



# Installing and Upgrading Software

This chapter describes how to update software on the Cisco NCS 520 Series Router.

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## Upgrading Field Programmable Hardware Devices

Generally an upgrade is only necessary in cases where a system message indicates that an upgrade is required or a Cisco technical support representative suggests an upgrade.

The procedures in this chapter describe how to upgrade the firmware on the router.

## File Systems on the Cisco NCS 520 Series Router

The table below provides a list of file systems that can be seen on the Cisco NCS 520 Series Router.

*Table 1: File Systems*

File System	Description
bootflash:	The boot flash memory file system.
cns:	The Cisco Networking Services file directory.
nvrn:	Router NVRAM. You can copy the startup configuration to NVRAM or from NVRAM.
system:	The system memory file system, which includes the running configuration.
tmpsys:	The temporary system files file system.

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

# System Requirements

The following sections describe the system requirements for the Cisco NCS 520 Series Router software:

## Memory Recommendations

These are the recommendation for the router images and packages:

- Image size—350 MB
- DRAM memory—4 GB
- Software Image—ncs520-universalk9\_npe.BLD\_V168\_1\_THROTTLE\_◇.bin

## ROMmon Version Requirements

ROMmon Release 1.0 (FAI) is the recommended release for all ROMmon upgradeable components. For more information about ROMmon images, see Release Notes.

## Determining the Software Version

The Cisco IOS XE image is stored as a bin file in a directory that is named with the Cisco IOS XE release. The image is stored on the system board bootflash device (bootflash:).



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**Note** If you try to copy or archive upgrade beyond the bootflash memory capacity, the action terminates.

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You can use the **show version** privileged EXEC command to see the software version that is running on your router. The second line of the display shows the version.

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

## Autogenerated Files and Directories

The table below provides a list and descriptions of autogenerated files on the router.



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**Caution** Do not alter 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.

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Table 2: 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>Caution</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 XE failure. <b>Caution</b> Do not erase or move the tracelog directory.

# Upgrading the Router Software

## Downloading an Image

Download the image to the bootflash. For information on downloading images see, Loading and Managing System Images Configuration Guide.



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

The routers are shipped with the latest software image installed. Follow the instructions in this section if you need to reinstall or upgrade the software image.

Before installing your router software, make sure that you have archived copies of the current Cisco IOS XE release and the Cisco IOS XE release to which you are upgrading. You should keep these archived images until you have upgraded all devices in the network to the new Cisco IOS XE image and until you have verified that the new Cisco IOS XE image works properly in your network.

Cisco routinely removes old Cisco IOS XE versions from Cisco.com. See End of Sale and End of Life Products at this URL: [http://www.cisco.com/en/US/products/sw/iosswrel/prod\\_category\\_end\\_of\\_life.html](http://www.cisco.com/en/US/products/sw/iosswrel/prod_category_end_of_life.html).

You can copy the software image file on the bootflash memory to the appropriate TFTP directory on a host by using the **copy bootflash: tftp:** privileged EXEC command. You can also configure the router as a TFTP server to copy files from one router to another without using an external TFTP server by using the **tftp-server** global configuration command. For more information about the **tftp-server** command, see the “Basic File Transfer Services Commands” section of the Cisco IOS Configuration Fundamentals Command Reference at this URL: [http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf\\_book.html](http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_book.html).

This procedure is for copying the combined bin file to the router. You copy the file to the router from a TFTP server and extract the files. You can download an image file and replace or keep the current image.

To download software, follow these steps:

## Procedure

### Step 1

Locate the software image file:

- a) If you are a registered customer, go to this URL and log in:  
<http://software.cisco.com/download/navigator.html>.
- b) Navigate to **Routers > Service Provider Edge Routers**.
- c) Navigate to your router model.
- d) Click IOS XE Software, then select the latest IOS XE release.

**Note** When you select a crypto graphic image, you must also accept the terms and conditions of using crypto graphic images.

### Step 2

Download the image to a TFTP server and make sure that the server is properly configured.

### Step 3

Log into the router through the console port or a Telnet session.

### Step 4

If Gigabit Ethernet (GE) port 0 is used as management interface, check the connectivity to TFTP server using the following CLI:

```
Router# ping vrf Mgmt-intf tftp-server-address
```

For more information about assigning an IP address and default gateway to the router, refer to the software configuration guide for this release.

### Step 5

Download the image file from the TFTP server to the router by entering this privileged EXEC command:

```
Router# ncs520-universalk9_npe.BLD_V168_1_THROTTLE_<>.bin:
```

- For // location, specify the IP address of the TFTP server.
- For / directory / image-name .bin, specify the directory (optional) and the image to download. Directory and image names are case sensitive.

This example shows how to download an image from a TFTP server at 192.0.2.1 and to overwrite the image on the router:

```
Router# copy tftp://192.0.2.1/image-name.bin bootflash:
```

The installation process extracts the bin file with all the files and the IOS XE image, and sets the BOOT directory to the created directory in bootflash memory. The process takes approximately 5 to 10 minutes, and at some stages might appear to have stopped.

### Step 6

Set the image path in the boot variables and configure the router to autoboot as follows:

```
Router# configure terminal
Router(config)# config-register 0x2102 (! 0x2102 sets the router for autoboot)
Router(config)# boot system bootflash:image-name.bin (! sets the image to be loaded in the
next reload)
```

### Step 7

Verify the boot variables set on the router using the following CLI:

```
Router# show bootvar
BOOT variable = ncs520-universalk9_npe.BLD_V168_1_THROTTLE_<>.bin,12;
CONFIG_FILE variable does not exist
```

```
BOOTLDR variable does not exist
Configuration register is 0x0 (! will be 0x2102 at next reload)
```

**Step 8** Save the configuration and reload the router.

```
Router# reload
```

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After the installation, the router is running the universal image. To install a purchased license with increased capabilities, see *Software Activation Configuration Guide*. To purchase a license, contact Cisco.

## Upgrading the ROMMON on router




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

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Follow the procedure to upgrade the ROMMON image:

- Copy the latest ROMMON package into bootflash.

```
Router# copy tftp://192.168.0.100/FPGA_ROMMON_PKG/ncs520dominica-rommon_0_11.SSA.pkg
bootflash:
```

- Use the following command to upgrade the ROMMON:

```
Router# upgrade rom-monitor filename bootflash:<pkg> all
```

- Reload the router for the ROMMON to take effect.

## Software Upgrade Example

The following section provide a sample of software upgrade on the router.

```
Router# show bootvar
BOOT variable = bootflash:ncs520-universalk9_npe.BLD_V168_1_THROTTLE_<>.bin;
CONFIG_FILE variable does not exist
BOOTLDR variable does not exist
Configuration register is 0x0 (will be 0x2102 at next reload)
Router# reload
Proceed with reload? [confirm]
System Bootstrap, Version 15.4(3r)S4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Boot ROM1
Last reset cause: RSP-Board
UEA platform with 2097152 Kbytes of main memory
Located ncs520-universalk9_npe.BLD_V168_1_THROTTLE_<>.bin
Image size 266349176 inode num 27, _bks cnt 65027 blk size 8*512
#####
Boot image size = 266349176 (0xfe02a78) bytes
Package header rev 0 structure detected
Calculating SHA-1 hash...done
validate_package: SHA-1 hash:
    calculated 424f2b4a:ea7da21d:397efd55:db10f40e:7a6250e8
```

```

expected 424f2b4a:ea7da21d:397efd55:db10f40e:7a6250e8
Image validated
Passing control to the main image..
%IOSXEBOOT-4-DEBUG_CONF: (rp/0): File /bootflash/debug.conf is absent, ignoring
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documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.
Tmpdisk creation successful, status = 0
flashfs[16]: 0 files, 1 directories
flashfs[16]: 0 orphaned files, 0 orphaned directories
flashfs[16]: Total bytes: 1935360
flashfs[16]: Bytes used: 1024
flashfs[16]: Bytes available: 1934336
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http://www.cisco.com/wwl/export/crypto/tool/stqrg.html
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(Freescale P2020) processor (revision 1.0 GHz) with 687183K/6147K bytes of memory.
Processor board ID CAT1748U1GQ
12 Gigabit Ethernet interfaces
2 Ten Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
2097152K bytes of physical memory.
1328927K bytes of SD flash at bootflash:.
Press RETURN to get started!
Router# show version
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or the applicable URL provided on the flyer accompanying the IOS-XE
software.
ROM: IOS-XE ROMMON
uptime is 21 minutes
Uptime for this control processor is 25 minutes
System returned to ROM by reload
System image file is "bootflash:ncs520-universalk9_npe.BLD_V168_1_THROTTLE_<>.bin"
Last reload reason: Reload Command

```

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(Freescale P2020) processor (revision 1.0 GHz) with 687183K/6147K bytes of memory.  
Processor board ID CAT1748U1GQ  
12 Gigabit Ethernet interfaces  
2 Ten Gigabit Ethernet interfaces  
32768K bytes of non-volatile configuration memory.  
2097152K bytes of physical memory.  
1328927K bytes of SD flash at bootflash:.  
Configuration register is 0x2102

