



CHAPTER 12

Software Images

This chapter describes how to install and upgrade Cisco MDS software images. It includes the following sections:

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- [Prerequisites for Installing Software Images, page 12-5](#)
- [Using the Software Install Wizard, page 12-10](#)
- [Performing Nondisruptive Upgrades on Fabric and Modular Switches, page 12-29](#)
- [Upgrade Status Verification, page 12-28](#)
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Information About Software Images

This section contains the following topics:

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- [Determining Software Compatibility, page 12-2](#)
- [Automated Upgrades, page 12-3](#)
- [Benefits of Using the Software Install Wizard, page 12-4](#)
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Each switch is shipped with a Cisco MDS NX-OS or SAN-OS operating system for Cisco MDS 9000 Family switches. The Cisco MDS NX-OS consists of two images—the kickstart image and the system image. To upgrade the switch to a new image, you must specify the variables that direct the switch to the images.

- To select the kickstart image, use the KICKSTART variable.
- To select the system image, use the SYSTEM variable.

The images and variables are important factors in any install procedure. You must specify the variable and the image to upgrade your switch. Both images are not always required for each install.

**Note**

Unless explicitly stated, the software install procedures in this chapter apply to any switch in the Cisco MDS 9000 Family.

Software Upgrade Methods

You can upgrade software without any disruptions using the Cisco MDS NX-OS software designed for mission-critical high availability environments. To realize the benefits of nondisruptive upgrades on the Cisco MDS 9500 Directors, we highly recommend that you install dual supervisor modules.

You can upgrade any switch in the Cisco MDS 9000 Family using one of the following methods:

- Automatic—You can use the DCNM-SAN Software Install Wizard for Cisco MDS NX-OS switches as described in the [“Using the Software Install Wizard” section on page 12-10](#).
- Manual—For information on manual upgrades, see the *Cisco MDS 9020 Switch Configuration Guide and Command Reference*.
- Automated, one-step upgrade using the **install all** command. This upgrade is nondisruptive for directors in the Cisco MDS 9500 Series (see the [“Automated Upgrades” section on page 12-3](#)).
- Quick, one-step upgrade using the **reload** command. This upgrade is disruptive (see the [“Quick Upgrade” section on page 12-39](#)).

**Tip**

The **install all** command compares and presents the results of the compatibility before proceeding with the installation. You can exit if you do not want to proceed with these changes.

In some cases, regardless of which process you use, the software upgrades may be disruptive. These exception scenarios can occur under the following conditions:

- A single supervisor module system with kickstart or system image changes.
- A dual supervisor module system with incompatible system software images.

**Note**

For high availability, you need to connect the ethernet port for both active and standby supervisors to the same network or virtual LAN. The active supervisor owns the one IP address used by these Ethernet connections. On a switchover, the newly activated supervisor takes over this IP address.

Determining Software Compatibility

If the running image and the image you want to install are incompatible, the software reports the incompatibility. In some cases, you may decide to proceed with this installation. If the active and the standby supervisor modules run different versions of the image, both images may be HA compatible in some cases and incompatible in others.

Compatibility is established based on the image and configuration:

- Image incompatibility—The running image and the image to be installed are not compatible.

- Configuration incompatibility—There is a possible incompatibility if certain features in the running image are turned off as they are not supported in the image to be installed. The image to be installed is considered incompatible with the running image if one of the following statements is true:
 - An incompatible feature is enabled in the image to be installed and it is not available in the running image and may cause the switch to move into an inconsistent state. In this case, the incompatibility is *strict*.
 - An incompatible feature is enabled in the image to be installed and it is not available in the running image and does not cause the switch to move into an inconsistent state. In this case, the incompatibility is *loose*.

**Tip**

The **Software Install Wizard** compares and presents the results of the compatibility before proceeding with the installation. You can exit if you do not want to proceed with these changes.

**Note**

When upgrading from Release 2.0(1) or later to Release 3.2(3a), modules may reload and disrupt traffic after an upgrade using the **install all** command if an enhanced zoning lock exists. To avoid this issue, commit or clear the zone locks and then rerun the **install all** command. Issue the **show zone status** command to check if an enhanced zoning lock exists. Do not make enhanced zoning changes while an upgrade is in progress.

To view the results of a dynamic compatibility check, issue the **show incompatibility system bootflash:filename** command (see [Example 12-1](#)). Use this command to obtain further information when the **install all** command returns the following message:

```
Warning: The startup config contains commands not supported by the standby supervisor; as
a result, some resources might become unavailable after a switchover.
```

```
Do you wish to continue? (y/ n) [y]: n
```

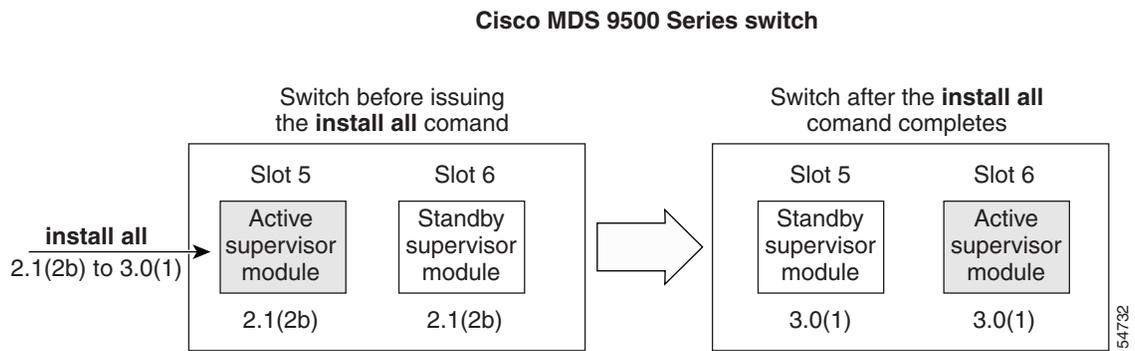
Example 12-1 Displays HA Compatibility Status

```
switch# show incompatibility system bootflash:new-system-image
The following configurations on active are incompatible with the system image
The following configurations on active are incompatible with the system image
1) Service : cfs , Capability : CAP_FEATURE_CFS_ENABLED_DEVICE_ALIAS
Description : CFS - Distribution is enabled for DEVICE-ALIAS
Capability requirement : STRICT
Disable command : no device-alias distribute
```

Automated Upgrades

The Software Install Wizard **install all** command upgrades all modules in any Cisco MDS 9000 Family switch. [Figure 12-1](#) provides an overview of the switch status before and after using Software Install Wizard issuing the **install all** command.

Figure 12-1 The Effect of the Software Install Wizard install all Command



The Software Install Wizard **install all** command automatically verifies if the standby supervisor module is functioning (if present). If it is not functioning, it reloads that module and uses the **force download** option **reload module slot force-dnld** command to force it to function.

Benefits of Using the install all Command

Benefits of Using the Software Install Wizard

The Software Install Wizard **install all** command provides the following benefits:

- You can upgrade the entire switch using just one procedure command.
- You can receive descriptive information on the intended changes to your system before you continue with the installation.
- You have the option to cancel the command. Once the effects of the command are presented, you can continue or cancel when you see this question (the default is **no**):


```
Do you want to continue (y/n) [n] :y
```
- You can upgrade the entire switch using the least disruptive procedure.
- You can see the progress of this command on the console, Telnet, and SSH screens:
 - After a switchover process, you can see the progress from both the supervisor modules.
 - Before a switchover process, you can only see the progress from the active supervisor module.
- The Software Install Wizard command automatically checks the image integrity. This includes the running kickstart and system images.
- The Software Install Wizard command performs a platform validity check to verify that a wrong image is not used. For example, to check if an MDS 9500 Series image is used inadvertently to upgrade an MDS 9200 Series switch.
- The **Ctrl-c** escape sequence gracefully ends the command. The command sequence completes the update step in progress and returns to the switch prompt. (Other upgrade steps cannot be ended using **Ctrl-c**.)
- After issuing the installation command, if any step in the sequence fails, the wizard command completes the step in progress and ends.

For example, if a switching module fails to be updated for any reason (for example, due to an unstable fabric state), then the command sequence disruptively updates that module and ends. In such cases, you can verify the problem on the affected switching module and upgrade the other switching modules.

Recognizing Failure Cases

The following situations cause the installation to end:

- If the standby supervisor module bootflash: file system does not have sufficient space to accept the updated image.
- If the specified system and kickstart images are not compatible.
- If the fabric or switch is configured while the upgrade is in progress.
- If the **install all** command is issued on the standby supervisor module.
- If the **install all** command does not reference the default bootflash: in a dual supervisor module configuration.
- If a module is removed while the upgrade is in progress.
- If the switch has any power disruption while the upgrade is in progress.
- If the entire path for the remote location is not specified accurately.
- If images are incompatible after an upgrade. For example, a switching module image may be incompatible with the system image, or a kickstart image may be incompatible with a system image. This is also identified by the Software Install Wizard compatibility check **show install all impact** command in the compatibility check section of the output (under the Bootable column).



Caution

If the installation **install all** command is ended, be sure to verify the state of the switch at every stage and reissue the command after 10 seconds. If you reissue the installation **install all** command within the 10-second span, the command is rejected with an error message indicating that an installation is currently in progress.



Tip

All configurations are disallowed while the installation **install all** command is in progress. However, configurations coming through the CFS applications are allowed and may affect the upgrade procedure.

Prerequisites for Installing Software Images

The software image install procedure is dependent on the following factors:

- Software images—The kickstart and system image files reside in directories or folders that can be accessed from the Cisco MDS 9000 Family switch prompt.
- Image version—Each image file has a version.
- Flash disks on the switch—The bootflash: resides on the supervisor module and the CompactFlash disk is inserted into the slot0: device.
- Supervisor modules—There are single or dual supervisor modules.

Selecting the Correct Software Images for Cisco MDS 9100 Series Switches

The Supervisor-1 and Supervisor-2 modules supported by Cisco MDS 9100 Series switches require different system and kickstart images. You can determine which images to use on your switch by the naming conventions shown in [Table 12-1](#) and [Table 12-2](#).

Table 12-1 Supervisor Module Software Image Naming Conventions for MDS 9100 Series

Cisco MDS 9100 Series Switch Type	Supervisor Module Type	Naming Convention
9124, 9124e, 9134, Cisco Fabric Switch for HP c-Class BladeSystem, Cisco Fabric Switch for IBM BladeCenter	Supervisor-2 module	Filename begins with m9100-s2ek9

Table 12-2 Software Image Naming Conventions for MDS 9100 Series

Cisco MDS 9100 Series Switch Type	Supervisor Module Type	Naming Convention
Cisco MDS 9148 Multilayer Fabric Switch	Supervisor-2 module	Filename begins with m9100-s3ek9.
Cisco MDS 9124 Multilayer Fabric Switch	Supervisor-2 module	Filename begins with m9100-s3ek9.

Selecting the Correct Software Images for Cisco MDS 9200 Series Switches

The Supervisor-1 and Supervisor-2 modules supported by Cisco MDS 9200 Series switches require different system and kickstart images. You can determine which images to use on your switch by the naming conventions shown in [Table 12-3](#).

Table 12-3 Supervisor Module Software Image Naming Conventions for MDS 9200 Series

Cisco MDS 9200 Series Switch Type	Supervisor Module Type	Naming Convention
9222i	Supervisor-2 module	Filename begins with m9200-s2ek9
9216, 9216A or 9216i	Supervisor-1 module	Filename begins with m9200-s1ek9

Selecting the Correct Software Images for Cisco MDS 9500 Family Switches

The Supervisor-1 and Supervisor-2 modules supported by Cisco MDS 9500 Family switches require different system and kickstart images. You can determine which images to use on your switch by the naming conventions shown in [Table 12-4](#).

Table 12-4 Supervisor Module Software Image Naming Conventions for MDS 9500 Series

Cisco MDS 9500 Series Switch Type	Supervisor Module Type	Naming Convention
9513	Supervisor-2 module	Filename begins with m9500-sf2ek9
9506 or 9509	Supervisor-2 module	Filename begins with m9500-sf2ek9

Use the **show module** command to display the type of supervisor module in the switch.

[Example 12-2](#) shows the output for a switch with Supervisor-1 modules.

Example 12-2 show module Command Output for Supervisor-1 Modules

```
switch# show module
Mod Ports Module-Type Model Status
-----
...
...
5 0 Supervisor/Fabric-1 DS-X9530-SF1-K9 active*
6 0 Supervisor/Fabric-1 DS-X9530-SF1-K9 ha-standby
```

[Example 12-1](#) shows the output for a switch with Supervisor-2 modules.

Example 12-3 show module Command Output for Supervisor-2 Modules

```
switch# show module
Mod Ports Module-Type Model Status
-----
...
...
7 0 Supervisor/Fabric-2 DS-X9530-SF2-K9 active *
8 0 Supervisor/Fabric-2 DS-X9530-SF2-K9 ha-standby
```

Essential Upgrade Prerequisites



Note

During a software upgrade to Cisco SAN-OS 3.1(3), the CompactFlash CRC Checksum test runs automatically in the background. All modules that are online are tested and the installation stops if any modules are running with a faulty CompactFlash. When this occurs, the switch can not be upgraded until the situation is corrected. A system message displays the module information and indicates that you must issue the **system health cf-crc-check module** CLI command to troubleshoot. For descriptions of new commands supported by the CompactFlash checksum feature, refer to the *Cisco MDS 9000 Family Command Reference*.

Before attempting to migrate to any software image version, follow these guidelines:

- Customer Service

Before performing any software upgrade, contact your respective customer service representative to review your software upgrade requirements and to provide recommendations based on your current operating environment.



Note If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL: <http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

- **Scheduling**
Schedule the upgrade when the fabric is stable and steady. Ensure that everyone who has access to the switch or the network is not configuring the switch or the network during this time. All configurations are disallowed at this time.
- **Space**
Verify that sufficient space is available in the location where you are copying the images. This location includes the active and standby supervisor module bootflash: (internal to the switch).
 - Standby supervisor module bootflash: file system.
 - Internal bootflash: offers approximately 200 MB of user space.
- **Hardware**
Avoid power interruption during any install procedure. These kinds of problems can corrupt the software image.
- **Connectivity (to retrieve images from remote servers)**
 - Configure the IPv4 address or IPv6 address for the 10/100/1000 BASE-T Ethernet port connection (interface mgmt0).



Note 1000 BASE-T Ethernet is only available on Supervisor-2 modules.

- Ensure the switch has a route to the remote server. The switch and the remote server must be in the same subnetwork if you do not have a router to route traffic between subnets.
- **Images**
 - Ensure that the specified system and kickstart images are compatible with each other.
 - If the kickstart image is not specified, the switch uses the current running kickstart image.
 - If you specify a different system image, ensure that it is compatible with the running kickstart image.
 - Retrieve images in one of two ways:
Local file—Images are locally available on the switch.
Network file—Images are in a remote location and the user specifies the destination using the remote server parameters and the file name to be used locally.
- **Terminology**
[Table 12-5](#) summarizes terms used in this chapter with specific reference to the install and upgrade process.

Table 12-5 Terms Specific to This Chapter

Term	Definition
bootable	The modules ability to boot or not boot based on image compatibility.
impact	The type of software upgrade mechanism—disruptive or nondisruptive.

Table 12-5 Terms Specific to This Chapter

Term		Definition
install-type	reset	Resets the module.
	sw-reset	Resets the module immediately after switchover.
	rolling	Upgrades each module in sequence.
	copy-only	Updates the software for BIOS, loader, or bootrom.

- Tools
- Commands
 - Verify connectivity to the remote server by clicking **Verify Remote Server in the Software Install Wizard in DCNM-SAN** using the **ping** command.
 - Ensure that the required space is available for the image files to be copied by using Software Install Wizard to check free disk space using the **dir** command.
 - We recommend the Software Install Wizard in DCNM-SAN one-step **install all** command to upgrade your software. This wizard command upgrades all modules in any Cisco MDS 9000 Family switch (see the [“Benefits of Using the Software Install Wizard”](#) section on page 12-4 [“Benefits of Using the install all Command”](#) section on page 12-4).
 - Run only one installation on a switch at any time.
 - Do not issue another command while running the installation.
 - Do the installation on the active supervisor module, not the standby supervisor module.



Note If the switching module(s) are not compatible with the new supervisor module image, some traffic disruption may be noticed in the related modules, depending on your configuration. These modules are identified in the summary when you use issue the Installation Wizard **install all** command. You can choose to proceed with the upgrade or end at this point.



Note Prior to Cisco SAN-OS Release 3.0, to preserve the FC IDs in your configuration, verify that the persistent FC ID feature is enabled before rebooting. This feature is enabled by default. In earlier releases, the default is disabled.



Note The Software Install Wizard supports installation and upgrade for Cisco MDS 9020 Fabric Switch or Cisco FabricWare. For successful installation and upgrade, specify the TFTP server address that the Cisco MDS 9020 Fabric Switch should use.



Note Before you use this wizard, be sure the standby supervisor management port is connected.

Default Settings

Table 12-6 lists the default image settings for all Cisco MDS 9000 Family switches.

Table 12-6 Default Image Settings

Parameters	Default
Kickstart image	No image is specified.
System image	No image is specified.

Using the Software Install Wizard

Using the Software Install Wizard

You can use the Software Install Wizard to install Cisco NX-OS images on supported switches.

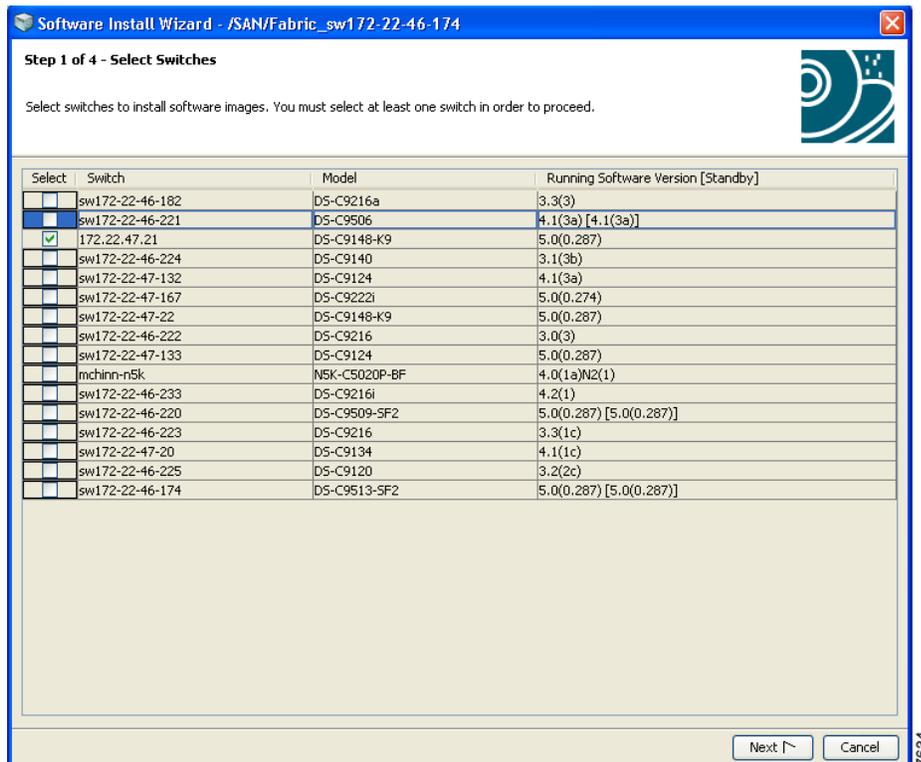
DETAILED STEPS

- Step 1** Click the Software Install Wizard icon in the toolbar (see [Figure 12-2](#)).

Figure 12-2 Software Install Wizard Icon

You see the Select Switches dialog box with all switches selected by default.

Figure 12-3 Select Switches Dialog Box



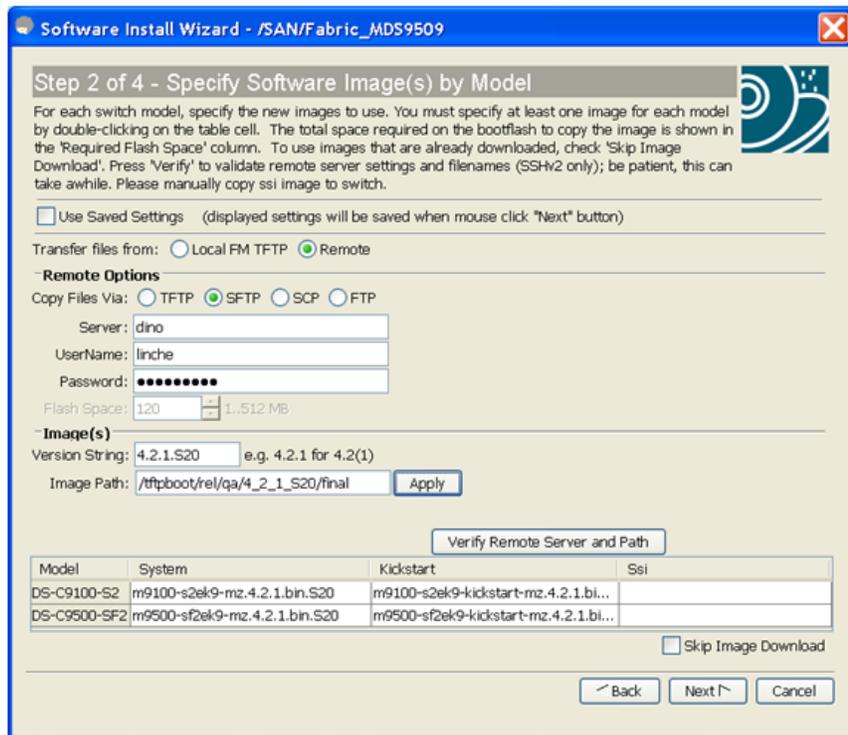
Step 2 Deselect the check box for the switch(es) for which you do not want to install images on. You must have at least one switch selected to proceed (see [Figure 12-3](#)).

Step 3 Click **Next** when finished.

Step 4 (Optional) Check the **Skip Image Download** check box and click **Next** to use images that are already downloaded (the file is already on the bootflash). Proceed to [Step 11](#).

You see the Specify Software Image(s) by Model Dialog Box shown in [Figure 12-4](#).

Figure 12-4 Specify Software Image(s) by Model Dialog Box



- Step 5** Click the **Use Saved Settings** check box to load and display the previously saved settings. Settings are saved each time the Next button is clicked.
- Step 6** Click the radio button for either:
- Local FM TFTP** to transfer files from local computer.
 - Remote** to transfer files from a remote computer.
- Step 7** If you select Local FM TFTP, proceed to [Step 10](#).
- Step 8** If you select Remote, click one of the Copy Files Via radio buttons transfers files (SFTP, SCP, FTP).
- Step 9** Enter the server name, user name and password.
- Step 10** Enter the version and the image path and then click **Apply**.



Note You can manually provide the file name, if you had chosen **Local FM TFTP** in step 6. To do that you may double-click the table, and choose the file from the Open dialog box or manually type the file name in the cell under system.

When you enter the version string and image path, DCCM-SAN tries to retrieve the default file name and calculate the flash space required to accommodate the image file. Version string should be the current version of the version to be installed. Image path is the path to locate the software image as shown in the following example:

Image URI: /tftpboot/rel/qa/5_0_0_201/gdb/m9500-sf2ek9-mzg.5.0.0.201.bin.S2
Path - /tftpboot/rel/qa/5_0_0_201/gdb
Version String - 5.0.0.201.S2

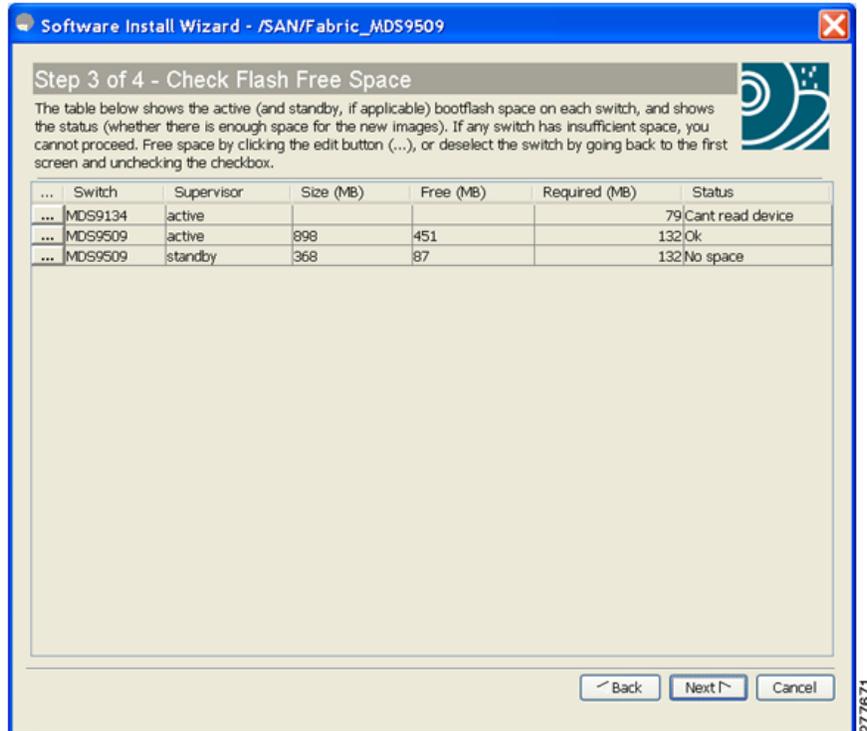
- Step 11** Click the row under the System, Kickstart or SSI columns to enter image URIs. You must specify at least one image for each switch to proceed.
- Step 12** Click **Verify Remote Server and Path**.
DCNM-SAN will validate the file path and server credentials. You see the output as shown in [Figure 12-5](#)

Figure 12-5 Validation Result



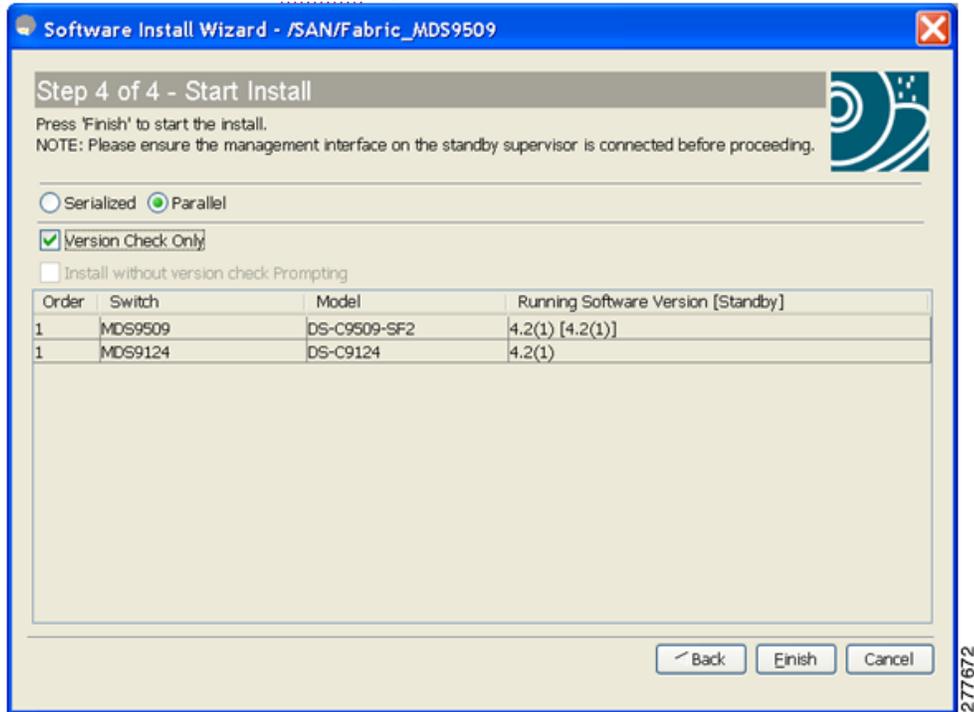
- Step 13** Click **OK** and then click **Next** in the Specify Software Images by Model dialog box.
You see the Check Flash Free Space dialog box (see [Figure 12-6](#)). This dialog box shows the active (and standby, if applicable) bootflash space on each switch, and shows the status (whether there is enough space for the new images). If any switch has insufficient space, you cannot proceed. Deselect the switch without enough bootflash by going back to the first screen and unchecking the check box for that switch.

Figure 12-6 Check Flash Free Space Dialog Box



- Step 14** Click **Next**.
You see the Start Install dialog box shown in .

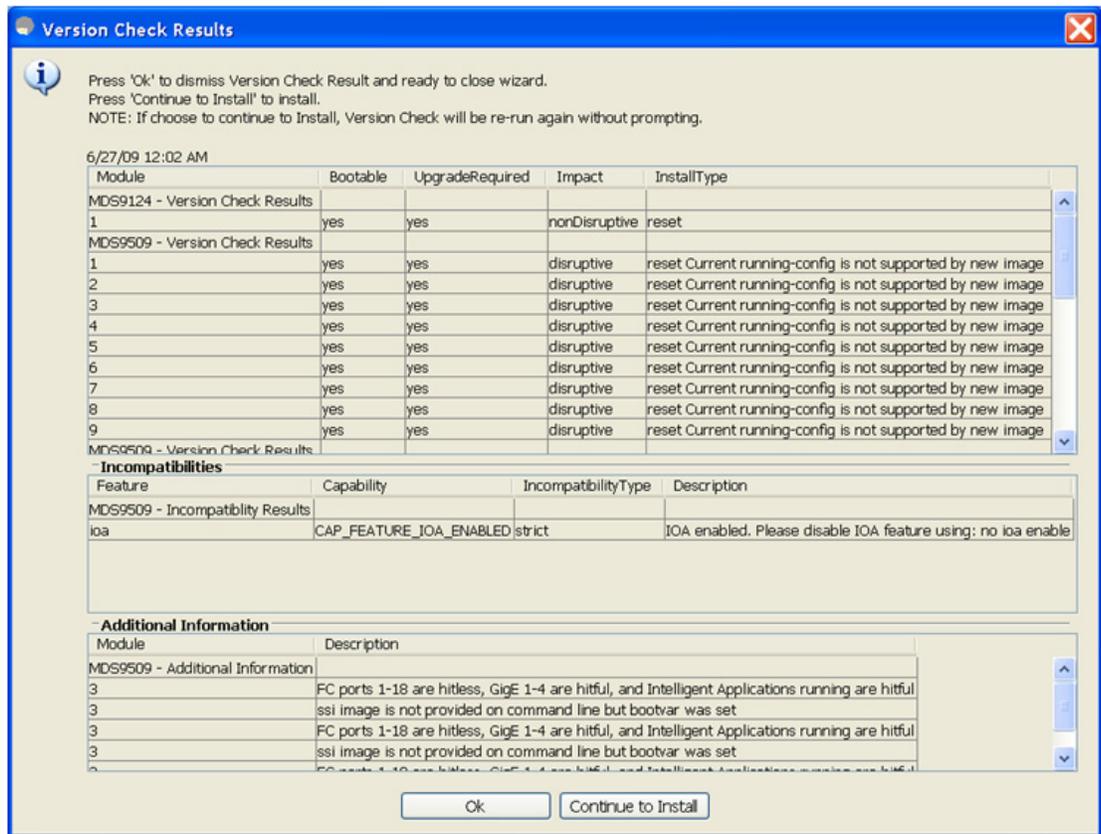
Figure 12-7 Start Install Dialog Box



Note There is no limit on the number of switches you can upgrade.

- Step 15** Click one of the the radio buttons:
- a. **Serialized** to upgrade one switch at a time.
 - b. **Parallel** to simultaneously upgrade multiple switches.
- Step 16** (Optional) Check the **Version Check Only** check box to complete the version check first and then prompt for your input to continue with installation.
- Step 17** (Optional) Click **Finish** to start installation.
- You see the Version Check Results dialog box shown in .

Figure 12-8 Version Check Results Dialog box



Step 18 (Optional) Check the **Install without Version check Prompting** check box to continue with the installation.



Note The version check provides information about the impact of the upgrade for each module on the switch. It also shows any incompatibilities that might result. You see a final dialog box at this stage, prompting you to confirm that this check should be performed. We recommend that you do not ignore the version check results.



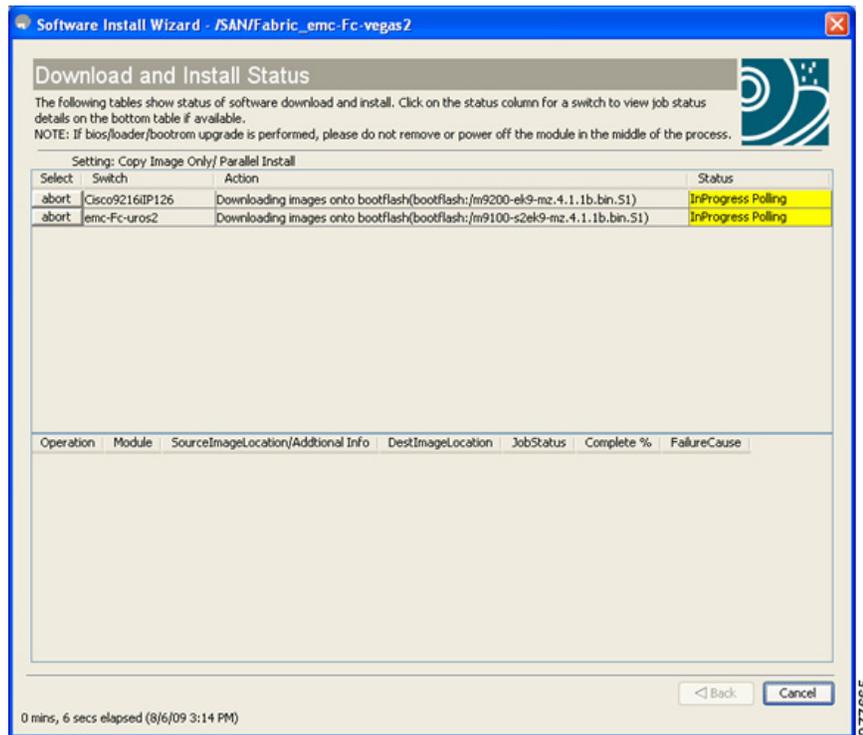
Caution If **Install without Version check Prompting** is checked, the upgrade will proceed even if the current switch version is newer than the version you are installing.

Step 19 Click **OK** to close the wizard.

Step 20 Click **Continue to install** to start the installation.

You see the Download and Install Status dialog box shown in [Figure 12-9](#).

Figure 12-9 Download and Install Status Dialog Box

**Note**

On hosts where the TFTP server cannot be started, a warning is displayed. The TFTP server may not start because an existing TFTP server is running or because access to the TFTP port 69 has been denied for security reasons (the default setting on Linux). In these cases, you cannot transfer files from the local host to the switch.

**Note**

Before exiting the session, be sure the upgrade process is complete. The wizard will display a status as it goes along. Check the lower left-hand corner of the wizard for the status message Upgrade Finished. First, the wizard displays the message Success followed a few seconds later by InProgress Polling. Then the wizard displays a second message Success before displaying the final Upgrade Finished.

Upgrading Services Modules

Any Fibre Channel switching module supports nondisruptive upgrades. The 14/2-port Multiprotocol Services (MPS-14/2)) module supports nondisruptive upgrades for the Fibre Channel ports. Any software upgrade for the two Gigabit Ethernet ports in this module is disruptive.

Any software upgrade for the Caching Services Module (CSM) and the IP Storage (IPS) services modules is disruptive.

CSMs and IPS modules use a rolling upgrade install mechanism to guarantee a stable state for each module in the switch:

- Each IPS module in a switch requires a 5-minute delay before the next IPS module is upgraded.
- Each CSM module requires a 30-minute delay before the next CSM module is upgraded. See the *Cisco MDS 9000 Family SAN Volume Controller Configuration Guide* for more information on CSMs.

Using the install all Command



Note

Ensure that there is enough space available on the active and standby supervisor module bootflash: to store the images being installed, even if the images are supplied in slot0:. The system will automatically synchronize the images to the standby supervisor module.

To perform an automated software upgrade on any switch, follow these steps:

- Step 1** Log into the switch through the console, Telnet, or SSH port of the active supervisor module.
- Step 2** Create a backup of your existing configuration file, if required.
- Step 3** Verify that you have enough free space available on the active and standby supervisor module bootflash:. The download site on Cisco.com shows the size of the system image file in bytes. If there is not adequate space, delete files using the **delete filename EXEC** command.

```
switch# dir bootflash:
 12288 Jan 01 00:01:06 1980 lost+found/
14765056 Mar 21 15:35:06 2005 m9500-sflek9-kickstart-mz.2.1.1.bin
15944704 Apr 06 16:46:04 2005 m9500-sflek9-kickstart-mz.2.1.1a.bin
48063243 Mar 21 15:34:46 2005 m9500-sflek9-mz.2.1.1.bin
48036239 Apr 06 16:45:41 2005 m9500-sflek9-mz.2.1.1a.bin

Usage for bootflash://sup-local
141066240 bytes used
43493376 bytes free
184559616 bytes total
```

```
switch# show module
Mod  Ports  Module-Type                Model                Status
---  ---
 2    32     Storage Services Module   DS-X9032-SSM        ok
 5     0     Supervisor/Fabric-1       DS-X9530-SF1-K9     active *
6     0     Supervisor/Fabric-1       DS-X9530-SF1-K9     ha-standby
...
```

The **show module** command output shows that the standby supervisor is in slot 6. Use the **attach** command to access the supervisor module.

```
switch# attach module 6
...
switch(standby)# dir bootflash:
 12288 Jan 01 00:01:06 1980 lost+found/
14765056 Mar 21 15:35:06 2005 m9500-sflek9-kickstart-mz.2.1.1.bin
15944704 Apr 06 16:46:04 2005 m9500-sflek9-kickstart-mz.2.1.1a.bin
48063243 Mar 21 15:34:46 2005 m9500-sflek9-mz.2.1.1.bin
48036239 Apr 06 16:45:41 2005 m9500-sflek9-mz.2.1.1a.bin

Usage for bootflash://sup-local
141066240 bytes used
43493376 bytes free
184559616 bytes total
```

```
switch(standby)# exit
switch#
```

- Step 4** Download a Cisco NX-OS system image to the active supervisor module bootflash: from a TFTP server, if necessary.

```
switch# copy tftp://10.16.10.100/system-img bootflash:system-img
Trying to connect to tftp server.....
```



Note Ensure that you download the correct Cisco NX-OS system image. The system image for Supervisor-1 modules is different from the system image for Supervisor-2 modules.

- Step 5** Download a kickstart image to the active supervisor module bootflash: from a TFTP server, if necessary.

```
switch# copy tftp://10.16.10.100/kickstart-img bootflash:kickstart-img
Trying to connect to tftp server.....
```

- Step 6** Perform the upgrade by issuing the **install all** command.



Note On a dual supervisor module switch, always use the default bootflash: in the **install all** command syntax. Do not qualify it with **"/sup-active/"** or **"/sup-local"**. Always use the following syntax: **install all system bootflash:filename kickstart bootflash:filename**.

```
switch# install all system bootflash:system-img kickstart bootflash:kickstart-img
```

```
Verifying image bootflash:/kickstart-img
[#####] 100% -- SUCCESS
```

```
Verifying image bootflash:/system-img
[#####] 100% -- SUCCESS
```

```
Extracting "slc" version from image bootflash:/system-img.
[#####] 100% -- SUCCESS
```

```
Extracting "ips" version from image bootflash:/system-img.
[#####] 100% -- SUCCESS
```

```
Extracting "system" version from image bootflash:/system-img.
[#####] 100% -- SUCCESS
```

```
Extracting "kickstart" version from image bootflash:/kickstart-img.
[#####] 100% -- SUCCESS
```

```
Extracting "loader" version from image bootflash:/kickstart-img.
[#####] 100% -- SUCCESS
```

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
1	yes	non-disruptive	rolling	
2	yes	disruptive	rolling	Hitless upgrade is not supported
3	yes	disruptive	rolling	Hitless upgrade is not supported
4	yes	non-disruptive	rolling	
5	yes	non-disruptive	reset	
6	yes	non-disruptive	reset	

Images will be upgraded according to following table:

Module	Image	Running-Version	New-Version	Upg-Required
--------	-------	-----------------	-------------	--------------

**Caution**

If a nondisruptive upgrade operation fails for any reason other than those listed in the “Recognizing Failure Cases” section on page 12-5, contact your reseller or Cisco representative for further assistance.

If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL: <http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

Upgrading Services Modules

Any Fibre Channel switching module supports nondisruptive upgrades. The 14/2-port Multiprotocol Services (MPS-14/2) module supports nondisruptive upgrades for the Fibre Channel ports. Any software upgrade for the two Gigabit Ethernet ports in this module is disruptive.

**Caution**

Any software upgrade for the Caching Services Module (CSM) and the IP Storage (IPS) services modules is disruptive.

CSMs and IPS modules use a rolling upgrade install mechanism to guarantee a stable state for each module in the switch:

- Each IPS module in a switch requires a 5-minute delay before the next IPS module is upgraded.
- Each CSM module requires a 30-minute delay before the next CSM module is upgraded. Refer to the *Cisco MDS 9000 Family SAN Volume Controller Configuration Guide* for more information on CSMs.

When you upgrade, or downgrade, the SSI boot image on a Storage Services Module (SSM), you might disrupt traffic through the module. Table 12-7 describes how updating the SSI boot image affects SSM traffic.

Table 12-7 SSI Boot Image Updating Effects on SSM Traffic

Cisco MDS SAN-OS Release	Traffic Type	Disrupts Traffic?
2.0(2b) through 2.1(1a)	All	Yes
2.1(2) and later	Layer 2 Fibre Channel switching only	No
	Both Layer 2 Fibre Channel switching and Layer 3 Intelligent Storage Services (such as FCWA, NASB, SANTap, ISAPI virtualization)	Yes
	Layer 3 Intelligent Storage Services (such as FCWA, NASB, SANTap, ISAPI virtualization) only	Yes

As shown in [Table 12-7](#), Layer 3 Intelligent Storage Services traffic is disrupted when you update the SSI boot image. If you have configured Layer 3 Intelligent Storage Services on your SSM, we recommend that you shut down these services before upgrading the SSI boot image. You can use dual fabric configuration to minimize the impact of shutting down Layer 3 services.

Sample install all Commands

[Example 12-4](#) displays the result of the **install all** command issued from a console terminal that is connected to the active supervisor module. Once a switchover happens, you can see the rest of the output from the console terminal of the standby supervisor module. [Example 12-5](#) displays the file output continuation of the **install all** command on the console of the standby supervisor module. [Example 12-6](#) displays the result of the **install all** command issued from a console terminal for a system that contains an SSI image.

Similarly, you can view the results of the **install all** command issued from the SSH or Telnet terminal that is connected to the active supervisor module. Once a switchover happens, you need to log back into the switch and issue the **show install all status** command (see the “[Upgrade Status Verification](#)” section on page 12-28).

Example 12-4 Successful install all Command Issued from the Active Console

```
Hacienda# install all system bootflash:system-img kickstart bootflash:kickstart-img
```

```
Verifying image bootflash:/kickstart-img
[#####] 100% -- SUCCESS
```

```
Verifying image bootflash:/system-img
[#####] 100% -- SUCCESS
```

```
Extracting "slc" version from image bootflash:/system-img.
[#####] 100% -- SUCCESS
```

```
Extracting "ips" version from image bootflash:/system-img.
[#####] 100% -- SUCCESS
```

```
Extracting "system" version from image bootflash:/system-img.
[#####] 100% -- SUCCESS
```

```
Extracting "kickstart" version from image bootflash:/kickstart-img.
[#####] 100% -- SUCCESS
```

```
Extracting "loader" version from image bootflash:/kickstart-img.
[#####] 100% -- SUCCESS
```

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
1	yes	non-disruptive	rolling	
2	yes	disruptive	rolling	Hitless upgrade is not supported
3	yes	disruptive	rolling	Hitless upgrade is not supported
4	yes	non-disruptive	rolling	
5	yes	non-disruptive	reset	
6	yes	non-disruptive	reset	

Images will be upgraded according to following table:

Example 12-6 Successful install all Command Including an SSI Image

```

Cisco-MDS# install all system bootflash:isan-2-1-1a kickstart
bootflash:boot-2-1-1a ssi bootflash:ssi-2.1.1a

Verifying image bootflash:/ssi-2.1.1a
[#####] 100% -- SUCCESS

Verifying image bootflash:/boot-2-1-1a
[#####] 100% -- SUCCESS

Verifying image bootflash:/isan-2-1-1a
[#####] 100% -- SUCCESS

Extracting "slc" version from image bootflash:/isan-2-1-1a.
[#####] 100% -- SUCCESS

Extracting "ips4" version from image bootflash:/isan-2-1-1a.
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash:/isan-2-1-1a.
[#####] 100% -- SUCCESS

Extracting "kickstart" version from image bootflash:/boot-2-1-1a.
[#####] 100% -- SUCCESS

Extracting "loader" version from image bootflash:/boot-2-1-1a.
[#####] 100% -- SUCCESS

Compatibility check is done:
Module bootable Impact Install-type Reason
-----
2 yes non-disruptive rolling
3 yes disruptive rolling Hitless upgrade is not supported
4 yes disruptive rolling Hitless upgrade is not supported
5 yes non-disruptive reset

Images will be upgraded according to following table:
Module Image Running-Version New-Version Upg-Required
-----
2 slc 2.0(3) 2.1(1a) yes
2 bios v1.1.0(10/24/03) v1.1.0(10/24/03) no
3 slc 2.0(3) 2.1(1a) yes
3 ssi 2.0(3) 2.1(1a) yes
3 bios v1.0.8(08/07/03) v1.1.0(10/24/03) yes
4 ips4 2.0(3) 2.1(1a) yes
4 bios v1.1.0(10/24/03) v1.1.0(10/24/03) no
5 system 2.0(3) 2.1(1a) yes
5 kickstart 2.0(3) 2.1(1a) yes
5 bios v1.1.0(10/24/03) v1.1.0(10/24/03) no
5 loader 1.2(2) 1.2(2) no

Do you want to continue with the installation (y/n)? [n] y

Install is in progress, please wait.

Module 6:Force downloading.
-- SUCCESS

Syncing image bootflash:/ssi-2.1.1a to standby.

```

```

#####] 100% -- SUCCESS

Syncing image bootflash:/boot-2-1-1a to standby.
#####] 100% -- SUCCESS

Syncing image bootflash:/isan-2-1-1a to standby.
#####] 100% -- SUCCESS

Setting boot variables.
#####] 100% -- SUCCESS

Performing configuration copy.
#####] 100% -- SUCCESS

Module 3:Upgrading Bios/loader/bootrom.
#####] 100% -- SUCCESS

Module 6:Waiting for module online.
-- SUCCESS

"Switching over onto standby".
-----

```

**Note**

If you perform the **install all** command to downgrade to a Cisco MDS SAN-OS release that does not support the SSM module, you must power down the SSM module when prompted by the CLI console. The boot variables for the SSM module are lost.

[Example 12-7](#) displays the result of the **install all** command if the system and kickstart files are automatically downloaded using a remote (TFTP, FTP, SCP, or SFTP) download option. It shows an accurate and complete example.

**Caution**

Specify the complete path of the remote location. The system will not allow you to proceed if the entire path is not accurately specified. Here are examples of incomplete **install all** commands:

```

switch# install all system bootflash:system-image kickstart tftp:
Please provide a complete URI
switch# install all system scp:
Please provide a complete URI

```

Example 12-7 A Sample of the install all Command Issued Using a Remote Download

```

switch# install all system
scp://user@10.10.1.1/tftpboot/HKrel/qa/final/m9500-sflek9-mz.1.3.2a.bin kickstart
scp://user@10.10.1.1/tftpboot/HKrel/qa/final/m9500-sflek9-kickstart-mz.1.3.2a.bin
For scp://user@10.10.1.1, please enter password:
For scp://user@10.10.1.1, please enter password:

Copying image from
scp://user@10.10.1.1/tftpboot/HKrel/qa/final/m9500-sflek9-kickstart-mz.1.3.2a.bin to
bootflash:///m9500-sflek9-kickstart-mz.1.3.2a.bin.
#####] 100% -- SUCCESS

Copying image from scp://user@10.10.1.1/tftpboot/HKrel/qa/final/m9500-sflek9-mz.1.3.2a.bin
to bootflash:///m9500-sflek9-mz.1.3.2a.bin.
#####] 100% -- SUCCESS

Verifying image bootflash:///m9500-sflek9-kickstart-mz.1.3.2a.bin
#####] 100% -- SUCCESS

```

```

Verifying image bootflash://m9500-sflek9-mz.1.3.2a.bin
[#####] 100% -- SUCCESS

Extracting "slc" version from image bootflash://m9500-sflek9-mz.1.3.2a.bin.
[#####] 100% -- SUCCESS

Extracting "ips" version from image bootflash://m9500-sflek9-mz.1.3.2a.bin.
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash://m9500-sflek9-mz.1.3.2a.bin.
[#####] 100% -- SUCCESS

Extracting "kickstart" version from image
bootflash://m9500-sflek9-kickstart-mz.1.3.2a.bin.
[#####] 100% -- SUCCESS

Extracting "loader" version from image bootflash://m9500-sflek9-kickstart-mz.1.3.2a.bin.
[#####] 100% -- SUCCESS

```

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
1	yes	non-disruptive	rolling	
2	yes	disruptive	rolling	Hitless upgrade is not supported
3	yes	non-disruptive	rolling	
4	yes	non-disruptive	rolling	
5	yes	non-disruptive	reset	
6	yes	non-disruptive	reset	
7	yes	non-disruptive	rolling	
8	yes	non-disruptive	rolling	
9	yes	disruptive	rolling	Hitless upgrade is not supported

Images will be upgraded according to following table:

Module	Image	Running-Version	New-Version	Upg-Required
1	slc	1.3(1)	1.3(2a)	yes
1	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
2	ips	1.3(1)	1.3(2a)	yes
2	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
3	slc	1.3(1)	1.3(2a)	yes
3	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
4	slc	1.3(1)	1.3(2a)	yes
4	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
5	system	1.3(1)	1.3(2a)	yes
5	kickstart	1.3(1)	1.3(2a)	yes
5	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
5	loader	1.2(2)	1.2(2)	no
6	system	1.3(1)	1.3(2a)	yes
6	kickstart	1.3(1)	1.3(2a)	yes
6	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
6	loader	1.2(2)	1.2(2)	no
7	slc	1.3(1)	1.3(2a)	yes
7	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
8	slc	1.3(1)	1.3(2a)	yes
8	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
9	ips	1.3(1)	1.3(2a)	yes
9	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no

Do you want to continue with the installation (y/n)? [n]

Example 12-8 displays the `install all` command output of a failed operation due to a lack of disk space.

Example 12-8 Failed Operation Due to a Full bootflash: File System

```
switch# install all system bootflash:isan-1.3.2a kickstart bootflash:boot-1.3.2a

Verifying image bootflash:/boot-1.3.2a
[#####] 100% -- SUCCESS

Verifying image bootflash:/isan-1.3.2a
[#####] 100% -- SUCCESS

Extracting "slc" version from image bootflash:/isan-1.3.2a.
[#####] 100% -- SUCCESS

Extracting "ips" version from image bootflash:/isan-1.3.2a.
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash:/isan-1.3.2a.
[#####] 100% -- SUCCESS

Extracting "kickstart" version from image bootflash:/boot-1.3.2a.
[#####] 100% -- SUCCESS

Extracting "loader" version from image bootflash:/boot-1.3.2a.
[#####] 100% -- SUCCESS
```

Compatibility check is done:

Module	bootable	Impact	Install-type	Reason
1	yes	non-disruptive	rolling	
2	yes	disruptive	rolling	Hitless upgrade is not supported
3	yes	non-disruptive	rolling	
4	yes	non-disruptive	rolling	
5	yes	non-disruptive	reset	
6	yes	non-disruptive	reset	
7	yes	non-disruptive	rolling	
8	yes	non-disruptive	rolling	
9	yes	disruptive	rolling	Hitless upgrade is not supported

Images will be upgraded according to following table:

Module	Image	Running-Version	New-Version	Upg-Required
1	slc	1.3(1)	1.3(2a)	yes
1	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
2	ips	1.3(1)	1.3(2a)	yes
2	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
3	slc	1.3(1)	1.3(2a)	yes
3	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
4	slc	1.3(1)	1.3(2a)	yes
4	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
5	system	1.3(1)	1.3(2a)	yes
5	kickstart	1.3(1)	1.3(2a)	yes
5	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no
5	loader	1.2(2)	1.2(2)	no
6	system	1.3(1)	1.3(2a)	yes
6	kickstart	1.3(1)	1.3(2a)	yes
6	bios	v1.1.0(10/24/03)	v1.0.8(08/07/03)	no

6	loader		1.2(2)	1.2(2)	no
7	slc		1.3(1)	1.3(2a)	yes
7	bios	v1.1.0(10/24/03)		v1.0.8(08/07/03)	no
8	slc		1.3(1)	1.3(2a)	yes
8	bios	v1.1.0(10/24/03)		v1.0.8(08/07/03)	no
9	ips		1.3(1)	1.3(2a)	yes
9	bios	v1.1.0(10/24/03)		v1.0.8(08/07/03)	no

Do you want to continue with the installation (y/n)? [n] y

Install is in progress, please wait.

Syncing image bootflash:/boot-1.3.2a to standby.
[#####] 100% -- SUCCESS

Syncing image bootflash:/isan-1.3.2a to standby.
[#] 0% -- FAIL. Return code 0x401E0008 (request was aborted, standby disk may be full).

Install has failed. Return code 0x40930013 (Syncing images to standby failed).
Please identify the cause of the failure, and try 'install all' again.
Dec 15 19:36:42 switch %SYSMGR-3-SERVICE_TERMINATED: Service "installer" (PID 5470) has finished with error code SYSMGR_EXITCODE_FAILURE_NOCALLHOME (20).

[Example 12-9](#) displays the **install all** command output of a failed operation due to an invalid image.

Example 12-9 Failed Operation Due to an Invalid Image

```
install all system bootflash:junk kickstart bootflash:junk

Verifying image bootflash:/junk
[# ] 0% -- FAIL. Return code 0x4045001E (mismatch between actual image
type and boot variable).
Compatibility check failed. Return code 0x40930011 (Image verification failed).
Hacienda# Jan 19 00:20:35 Hacienda %SYSMGR-3-SERVICE_TERMINATED: Service "installer" (PID
5664) has finished with error code SYSMGR_EXITCODE_FAILURE_NOCALLHOME (20).
```

Upgrade Status Verification

Use the **show install all status** command to view the ongoing **install all** command or the log of the last installed **install all** command from a console, SSH, or Telnet session.

This command presents the **install all** output on both the active and standby supervisor module even if you are not connected to the console terminal. It only displays the status of an **install all** command that is issued from the CLI (not the GUI). See [Example 12-10](#).

Example 12-10 Displays the install all Command Output

```
switch# show install all status
There is an on-going installation... <----- in progress installation
Enter Ctrl-C to go back to the prompt.
Verifying image bootflash:/b-1.3.0.104
-- SUCCESS

Verifying image bootflash:/i-1.3.0.104
-- SUCCESS
```

```
Extracting "system" version from image bootflash:/i-1.3.0.104.
-- SUCCESS

Extracting "kickstart" version from image bootflash:/b-1.3.0.104.
-- SUCCESS

Extracting "loader" version from image bootflash:/b-1.3.0.104.
-- SUCCESS

switch# show install all status
This is the log of last installation.          <<<<<< log of last install

Verifying image bootflash:/b-1.3.0.104
-- SUCCESS

Verifying image bootflash:/i-1.3.0.104
-- SUCCESS

Extracting "system" version from image bootflash:/i-1.3.0.104.
-- SUCCESS

Extracting "kickstart" version from image bootflash:/b-1.3.0.104.
-- SUCCESS

Extracting "loader" version from image bootflash:/b-1.3.0.104.
-- SUCCESS
```

Performing Nondisruptive Upgrades on Fabric and Modular Switches

This section describes how to perform nondisruptive upgrades on the following Cisco Fabric Switches:

- Cisco MDS 9124 Multilayer Fabric Switch
- Cisco MDS 9134 Multilayer Fabric Switch
- Cisco MDS 9222i Multiservice Modular Switch
- Cisco Fabric Switch for HP c-Class BladeSystem
- Cisco Fabric Switch for IBM BladeCenter

This section includes the following topics:

- [Preparing for a Nondisruptive Upgrade on Fabric and Modular Switches, page 12-29](#)
- [Performing a Nondisruptive Upgrade on a Fabric Switch, page 12-32](#)
- [Viewing the Status of a Nondisruptive Upgrade on a Fabric Switch, page 12-34](#)
- [Troubleshooting a Nondisruptive Upgrade on a Fabric Switch, page 12-34](#)

Preparing for a Nondisruptive Upgrade on Fabric and Modular Switches

You can upgrade software on the following without any disruptions using the **install all** command Software Install Wizard for the system software images.

- Cisco MDS 9124 Multilayer Fabric Switch
- Cisco MDS 9134 Multilayer Fabric Switch

- Cisco MDS 9222i Multiservice Modular Switch
- Cisco Fabric Switch for HP c-Class BladeSystem
- Cisco Fabric Switch for IBM BladeCenter

When completed, the supervisor kickstart image, supervisor system image, the linecard image and the system BIOS are all updated.

Nondisruptive upgrades on these fabric switches take down the control plane for not more than 80 seconds. In some cases, when the upgrade has progressed past the point at which it cannot be stopped gracefully, or if a failure occurs, the software upgrade may be disruptive.


Note

During the upgrade the control plane is down, but the data plane remains up. So new devices will be unable to log in to the fabric via the control plane, but existing devices will not experience any disruption of traffic via the data plane.

Before attempting to upgrade any software images on these fabric switches, follow these guidelines:

- During the upgrade, the fabric must be stable. None of the following configuration activities are allowed:
 - Zoning changes
 - Telnet sessions
 - Schedule changes
 - Switch cabling
 - Addition or removal of physical devices
- Configure the FSPF timers to the default value of 20 seconds.
- If there are any CFS commits pending in the fabric, the upgrade is aborted.
- If there is a zone server merge in progress, the upgrade is aborted.
- If the upgrade is aborted due to a service not being ready for the upgrade, you are prompted to enter the **show install all failure-reason** command to identify the reason why.
- If there is insufficient space available in the system to load the new images, then you will be notified via the compatibility table. At this point, you need to either abort the upgrade or proceed with a disruptive upgrade.
- Check whether there is sufficient space available in the system to load the new images using the Software Install Wizard. At this point you need to either abort the upgrade or proceed with a disruptive upgrade.
- Issue the **no logging level all** command before the commencing with the upgrade. Failing to issue this command could result in a failure due to the debug system log messages being printed and potentially resulting in control plane downtime exceeding 80 seconds.
- If VRRP is running on the mgmt0 interface, and the switch being upgraded is the master, then a new master is selected. This cannot be avoided because the mgmt0 interface goes down when the control plane goes down.
- On the Cisco MDS 18/4-port multiservice module, upgrades of the 4-Gigabit Ethernet ports for the hybrid Supervisor 18/4 line card will be disruptive.

To ensure that you can view the entire upgrade process, it is recommended that you perform the upgrade via the console port; performing the upgrade in this way also enables you to log your session to a file (in case you need it later for troubleshooting). Also, Telnet sessions are lost when the switch is rebooted, so if you wish to view the process in its entirety, use the console port instead.

Example 12-11 Failed Nondisruptive Upgrade Due to Insufficient Resources

```

switch# install all kickstart bootflash:boot-fs9124 system bootflash:isan-164

Verifying image bootflash:/boot-fs9124 for boot variable "kickstart".
[#####] 100% -- SUCCESS

Verifying image bootflash:/isan-164 for boot variable "system".
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash:/isan-164.
[#####] 100% -- SUCCESS

Extracting "kickstart" version from image bootflash:/boot-fs9124.
[#####] 100% -- SUCCESS

Extracting "bios" version from image bootflash:/isan-164.
[#####] 100% -- SUCCESS

Compatibility check is done:
Module bootable Impact Install-type Reason
-----
1 yes disruptive reset insufficient resources<----Reason for failure

Images will be upgraded according to following table:
Module Image Running-Version(pri:alt) New-Version Upg-Required
-----
1 system 3.1(1u) 3.1(1) yes
1 kickstart 3.1(1u) 3.1(1) yes
1 bios v1.0.0(10/04/06):v1.0.0(10/04/06) v1.0.0(10/04/06) no

Do you want to continue with the installation (y/n)? [n]

```

Before performing an upgrade, you may wish to use the **show install all impact** command to view the effect of updating the system from the running image to another specified image.

```

switch# show install all impact kickstart bootflash:boot-fs9124 system bootflash:isan-164

Verifying image bootflash:/boot-fs9124 for boot variable "kickstart".
[#####] 100% -- SUCCESS

Verifying image bootflash:/isan-164 for boot variable "system".
[#####] 100% -- SUCCESS

Extracting "system" version from image bootflash:/isan-164.
[#####] 100% -- SUCCESS

Extracting "kickstart" version from image bootflash:/boot-fs9124.
[#####] 100% -- SUCCESS

Extracting "bios" version from image bootflash:/isan-164.
[#####] 100% -- SUCCESS

Compatibility check is done:
Module bootable Impact Install-type Reason
-----
1 yes non-disruptive reset

```

```

Images will be upgraded according to following table:
Module      Image      Running-Version(pri:alt)      New-Version      Upg-Required
-----
1          system    3.1(1u)                       3.1(1)          yes
1      kickstart  3.1(1u)                       3.1(1)          yes
1          bios      v1.0.0(10/04/06): v1.0.0(10/04/06)  v1.0.0(10/04/06)  no

```

```
switch#
```

Performing a Nondisruptive Upgrade on a Fabric Switch

To perform a nondisruptive software upgrade on any of the following switches, enter the **install all kickstart** command using the console port:

- Cisco MDS 9124 Multilayer Fabric Switch
- Cisco MDS 9134 Multilayer Fabric Switch
- Cisco MDS 9222i Multiservice Modular Switch
- Cisco Fabric Switch for HP c-Class BladeSystem
- Cisco Fabric Switch for IBM BladeCenter

```
switch# install all kickstart bootflash:boot-fs9124 system bootflash:isan-164u
```

```
Verifying image bootflash:/boot-fs9124 for boot variable "kickstart".
[#####] 100% -- SUCCESS
```

```
Verifying image bootflash:/isan-164u for boot variable "system".
[#####] 100% -- SUCCESS
```

```
Extracting "system" version from image bootflash:/isan-164u.
[#####] 100% -- SUCCESS
```

```
Extracting "kickstart" version from image bootflash:/boot-fs9124.
[#####] 100% -- SUCCESS
```

```
Extracting "bios" version from image bootflash:/isan-164u.
[#####] 100% -- SUCCESS
```

Compatibility check is done:

```

Module  bootable      Impact      Install-type  Reason
-----
1       yes          non-disruptive      reset

```

```

Images will be upgraded according to following table:
Module      Image      Running-Version(pri:alt)      New-Version      Upg-Required
-----
1          system    3.1(1u)                       3.1(1u)          yes
1      kickstart  3.1(1u)                       3.1(1u)          yes
1          bios      v1.0.0(10/04/06): v1.0.0(10/04/06)  v1.0.0(10/04/06)  no

```

```
Do you want to continue with the installation (y/n)? [n]
```

```
Install is in progress, please wait.
```

```
Notifying services about the upgrade.
[#####] 100% -- SUCCESS
```

```
Setting boot variables.
```

```
[#####] 100% -- SUCCESS

Performing configuration copy.
[#####] 100% -- SUCCESS

Converting startup config.
[#####] 100% -- SUCCESS

Upgrade can no longer be aborted, any failure will result in a disruptive upgrade.
<---Note that after this point you cannot abort the upgrade.

Freeing memory in the file system.
[#####] 100% -- SUCCESS

Loading images into memory.
[#####] 100% -- SUCCESS

Saving linecard runtime state.
[#####] 100% -- SUCCESS

Saving supervisor runtime state.
[#####] 100% -- SUCCESS

Saving mts state.
[#####] 100% -- SUCCESS

Rebooting the switch to proceed with the upgrade.

Continuing with installation process, please wait.
The login will be disabled until the installation is completed.

Status for linecard upgrade.
[#####] 100% -- SUCCESS

Performing supervisor state verification.
[#####] 100% -- SUCCESS

Install has been successful.
```

You can use the Software Install Wizard to perform nondisruptive upgrades on Cisco MDS 9124 Fabric Switches. See the [“Using the Software Install Wizard”](#) section on page 12-10 for more information on using the Software Install Wizard.

**Caution**

It is recommended that you enable port-fast on the Ethernet interface of the Catalyst switch to which the management interface of the fabric switch is connected. This is to avoid spanning-tree convergence time on the Catalyst switch and packets from the fabric switch are forwarded immediately during the nondisruptive upgrade.

**Note**

When selecting images during the upgrade, ASM-SFN and SSI are not supported on the Cisco MDS 9124 Switch and the Cisco MDS 9134 Multilayer Fabric Switch.

Viewing the Status of a Nondisruptive Upgrade on a Fabric Switch

You can view the status of a nondisruptive upgrade using the **show install all status** command. Note that the output shows the status only after the switch has rebooted to come up with the new image. All actions preceding the reboot are not captured in this output because when you enter the **install all** command using a Telnet session, the session is disconnected when the switch reboots. After you can reconnect to the switch via a Telnet session, the upgrade may already be complete; in this case, the output will show the status of the upgrade.

```
switch# show install all status
This is the log of last installation.

Continuing with installation process, please wait.
The login will be disabled until the installation is completed.

Status for linecard upgrade.
-- SUCCESS

Performing supervisor state verification.
-- SUCCESS

Install has been successful.
```

Troubleshooting a Nondisruptive Upgrade on a Fabric Switch

When a nondisruptive upgrade begins, the system notifies all services that an upgrade is about to start, and finds out whether or not the upgrade can proceed. If a service cannot allow the upgrade to proceed at this time (for example, FSPF timers are not configured to the default value, or a CFS operation is in progress), then the service will abort the upgrade. In such a context, you will be prompted to enter the **show install all failure-reason** command to determine the reason why the upgrade cannot proceed.

```
...
Do you want to continue with the installation (y/n)? [n] y

Install is in progress, please wait.

Notifying services about the upgrade.
[#           ] 0% -- FAIL. Return code 0x401E0066 (request timed out).

Please issue "show install all failure-reason" to find the cause of the failure.<---system
prompt to enter the show all failure-reason command.

Install has failed. Return code 0x401E0066 (request timed out).
Please identify the cause of the failure, and try 'install all' again.

switch# show install all failure-reason
Service: "cfs" failed to respond within the given time period.
switch#
```

If there are any failures for whatever reason (a save runtime state failure or linecard upgrade failure) once the upgrade is already in progress, then the switch will be rebooted disruptively because the changes cannot be rolled back. In such cases the upgrade has failed; you are not prompted to enter the **show install all failure-reason** command, and entering it will not yield any useful information.

If further assistance is required to determine why an upgrade is unsuccessful, you should collect the details from the **show tech-support** command output, and the console output from the installation, if available.

Manual Upgrade on a Dual Supervisor Module Switch



Caution

If you are a new user, use the **install all** command to perform a software upgrade. This section is for administrators or individuals who are completely familiar with specific switch functions.

You can manually upgrade the BIOS and the loader in any Cisco MDS switch using the procedures provided in this section. This upgrade process requires you to implement some or all procedures depending on your switch or network configuration.

This section includes the following topics:

- [Preparing for a Manual Installation, page 12-35](#)
- [Upgrading a Loader, page 12-36](#)
- [Upgrading the BIOS, page 12-38](#)

Preparing for a Manual Installation

To prepare any Cisco MDS 9000 Family switch for a manual software installation, follow these steps:

-
- Step 1** Log into the switch through the console port, an SSH session, or a Telnet session.
 - Step 2** Create a backup of your existing configuration file, if required.
 - Step 3** Copy the software image from an SCP location to one of two targets: bootflash: or slot0:.

The switch remains operational while the image file is copied.

- **Bootflash device** (SCP defaults to the bootflash device)—Copy the software image file from the appropriate SCP file system to the bootflash: file system.

```
switch# copy scp://server_IP_address/destination_file_name
```

For example:

```
switch# copy scp://user@10.1.7.2/system-image bootflash:system-image
```



Note The Cisco MDS 9216 Switch does not have an external CompactFlash. If you are using a switch in this series, use the bootflash: file system to copy and verify files.

- **CompactFlash device**—Copy the software image file from the appropriate SCP file system to the CompactFlash device in slot0: file system.

```
switch# copy scp://server_IP_address/file_name_in_SCP slot0:system-image
```

You can also copy the image onto a new flash disk from a PC and insert it in slot0: in the Cisco MDS 9500 Series switch. After you copy the image and insert it into the slot0: file system, the process is the same as the CompactFlash device after the **copy** command is issued.

- Step 4** Verify that the file was copied in the required directory.

```
switch# dir bootflash:
40295206 Aug 05 15:23:51 1980 ilc1.bin
12456448 Jul 30 23:05:28 1980 kickstart-image1
12288 Jun 23 14:58:44 1980 lost+found/
27602159 Jul 30 23:05:16 1980 system-image1
```

```
12447232    Aug 05 15:08:30 1980  kickstart-image2
28364853    Aug 05 15:11:57 1980  system-image2
```

```
Usage for bootflash://sup-local
 135404544 bytes used
  49155072 bytes free
 184559616 bytes total
```

- Step 5** Ensure that the software images are not damaged or corrupted in the saved bootflash: file system. When copying a new image to your switch, confirm that the image was not corrupted during the copy process.
- Use the **show version image** command to verify that the required image was copied successfully.

```
switch# show version image bootflash:kickstart-image
image name: m9500-sflek9-kickstart-mzg.1.0.3.bin
kickstart:  version 1.0(3)
loader:      version 1.0(3)
compiled:    2/12/2003 11:00:00
```



Note A verification failed message is generated when you use a Cisco MDS 9500 Series image on a Cisco MDS 9200 Series switch or a Cisco MDS 9200 Series image on a Cisco MDS 9500 Series switch. Be sure to verify the right image.

- Step 6** Compare the running system image and the new image by issuing the **show install all impact** command.

Upgrading a Loader

The **install module slot# of the supervisor module loader** command upgrades the (boot) loader.



Note If the loader is upgraded, you need to reboot to make the new loader effective. You can schedule the reboot at a convenient time so traffic is not impacted.



Caution Before issuing this command, be sure to read the release notes to verify compatibility issues between the loader and the kickstart or system images.

To upgrade the loader on either the active or standby supervisor module, follow these steps:

- Step 1** Use the **show version** command to verify the version on the active and standby supervisor modules.

```
switch# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2009, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
Cisco Systems, Inc. and/or other third parties and are used and
distributed under license. Some parts of this software are covered
under the GNU Public License. A copy of the license is available
at http://www.gnu.org/licenses/gpl.html.
```

```
Software
```

```

BIOS:      version 1.0.8
loader:    version 1.1(2) <-----current running version
kickstart: version 2.0(1)
system:    version 2.0(1)

```

```

BIOS compile time:      08/07/03
kickstart image file is: bootflash:///m9500-sflek9-kickstart-mzg.2.0.0.6.bin
kickstart compile time: 10/25/2010 12:00:00
system image file is:   bootflash:///m9500-sflek9-mzg.2.0.0.6.bin
system compile time:    10/25/2020 12:00:00

```

Hardware

```
RAM 1024584 kB
```

```
bootflash: 1000944 blocks (block size 512b)
slot0:      0 blocks (block size 512b)

```

```
172.22.92.181 uptime is 0 days 2 hours 18 minute(s) 1 second(s)
```

```

Last reset at 970069 usecs after Tue Sep 16 22:31:25 1980
Reason: Reset Requested by CLI command reload
System version: 2.0(0.6)
Service:

```

- Step 2** Issue the **install module** command for the required supervisor module (active or standby). This example displays the command being issued for the standby supervisor module in slot 6:

```
switch# install module 6 loader bootflash:kickstart-image
```



Note If you install a loader version that is the same as the currently installed version, the command will not execute. When both the current version and the installed version are the same, use the **init system** command to force a loader upgrade.

- Step 3** Use the **show version** command to verify the updated image on the supervisor module.

```

switch# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2009, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
Cisco Systems, Inc. and/or other third parties and are used and
distributed under license. Some parts of this software are covered
under the GNU Public License. A copy of the license is available
at http://www.gnu.org/licenses/gpl.html.

```

Software

```

BIOS:      version 1.3.1
loader:    version 1.2(2) <-----New running version
kickstart: version 1.3(1) ]
system:    version 1.3(1)

```

```

BIOS compile time:      08/07/03
kickstart image file is: bootflash:///m9500-sflek9-kickstart-mzg.2.0.0.6.bin
kickstart compile time: 10/25/2010 12:00:00
system image file is:   bootflash:///m9500-sflek9-mzg.2.0.0.6.bin
system compile time:    10/25/2020 12:00:00

```

Hardware

```

RAM 1024584 kB

bootflash: 1000944 blocks (block size 512b)
slot0:      0 blocks (block size 512b)

172.22.92.181 uptime is 0 days 2 hours 18 minute(s) 1 second(s)

Last reset at 970069 usecs after Tue Sep 16 22:31:25 1980
Reason: Reset Requested by CLI command reload
System version: 2.0(0.6)
Service:

```

Upgrading the BIOS



Tip

Refer to the release notes to verify if the BIOS has changed for the image version being used.

Program the supervisor module or switching module BIOS only if a new BIOS image is provided by Cisco Systems. Only use the provided image to upgrade the BIOS. This command does not affect traffic and can be issued at any time on any switch in the Cisco MDS 9200 Series or Cisco MDS 9500 Series.



Note

If the BIOS is upgraded, reboot to make the new BIOS take effect. You can schedule the reboot at a convenient time so traffic is not impacted.



Caution

The console baud rate automatically reverts to the default rate (9600) after any BIOS upgrade.

To upgrade the BIOS for a module, follow these steps:

Step 1 Use the **show version** command to verify the current running BIOS version.

```

switch# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2009 by Cisco Systems, Inc. All rights reserved.
The copyright for certain works contained herein are owned by
Cisco Systems, Inc. and/or other third parties and are used and
distributed under license.
Software
  BIOS:      version 1.0(6) <----- current running version
  loader:    version 1.0(3)
  kickstart: version 1.0(3)
  system:    version 1.0(3)

  BIOS compile time:      01/27/03
  kickstart image file is: bootflash:/kickstart-image
  kickstart compile time: 01/25/2003 12:00:00
  system image file is:   bootflash:/system-image
  system compile time:    01/25/2003 12:00:00

Hardware
  RAM 1027564 kB

```

Step 2 Verify that the BIOS version of the system image is different from the running image.

```
switch# show version image bootflash:system-image
  image name: m9500-sflek9-mz.1.0.3.bin
  bios:      version  v1.0.6(01/27/03) <----- BIOS is same version 1.0.6
  system:    version 1.0(3)
  compiled:  2/28/2003 5:00:00

system service's list

package name      package version
acl                1.0(3)
ascii-cfg         1.0(3)
bios_daemon       1.0(3)
...
```



Note If the versions are different, issue the **install module** command as specified in Step 3. If they are the same, you do not need to update the BIOS image.

Step 3 Run the **install module slot# bios** command to install each module (if required). In this example, the supervisor module in slot 6 was updated.

```
switch# install module 6 bios system bootflash:system-image
Started bios programming ... please wait
[#####] 100%
BIOS upgrade succeeded for module 1
```



Caution Do not reboot the switch if any errors were indicated in response to this command.

Step 4 Issue the **show version** command to verify that the module was updated with a the new BIOS version.

```
switch# show version module 6
ModNo  Image Type  SW Version  SW Interim Version  BIOS Version
6      Stby Sup    1.3(2)      1.3(1.1)             1.1.0 [last 1.0.6]
```

Quick Upgrade

To perform a quick upgrade on a Cisco MDS 9000 Family switch, follow these steps:

Step 1 Copy the kickstart and system image files to the required location.

Step 2 Set the boot variables.

```
switch# config t
switch(config)# boot system system-img
switch(config)# boot kickstart kickstart-img
switch(config)# exit
switch#
```

Step 3 Issue the **reload** command. The **reload** command reboots the system. This upgrade is disruptive.

**Tip**

Use the **install all** command to gracefully reload the switch and handle configuration conversions.

Downgrading from a Higher Release

Use the **install all** command to gracefully reload the switch and handle configuration conversions. When downgrading any switch in the Cisco MDS 9000 Family, avoid using the **reload** command.

**Note**

Downgrading from Cisco MDS NX-OS Release 4.1(1a) or later to Cisco MDS SAN-OS Release 3.3(1c) and earlier is disruptive and requires a reload of the switch. The 8-Gbps hardware modules will be brought to a power down state.

**Note**

If you downgrade from Cisco MDS SAN-OS Release 3.1(3) to any earlier SAN-OS release after you execute the **system default switchport mode F** command, the ports retain the configuration that resulted from the execution of the command. In other words, the ports do not revert back to the mode they were in prior to executing the command.

For example, to revert to Cisco MDS SAN-OS Release 1.3(4b) or 1.3(5) from Release 3.0(1), follow these steps:

- Step 1** Issue the **show incompatibility system image-filename** command to determine if you need to disable any features not supported by the older release. The command output provides the commands needed to disable the incompatible features.

```
switch# show incompatibility system bootflash:m9200-ek9-mz.1.3.4b.bin
The following configurations on active are incompatible with the system image
1) Service : cfs , Capability : CAP_FEATURE_CFS_ENABLED_DEVICE_ALIAS
Description : CFS - Distribution is enabled for DEVICE-ALIAS
Capability requirement : STRICT
Disable command : no device-alias distribute
```

- Step 2** Disable the incompatible features.

```
switch# config t
switch(config)# no device-alias distribute
switch(config)# exit
switch#
```

- Step 3** Save the running configuration to the startup configuration.

```
switch# copy running-config start-config
```

- Step 4** Issue the **install all** command to downgrade the software (see the [“Automated Upgrades” section on page 12-3](#)).

Maintaining Supervisor Modules

This section includes general information about replacing and using supervisor modules effectively.

This section includes the following topics:

- [Replacing Supervisor Modules, page 12-41](#)
- [Migrating from Supervisor-1 Modules to Supervisor-2 Modules, page 12-41](#)
- [Setting Standby Supervisor Module Boot Variable Version, page 12-42](#)
- [Setting Standby Supervisor Module Bootflash Memory, page 12-42](#)
- [Standby Supervisor Module Boot Alert, page 12-42](#)

Replacing Supervisor Modules

To avoid packet loss when removing a supervisor module from a Cisco MDS 9500 Series Director, take the supervisor modules out of service before removing the supervisor module.

Use the out-of-service command in EXEC mode before removing the supervisor module.

out-of-service module *slot*

Where *slot* indicates the chassis slot number in which the supervisor module resides.



Note

You must remove and reinsert or replace the supervisor module to bring it into service.

Migrating from Supervisor-1 Modules to Supervisor-2 Modules

Cisco MDS NX-OS Release 4.1(1a) requires the Supervisor-2 modules on the Cisco MDS 9509 and 9506 Directors both active and standby. You must upgrade from Supervisor-1 modules to Supervisor-2 modules before upgrading to MDS NX-OS Release 4.1(1a) or later, using the Cisco MDS SAN-OS Release 3.3(1c) or earlier.

Supervisor-1 modules and Supervisor-2 modules cannot be used in the same switch, except for migration purposes. Both the active and standby supervisor modules must be of the same type, either Supervisor-1 or Supervisor-2 modules. For Cisco MDS 9513 Directors, both supervisor modules must be Supervisor-2 modules.



Caution

Migrating your supervisor modules is a disruptive operation. When migration occurs from a Supervisor 1 to a Supervisor 2 module, a cold switchover occurs and both modules are reloaded. When the Supervisor 1 attempts to come up as the standby with the Supervisor 2 as the active supervisor, the standby is not brought up.

For step-by-step instructions about migrating from Supervisor 1 modules to Supervisor 2 modules, refer to the *Cisco MDS 9000 Family NX-OS and SAN-OS Software Upgrade and Downgrade Guide*.



Note

Migrating from Supervisor-2 modules to Supervisor-1 modules is not supported.

Setting Standby Supervisor Module Boot Variable Version

If the standby supervisor module boot variable images are not the *same* version as those running on the active supervisor module, the software forces the standby supervisor module to run the same version as the active supervisor module.

If you specifically set the boot variables of the standby supervisor module to a different version and reboot the standby supervisor module, the standby supervisor module will only load the specified boot variable if the same version is also running on the active supervisor module. At this point, the standby supervisor module is *not* running the images set in the boot variables.

Setting Standby Supervisor Module Bootflash Memory

When updating software images on the standby supervisor module, verify that there is enough space available for the image using the **dir bootflash://sup-standby/** command. It is a good practice to remove older versions of Cisco MDS NX-OS images and kickstart images.

DETAILED STEPS

-
- Step 1** Click **Admin > Flash Files**.
- Step 2** Select the standby supervisor from the Partition drop-down list.
- At the bottom of the Flash Files dialog box, you see the space used and free space.
-

Standby Supervisor Module Boot Alert

If a standby supervisor module fails to boot, the active supervisor module detects that condition and generates a Call Home event and a system message and reboots the standby supervisor module approximately 3 to 6 minutes after the standby supervisor module moves to the loader> prompt.

The following system message is issued:

```
%DAEMON-2-SYSTEM_MSG:Standby supervisor failed to boot up.
```

This error message is also generated if one of the following situations apply:

- You remain at the loader> prompt for an extended period of time.
- You do not set the boot variables appropriately.

Installing Generation 2 Modules in Generation 1 Chassis

The Generation 2 modules have the following installation restrictions:

- Supervisor-2 modules can be installed on all Cisco MDS 9500 Series Directors.



Note The Cisco MDS 9513 Director does not support Supervisor-1 modules.

- Generation 2 switching modules can be installed on all Cisco MDS 9000 Family switches, except the Cisco MDS 9216 switch.
- Generation 1 modules can be used with Cisco MDS 9000 Family switches. However, installing Generation 1 modules in combination with Generation 2 switching modules in the same chassis reduces the capabilities of the Generation 2 switching modules.
- Generation 1 and Generation 2 switching modules can be installed on Cisco MDS 9500 Family switches with either Supervisor-1 modules or Supervisor-2 modules.

Replacing Modules

When you replace any module (supervisor, switching, or services module), you must ensure that the new module is running the same software version as the rest of the switch.

Refer to *Cisco MDS 9000 Family SAN Volume Controller Configuration Guide* for configuration details on replacing the Caching Services Module (CSM).



Note

When a spare standby supervisor module is inserted, it uses the same image as the active supervisor module. The Cisco NX-OS software image is not automatically copied to the standby flash device.



Tip

Use the Software Install Wizard to copy the Cisco NX-OS software image to the standby supervisor bootflash device.

Using the Software Install Wizard after replacing any module, ensures the following actions:

- The proper system and kickstart images are copied on the standby bootflash: file system.
- The proper boot variables are set.
- The loader and the BIOS are upgraded to the same version available on the active supervisor module.

DETAILED STEPS

- Step 1** Create a backup of your existing configuration file, if required, by clicking **Admin > Copy Configuration** and selecting **runningConfig** to **startupConfig**.
- Step 2** Replace the required module as specified in the *Cisco MDS 9200 Series Hardware Installation Guide* or the *Cisco MDS 9500 Series Hardware Installation Guide*.
- Step 3** Verify that space is available on the standby supervisor bootflash by choosing **Admin > Flash Files** and selecting the **sup-standby**. It is a good practice to remove older versions of Cisco MDS NX-OS images and kickstart images.
- Step 4** Use the Software Install Wizard to ensure that the new module is running the same software as the rest of the switch.
- Step 5** Wait until the new module is online and then ensure that the replacement was successful by choosing **Physical > Modules** in Device Manager.

**Tip**

Issue the **install all** command to copy the Cisco SAN-OS software image to the standby supervisor module bootflash device.

Issuing the **install all** command after replacing any module, ensures the following actions:

- The proper system and kickstart images are copied on the standby bootflash: file system.
- The proper boot variables are set.
- The loader and the BIOS are upgraded to the same version available on the active supervisor module.

To replace a module in any switch in the Cisco MDS 9200 Series or 9500 Series, follow these steps:

-
- Step 1** Create a backup of your existing configuration file, if required, using the **copy running-config startup-config** command.
- Step 2** Replace the required module as specified in the *Cisco MDS 9200 Series Hardware Installation Guide* or the *Cisco MDS 9500 Series Hardware Installation Guide*.
- Step 3** Verify that space is available on the standby supervisor module bootflash using the **dir bootflash://sup-standby/** command. It is a good practice to remove older versions of Cisco MDS SAN-OS images and kickstart images. For information about displaying file systems and removing files.
- Step 4** Issue the **install all** command to ensure that the new module is running the same software as the rest of the switch.
- Step 5** Wait until the new module is online and then ensure that the replacement was successful using the **show module** command.
-