upgrading Redundant NRP-1s

This section presents an example of upgrading redundant NRP-1 images from Cisco IOS Release 12.0(7)DC to Cisco IOS Release 12.1(1)DC1.

The example is broken up into the following tasks:

1. [Upgrading the Images on the Secondary NRP-1](#)
2. [Identifying the New Image as the Startup Image](#)
3. [Reloading the Secondary NRP-1](#)
4. [Upgrading the Images on the Primary NRP-1](#)
5. [Switching the Primary and Secondary NRP-1s](#)

Upgrading the Images on the Secondary NRP-1

In the following example, the secondary NRP-1 system image is upgraded from Cisco IOS Release 12.0(7)DC to Cisco IOS Release 12.2(13)T. NRP slot5 is the primary device in slot 5 of the Cisco 6400 chassis, and NRP slot6 is the secondary device in slot 6.

```
NRPslot5# dir sec-flash:
Directory of sec-flash:/

   1  -rw-          5018040   Aug 09 2000 12:47:44  c6400r-g4p5-mz.120-7.DC

7602176 bytes total (2584008 bytes free)

NRPslot5# delete sec-flash:c6400r-g4p5-mz.120-7.DC
Delete filename [c6400r-g4p5-mz.120-7.DC]?
Delete sec-flash:c6400r-g4p5-mz.120-7.DC? [confirm]
NRPslot5# copy tftp:sec-flash:
Address or name of remote host []? 10.1.1.1
Source filename []? c6400r-g4p5-mz.122-13.T
Destination filename [c6400r-g4p5-mz.122-13.T]?
Accessing tftp://10.1.1.1/c6400r-g4p5-mz.122-13.T...
Loading c6400r-g4p5-mz.122-13.T from 10.1.1.1 (via
Ethernet0/0/1):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[snip]
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!
[OK - 5215184/10429440 bytes]

5215184 bytes copied in 125.792 secs (41721 bytes/sec)
```

Identifying the New Image as the Startup Image

In the following example, the boot system variable is updated to reflect the new startup image.

```
NRPslot5(config)# no boot system flash:c6400r-g4p5-mz.120-7.DC
NRPslot5(config)# boot system flash:c6400r-g4p5-mz.122-13.T
NRPslot5(config)# config-register 0x2
NRPslot5(config)# end
NRPslot5#
NRPslot5# copy system:running-config nvram:startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

Reloading the Secondary NRP-1

In the following example, the secondary NRP-1 is reset from the NSP. NRP slot5 is the primary device, and NRP slot6 is the secondary device.

```
Switch# hw-module slot 6 reset

20:21:05:%NSP_OIR-6-FULL_CREM:Card NRP removed from slot:6
Switch#
20:21:06:%NSP_OIR-6-FULL_CINS:Card NRP inserted into slot:6
20:21:06:%NSP_OIR-6-FULL_ONLINE:Card NRP, slot:6, being brought online
20:21:08:%LINK-3-UPDOWN:Interface ATM6/0/0, changed state to down
```

Upgrading the Images on the Primary NRP-1

In the following example, the primary NRP-1 system image is upgraded from Cisco IOS Release 12.0(7)DC to Cisco IOS Release 12.2(13)T. NRP slot5 is the primary device, and NRP slot6 is the secondary device.

```

NRPslot5# dir sec-flash:
Directory of sec-flash:/
 1 -rw-      5215184  Aug 09 2000 13:09:38  c6400r-g4p5-mz.122-13.T

7602176 bytes total (2386864 bytes free)
NRPslot5# dir flash:
Directory of flash:/

 1 -rw-      94074   Jul 26 2000 17:11:46  lns.cfg
 2 -rw-     96278   Jul 26 2000 17:14:46  ip_route.cfg
 3 -rw-    190480   Jul 27 2000 10:14:08  work.cfg
 4 -rw-    5018040   Aug 09 2000 12:55:27  c6400r-g4p5-mz.120-7.DC

15990784 bytes total (10591396 bytes free)
NRPslot5# delete flash:c6400r-g4p5-mz.120-7.DC
Delete filename [c6400r-g4p5-mz.120-7.DC]?
Delete flash:c6400r-g4p5-mz.120-7.DC? [confirm]

NRPslot5# squeeze flash:
All deleted files will be removed. Continue? [confirm]
Squeeze operation may take a while. Continue? [confirm]

Squeeze of flash complete
NRPslot5# copy sec-flash:c6400r-g4p5-mz.122-13.T flash:
Destination filename [c6400r-g4p5-mz.122-13.T]?
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
[snip]
CCCCCCCCCCCCCCCC
5215184 bytes copied in 67.228 secs (77838 bytes/sec)

```

Switching the Primary and Secondary NRP-1s

In the following example, the primary and secondary NRP-1s are switched. NRP slot5 is now the secondary device, and NRP slot6 is now the primary device.

```

Switch# redundancy force-failover slot 5
Switch#

```

Upgrading Software on Redundant NSPs

This section describes how to upgrade software on redundant NSPs. To upgrade software on an NSP that is not configured for redundancy, see the “Upgrading Software on Nonredundant NSPs” section on page B-5.

To upgrade the software images on redundant NSPs, perform the following tasks in the specified order. Each task in the list must be performed on the primary NSP.

1. [Upgrade the Secondary NSP Images](#)
2. [Reload the Secondary NSP](#)
3. [Upgrade the Primary NSP Images](#)
4. [Switch the Primary and Secondary NSPs](#)

Prerequisites

Make sure that automatic configuration synchronization is enabled before you follow these procedures.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-r)# main-cpu
Switch(config-r-mc)# auto-sync standard
```

Upgrade the Secondary NSP Images

Complete the following steps to upgrade the secondary NSP images. The NSP in slot 0A is the primary device, and the NSP in slot 0B is the secondary device.

- Step 1** Use the **dir** EXEC command to locate and identify the images you want to replace on the secondary NSP.

```
Switch# dir sec-disk0:
Switch# dir sec-disk1:
Switch# dir sec-bootflash:
```

- Step 2** Use the **copy** EXEC command to back up the secondary NSP images to a TFTP server.

```
Switch# copy sec-disk0:c6400s-wp-mz.120-7.DB tftp://10.1.1.1/c6400s-wp-mz.120-7.DB
Switch# copy sec-disk0:c6400s-html.tar.120-5.DB tftp://10.1.1.1/c6400s-html.tar.120-5.DB
Switch# copy sec-bootflash:c6400s-wp-mz.120-5.DB tftp://10.1.1.1/c6400s-wp-mz.120-5.DB
```

- Step 3** Use the **delete**, and for boot flash, the **squeeze** EXEC commands to delete the secondary NSP's old images.

```
Switch# delete sec-disk0:c6400s-wp-mz.120-7.DB
Switch# delete sec-disk0:c6400s-html.tar.120-5.DB
Switch# delete sec-bootflash:c6400s-wp-mz.120-5.DB
Switch# squeeze sec-bootflash
```

- Step 4** Use the **copy** EXEC command to load the new images onto the secondary NSP.

```
Switch# copy tftp://10.1.1.1/c6400s-wp-mz.122-13.T sec-disk0:c6400s-wp-mz.122-13.T
Switch# copy tftp://10.1.1.1/c6400s-html.tar.122-13.T sec-disk0:c6400s-html.tar.122-13.T
Switch# copy tftp://10.1.1.1/c6400s-wp-mz.122-13.T sec-bootflash:c6400s-wp-mz.122-13.T
```

Reload the Secondary NSP

Complete the following step to reload the secondary NSP. The NSP in slot 0A is still the primary device, and the NSP in slot 0B is still the secondary device.

- Step 1** Use the **hw-module** EXEC or global configuration command to reload the secondary NSP.

```
Switch# hw-module nsp B reset
```

The secondary NSP is now running the new image.

Upgrade the Primary NSP Images

Complete the following steps to upgrade the software images on the primary NSP. The NSP in slot 0A is still the primary device, and the NSP in slot 0B is still the secondary device.

- Step 1** Use the **dir EXEC** command to locate and identify the images you want to replace on the primary NSP.

```
Switch# dir disk0:
Switch# dir disk1:
Switch# dir bootflash:
```

- Step 2** Use the **copy EXEC** command to back up the primary NSP images to a TFTP server.

```
Switch# copy disk0:c6400s-wp-mz.120-7.DB tftp://10.1.1.1/c6400s-wp-mz.120-7.DB
Switch# copy disk0:c6400s-html.tar.120-5.DB tftp://10.1.1.1/c6400s-html.tar.120-5.DB
Switch# copy bootflash:c6400s-wp-mz.120-5.DB tftp://10.1.1.1/c6400s-wp-mz.120-5.DB
```

- Step 3** Use the **delete**, and for boot flash, the **squeeze EXEC** commands to delete the old images.

```
Switch# delete disk0:c6400s-wp-mz.120-7.DB
Switch# delete disk0:c6400s-html.tar.120-5.DB
Switch# delete bootflash:c6400s-wp-mz.120-5.DB
Switch# squeeze bootflash
```

- Step 4** Use the **copy EXEC** command to load the new images.

```
Switch# copy tftp://10.1.1.1/c6400s-wp-mz.122-13.T disk0:c6400s-wp-mz.122-13.T
Switch# copy tftp://10.1.1.1/c6400s-html.tar.122-13.T disk0:c6400s-html.tar.122-13.T
Switch# copy tftp://10.1.1.1/c6400s-wp-mz.DB1 bootflash:c6400s-wp-mz.122-13.T
```

- Step 5** Use the **no boot system** global configuration command to remove the old startup image configuration.

```
Switch(config)# no boot system flash:c6400s-wp-mz.120-7.DB
```

- Step 6** Use the **boot system** global configuration command to add the new startup image configuration.

```
Switch(config)# boot system flash:c6400s-wp-mz.122-13.T
```

- Step 7** Use the **config-register** global configuration command to do one of the following:

- a. Set the config register to 0x2 for automatic boot.

```
Switch(config)# config-register 0x2
```

- b. Set the config register to 0x0 to boot manually from the ROMMON prompt.

```
Switch(config)# config-register 0x0
```

- Step 8** Use the **copy EXEC** command to save the running configuration as the startup configuration.

```
Switch# copy system:running-config nvram:startup-config
```


Switch the Primary and Secondary NSPs

Complete the following steps to switch the primary and secondary NSPs. Before this task is completed, the NSP in slot 0A is the primary device, and the NSP in slot 0B is the secondary device.

- Step 1** Use the **redundancy force-failover EXEC** command to switch the primary and secondary devices.

```
Switch# redundancy force-failover main-cpu
```

The NSP in slot 0A is now the secondary device, and the NSP in slot 0B is now the primary device. Both devices are running the new image.

Example—Upgrading Redundant NSPs

This section presents an example of upgrading redundant NSP images from Cisco IOS Release 12.0(7)DB to Cisco IOS Release 12.2(13)T.

The example is broken up into the following tasks:

1. [Upgrading the Secondary NSP Images](#)
2. [Reloading the Secondary NSP](#)
3. [Upgrading the Primary NSP Images](#)
4. [Switching the Primary and Secondary NSPs](#)

Upgrading the Secondary NSP Images

In the following example, the secondary NSP image is upgraded from Cisco IOS Release 12.0(7)DB to Cisco IOS Release 12.2(13)T. The NSP in slot 0A is the primary device, and the NSP in slot 0B is the secondary device.

```
NSP# show redundancy
NSP A           :Primary
NSP B           :Secondary

NSP# dir sec-disk0:
Directory of sec-disk0:/

1151  -rw-      4504276   Aug 07 2000 17:32:28  c6400s-wp-mz.120-7.DB

20819968 bytes total (16314368 bytes free)

NSP# delete sec-disk0:c6400s-wp-mz.120-7.DB
Delete sec-disk0:c6400s-wp-mz.120-7.DB? [confirm]

NSP# copy tftp:sec-disk0:
Address or name of remote host []? 10.1.1.1
Source filename []? c6400s-wp-mz.122-13.T
Accessing tftp://10.1.1.1/c6400s-wp-mz.122-13.T...
Loading c6400s-wp-mz.122-13.T from 10.1.1.1 (via
BVI1):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[snip]
```

```

!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!
[OK - 4575296/9150464 bytes]

4575296 bytes copied in 256.468 secs (17872 bytes/sec)

```

Reloading the Secondary NSP

In the following example, the secondary NSP is reset from the primary NSP. The NSP in slot 0A is the primary device, and the NSP in slot 0B is the secondary device.

```

NSP# hw-module nsp B reset
NSP#
00:19:47:%EHS-5-PEER_MONITOR_EVENT:Master detected a secondary crash
(raw-event=PEER_DOWN(2))

00:19:47:%EHS-5-PEER_MONITOR_EVENT:Master detected a secondary removal
(raw-event=PEER_EHSA_STATE_CHANGE(5))

00:19:48:%EHS-5-PEER_MONITOR_EVENT:Master detected a secondary insertion
(raw-event=PEER_EHSA_STATE_CHANGE(5))

```

Upgrading the Primary NSP Images

In the following example, the primary NSP image is upgraded from Cisco IOS Release 12.0(7)DB to Cisco IOS Release 12.2(13)T. The NSP in slot 0A is the primary device, and the NSP in slot 0B is the secondary device.

```

NSP# ping 10.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
NSP# dir disk0:
Directory of disk0:/

2222  -rw-          1944   Jul 27 2000 09:41:45  pvp-config
2254  -rw-          91833  Jul 27 2000 10:24:47  running-config
2277  -rw-          91833  Jul 27 2000 10:25:19  pvc-config
2223  -rw-        4504276  Aug 03 2000 09:44:01  c6400s-wp-mz.120-7.DB

20819968 bytes total (16121856 bytes free)
NSP# show version
Cisco Internetwork Operating System Software
IOS (tm) C6400 Software (C6400S-WP-M), Version 12.0(7)DB, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)
TAC:Home:SW:IOS:Specials for info
Copyright (c) 1986-2000 by Cisco Systems, Inc.
Compiled Wed 22-Mar-00 11:47 by beliu
Image text-base:0x60010908, data-base:0x6081E000

ROM:System Bootstrap, Version 12.0(1)DB [gmgreen-fcs 102], RELEASE SOFTWARE
ROM:C6400 Software (C6400S-WP-M), Version 12.0(7)DB, EARLY DEPLOYMENT RELEASE SOFTWARE
(fc1)

nsp uptime is 2 minutes
System returned to ROM by reload
System image file is "disk0:c6400s-wp-mz.120-7.DB"

```

```

cisco C6400S (R4600) processor with 131072K bytes of memory.
R4700 CPU at 100Mhz, Implementation 33, Rev 1.0
Last reset from s/w peripheral
Bridging software.
2 Ethernet/IEEE 802.3 interface(s)
8 ATM network interface(s)
507K bytes of non-volatile configuration memory.
--More--
20480K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0

2254 -rw-          91833   Jul 27 2000 10:24:47  running-config
2277 -rw-          91833   Jul 27 2000 10:25:19  pvc-config
2223 -rw-        4504276   Aug 03 2000 09:44:01  c6400s-wp-mz.120-7.DB

20819968 bytes total (16121856 bytes free)
NSP# copy tftp:disk0:
Address or name of remote host []? 10.1.1.1
Source filename []? c6400s-wp-mz.122-13.T
Accessing tftp://10.1.1.1/c6400s-wp-mz.122-13.T...
Loading c6400s-wp-mz.122-13.T from 10.1.1.1 (via
BVII):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[snip]
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!
[OK - 4575296/9150464 bytes]
4575296 bytes copied in 141.700 secs (32448 bytes/sec)
NSP# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
NSP(config)# no boot system disk0:c6400s-wp-mz.120-7.DB
NSP(config)# boot system disk0:c6400s-wp-mz.122-13.T
NSP(config)# config-register 0x2
NSP(config)# end

NSP# copy system:running-config nvram:startup-config
Building configuration...
[OK]
NSP#

```

Switching the Primary and Secondary NSPs

In the following example, the NSP in slot 0A becomes the secondary device and the NSP in slot 0B becomes the primary device. Both NSPs now run the new image.

```

NSP# redundancy force-failover main-cpu

00:33:38:%SYS-5-RELOAD:Reload requested

```

