



Software Images

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

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About Software Images

Each switch is shipped with a Cisco MDS SAN-OS operating system for Cisco MDS 9000 Family switches. The Cisco MDS SAN-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.

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Dependent Factors for Software Installation

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 7-1](#).

Table 7-1 Supervisor Module Software Image Naming Conventions for MDS 9100 Series

Cisco MDS 9100 Series Switch Type	Supervisor Module Type	Naming Convention
9124, 9134, Cisco Fabric Switch for HP c-Class BladeSystem, Cisco Fabric Switch for IBM BladeCenter	Supervisor-2 module	Filename begins with m9100-s2ek9
9120 or 9140	Supervisor-1 module	Filename begins with m9100-s1ek9

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 7-2](#).

Table 7-2 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 7-3](#).

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Table 7-3 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-1 module	Filename begins with m9500-sf1ek9
	Supervisor-2 module	Filename begins with m9500-sf2ek9

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

Example 7-1 shows the output for a switch with Supervisor-1 modules.

Example 7-1 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 7-3 shows the output for a switch with Supervisor-2 modules.

Example 7-2 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

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

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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 (see [Chapter 5, “Initial Configuration”](#)).
- 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 7-4](#) summarizes terms used in this chapter with specific reference to the install and upgrade process.

Table 7-4 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.	
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.

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- Commands
 - Verify connectivity to the remote server using the **ping** command.
 - Ensure that the required space is available for the image files to be copied using the **dir** command.
 - We recommend the one-step **install all** command to upgrade your software. This command upgrades all modules in any Cisco MDS 9000 Family switch (see the “[Benefits of Using the install all Command](#)” section on page 7-7).
 - 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 issue the **install all** command. You can choose to proceed with the upgrade or end at this point.

**Note**

When you issue the **install all** command, the switch displays a summary of changes that are made to your configuration.

**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. See the “[FC IDs](#)” section on page 17-14.

Software Upgrade Methods

You can upgrade software without any disruptions using the Cisco MDS SAN-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:

- 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 7-6).
- Quick, one-step upgrade using the **reload** command. This upgrade is disruptive (see the “[Quick Upgrade](#)” section on page 7-31).

**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.

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**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*.

To view the results of a dynamic compatibility check, issue the **show incompatibility system bootflash:filename** command (see [Example 7-3](#)). 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 7-3 Displays HA Compatibility Status

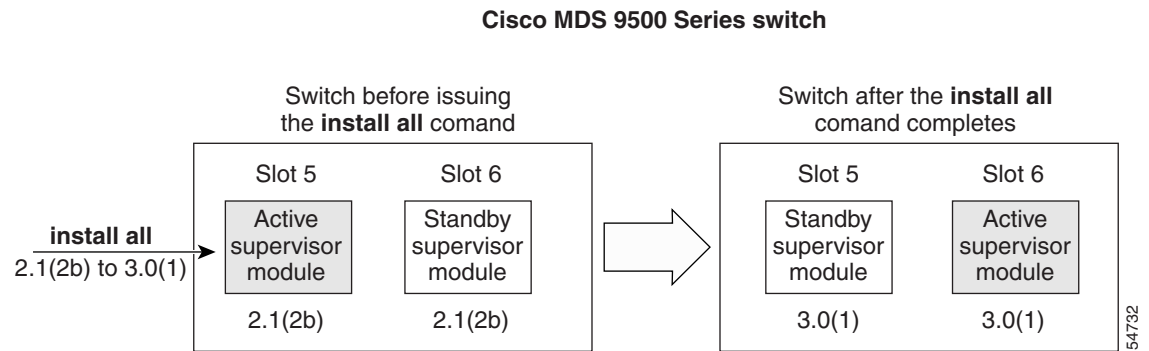
```
switch# show incompatibility system bootflash:new-system-image
The following configurations on active are incompatible with the system image
The following configurations on active are incompatible with the system image
1) Service : cfs , Capability : CAP_FEATURE_CFS_ENABLED_DEVICE_ALIAS
Description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

Automated Upgrades

The **install all** command upgrades all modules in any Cisco MDS 9000 Family switch. [Figure 7-1](#) provides an overview of the switch status before and after issuing the **install all** command.

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Figure 7-1 The Effect of the install all Command



The **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 **reload module slot force-dnld** command to force it to function.

Benefits of Using the install all Command

The **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 **install all** command automatically checks the image integrity. This includes the running kickstart and system images.
- The **install all** 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 command, if any step in the sequence fails, the **install all** 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.

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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 **show install all impact** command in the compatibility check section of the output (under the Bootable column).



Caution

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

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 (see the [“Managing Configuration Files” section on page 8-1](#)).
- 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-sf1ek9-kickstart-mz.2.1.1.bin
```


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```
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 SAN-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 SAN-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
```

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```

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
-----  -----
1       slc             1.3(2a)         1.3(1)       yes
1       bios            v1.1.0(10/24/03)  v1.1.0(10/24/03)  no
2       ips             1.3(2a)         1.3(1)       yes
2       bios            v1.1.0(10/24/03)  v1.1.0(10/24/03)  no
3       ips             1.3(2a)         1.3(1)       yes
3       bios            v1.1.0(10/24/03)  v1.1.0(10/24/03)  no
4       slc             1.3(2a)         1.3(1)       yes
4       bios            v1.1.0(10/24/03)  v1.1.0(10/24/03)  no
5       system          1.3(2a)         1.3(1)       yes
5       kickstart       1.3(2a)         1.3(1)       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
6       system          1.3(2a)         1.3(1)       yes
6       kickstart       1.3(2a)         1.3(1)       yes
6       bios            v1.1.0(10/24/03)  v1.1.0(10/24/03)  no
6       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.

Syncing image bootflash:/kickstart-img to standby.
[#####] 100% -- SUCCESS

Syncing image bootflash:/system-img to standby.
[#####] 100% -- SUCCESS
Jan 18 23:40:03 Hacienda %VSHD-5-VSHD_SYSLOG_CONFIG_I: Configuring console from

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

```

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```

Module 6: Waiting for module online.
|
Auto booting bootflash:/kickstart-img bootflash:/system-img...
Booting kickstart image: bootflash:/kickstart-img...
.....Image verification OK

Starting kernel...
INIT: version 2.78 booting
Checking all filesystems..r.r.. done.
Loading system software
Uncompressing system image: bootflash:/system-img
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCC
INIT: Entering runlevel: 3

```

Step 7 Exit the switch console and open a new terminal session to view the upgraded supervisor module using the **show module** command.

If the configuration meets all guidelines when the **install all** command is issued, all modules (supervisor and switching) are upgraded. This is true for any switch in the Cisco MDS 9000 Family.



Caution If a nondisruptive upgrade operation fails for any reason other than those listed in the “Recognizing Failure Cases” section on page 7-8, 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. See Chapter 44, “Configuring IP Storage” for more information on MPS-14/2 modules.



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. See the Chapter 44, “Configuring IP Storage” for more information on IPS modules.
- 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 7-5 describes how updating the SSI boot image affects SSM traffic.

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Table 7-5 SSI Boot Image Updating Affects 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 7-5](#), 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. See [Chapter 11, “Managing Modules,”](#) for more information on updating the boot images on the SSM.

Sample install all Commands

[Example 7-4](#) 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 7-5](#) displays the file output continuation of the **install all** command on the console of the standby supervisor module. [Example 7-6](#) 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 7-20).

Example 7-4 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
```

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```
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
1	slc	1.3(2a)	1.3(1)	yes
1	bios	v1.1.0(10/24/03)	v1.1.0(10/24/03)	no
2	ips	1.3(2a)	1.3(1)	yes
2	bios	v1.1.0(10/24/03)	v1.1.0(10/24/03)	no
3	ips	1.3(2a)	1.3(1)	yes
3	bios	v1.1.0(10/24/03)	v1.1.0(10/24/03)	no
4	slc	1.3(2a)	1.3(1)	yes
4	bios	v1.1.0(10/24/03)	v1.1.0(10/24/03)	no
5	system	1.3(2a)	1.3(1)	yes
5	kickstart	1.3(2a)	1.3(1)	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
6	system	1.3(2a)	1.3(1)	yes
6	kickstart	1.3(2a)	1.3(1)	yes
6	bios	v1.1.0(10/24/03)	v1.1.0(10/24/03)	no
6	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.

```
Syncing image bootflash:/kickstart-img to standby.
[#####] 100% -- SUCCESS
```

```
Syncing image bootflash:/system-img to standby.
[#####] 100% -- SUCCESS
```

```
Jan 18 23:40:03 Hacienda %VSHD-5-VSHD_SYSLOG_CONFIG_I: Configuring console from
```

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

Module 6: Waiting for module online.

```
|
Auto booting bootflash:/kickstart-img bootflash:/system-img...
Booting kickstart image: bootflash:/kickstart-img...
.....Image verification OK
```

Starting kernel...

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```
INIT: version 2.78 booting
Checking all filesystems..r.r.. done.
Loading system software
Uncompressing system image: bootflash:/system-img
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCC
INIT: Entering runlevel: 3
```

Example 7-5 displays the file output continuation of the **install all** command on the console of the standby supervisor module.

Example 7-5 Successful install all Command Output Continued from the Standby Console

```
Hacienda(standby)#

Auto booting bootflash:/kickstart-img bootflash:/system-img...
Booting kickstart image: bootflash:/kickstart-img...
.....Image verification OK

Starting kernel...
INIT: version 2.78 booting
Checking all filesystems..r.r.. done.
Loading system software
Uncompressing system image: bootflash:/system-img
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCC
INIT: Entering runlevel: 3

Continue on installation process, please wait.
The login will be disabled until the installation is completed.

Module 6: Waiting for module online.
Jan 18 23:43:02 Hacienda %PORT-5-IF_UP: Interface mgmt0 is up
Jan 18 23:43:19 Hacienda %LICMGR-3-LOG_LIC_NO_LIC: No license(s) present for feature
FM_SERVER_PKG. Application(s) shutdown in 53 days.
Jan 18 23:43:19 Hacienda %LICMGR-3-LOG_LIC_NO_LIC: No license(s) present for feature
ENTERPRISE_PKG. Application(s) shutdown in 50 days.
Jan 18 23:43:19 Hacienda %LICMGR-3-LOG_LIC_NO_LIC: No license(s) present for feature
SAN_EXTN_OVER_IP. Application(s) shutdown in 50 days.
Jan 18 23:43:19 Hacienda %LICMGR-3-LOG_LICAPP_NO_LIC: Application port-security running
without ENTERPRISE_PKG license, shutdown in 50 days
Jan 18 23:43:19 Hacienda %LICMGR-4-LOG_LICAPP_EXPIRY_WARNING: Application Roles evaluation
license ENTERPRISE_PKG expiry in 50 days
Jan 18 23:44:54 Hacienda %BOOTVAR-5-NEIGHBOR_UPDATE_AUTOCOPY: auto-copy supported by
neighbor, starting...
Module 1: Non-disruptive upgrading.
[# ] 0%Jan 18 23:44:56 Hacienda %MODULE-5-STANDBY_SUP_OK: Supervisor 5
is standby
Jan 18 23:44:55 Hacienda %IMAGE_DNLD-SLOT1-2-IMG_DNLD_STARTED: Module image download
process. Please wait until completion...
Jan 18 23:45:12 Hacienda %IMAGE_DNLD-SLOT1-2-IMG_DNLD_COMPLETE: Module image download
process. Download successful.
Jan 18 23:45:48 Hacienda %MODULE-5-MOD_OK: Module 1 is online
[#####] 100% -- SUCCESS
Module 4: Non-disruptive upgrading.
[# ] 0%Jan 18 23:46:12 Hacienda %IMAGE_DNLD-SLOT4-2-IMG_DNLD_STARTED:
Module image download process. Please wait until completion...
Jan 18 23:46:26 Hacienda %IMAGE_DNLD-SLOT4-2-IMG_DNLD_COMPLETE: Module image download
process. Download successful.
Jan 18 23:47:02 Hacienda %MODULE-5-MOD_OK: Module 4 is online
[#####] 100% -- SUCCESS
```

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```

Module 2: Disruptive upgrading.
...
-- SUCCESS
Module 3: Disruptive upgrading.
...
-- SUCCESS
Install has been successful.
MDS Switch
Hacienda login:

```

[Example 7-6](#) displays the result of the **install all** command issued from a console terminal for a system that contains an SSI image. The **install all** command syncs the SSI image to the standby supervisor module.



Note

You can use the **install all** command for the SSM only if the SSM is already up and running. For first time SSM installations, see the [“Upgrading the SSI Boot Image on an SSM”](#) section on page 11-19.

Example 7-6 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:

```

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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 7-7 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:
```


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```
Please provide a complete URI
switch# install all system scp:
Please provide a complete URI
```

Example 7-7 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
--------	-------	-----------------	-------------	--------------

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```

-----
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 7-8 displays the **install all** command output of a failed operation due to a lack of disk space.

Example 7-8 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	

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```

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 7-9 displays the **install all** command output of a failed operation due to an invalid image.

Example 7-9 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).

```

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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 7-10](#).

Example 7-10 *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
```

Non-Disruptive Upgrades on Fabric and Modular Switches

This section describes how to perform non-disruptive 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

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- Cisco Fabric Switch for IBM BladeCenter

This section includes the following topics:

- [Preparing for a Non-Disruptive Upgrade on Fabric and Modular Switches, page 7-21](#)
- [Performing a Non-Disruptive Upgrade on a Fabric Switch, page 7-23](#)
- [Viewing the Status of a Non-Disruptive Upgrade on a Fabric Switch, page 7-25](#)
- [Troubleshooting a Non-Disruptive Upgrade on a Fabric Switch, page 7-25](#)

Preparing for a Non-Disruptive Upgrade on Fabric and Modular Switches

You can upgrade software on the following without any disruptions using the **install all** command 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.

Non-disruptive 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.

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- 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.
- 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 7-11 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
```

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```

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 Non-Disruptive Upgrade on a Fabric Switch

To perform a non-disruptive 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

```

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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(1)	3.1(1u)	yes
1	kickstart	3.1(1)	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.

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Caution

It is recommended that you enable port-fast on the ethernet interface of the catalyst to which the management interface of the fabric switch is connected. This is to avoid spanning-tree convergence time on the catalyst and packets from the fabric switch are forwarded immediately during the non-disruptive 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 Non-Disruptive Upgrade on a Fabric Switch

You can view the status of a non-disruptive 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 Non-Disruptive Upgrade on a Fabric Switch

When a non-disruptive 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.
```

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```
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 7-26](#)
- [Upgrading a Loader, page 7-27](#)
- [Upgrading the BIOS, page 7-29](#)

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 (see the [“Saving the Running Configuration”](#) section on page 8-4).
 - 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
```

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Note The Cisco MDS 9216 Switch does not have an external CompactFlash (see the “[Managing Configuration Files](#)” section on page 8-1). 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.

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**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
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TAC support: http://www.cisco.com/tac
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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-sf1ek9-kickstart-mzg.2.0.0.6.bin
  kickstart compile time: 10/25/2010 12:00:00
  system image file is:   bootflash:///m9500-sf1ek9-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 Storage Area Networking Operating System (SAN-OS) Software
TAC support: http://www.cisco.com/tac
```

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```
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
```

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```

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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]

```

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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 (see the “[Copying Configuration Files](#)” section on page 8-5).

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

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#
```

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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 7-6).

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 7-32](#)
- [Standby Supervisor Module Boot Variable Version, page 7-40](#)
- [Standby Supervisor Module Bootflash Memory, page 7-40](#)
- [Standby Supervisor Module Boot Alert, page 7-40](#)

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

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.

The procedure described in this section ensures that your configuration is correctly synchronized after completing the migration.



Caution

Migrating your supervisor modules is a disruptive operation.



Note

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

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To migrate from Supervisor-1 modules to Supervisor-2 modules on a Cisco MDS 9509 or 9506 switch, follow these steps:

Step 1 Ensure that the configured domain ID is the same as the current domain ID for every VSAN on the switch by following these steps:

- a. Issue a **show vsan** command to display all the VSANs on the switch.

```
switch# show vsan
vsan 1 information
    name:VSAN0001 state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:down

vsan 2 information
    name:VSAN0002 state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id/oxid
    operational state:down

vsan 10 information
    name:VSAN0010 state:active
    interoperability mode:default
    loadbalancing:src-id/dst-id
    operational state:down

vsan 4094:isolated_vsan
```

- b. Display the current and configured domain IDs for a VSAN.

```
switch# show fcdomain vsan 1
The local switch is the Principal Switch.

Local switch run time information:
  State: Stable
  Local switch WWN: 20:01:00:05:30:00:35:df
  Running fabric name: 20:01:00:05:30:00:35:df
  Running priority: 128
  Current domain ID: 0x6a(106)

Local switch configuration information:
  State: Enabled
  FCID persistence: Enabled
  Auto-reconfiguration: Disabled
  Contiguous-allocation: Disabled
  Configured fabric name: 20:01:00:05:30:00:28:df
  Configured priority: 128
  Configured domain ID: 0x00(0) (preferred)

Principal switch run time information:
  Running priority: 128
```

- c. Change the configured domain ID if it differs from the current domain ID.

```
switch# config t
switch(config)# fcdomain domain 106 static vsan 1
switch(config)# exit
switch#
```

- d. Repeat [Step b](#) and [Step c](#) for each VSAN on the switch.

Step 2 Save the configuration.

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```
switch# copy running-config startup-config
```

- Step 3** Verify that the switch is running Cisco SAN-OS Release 3.0(1) or later. Upgrade the switch, if necessary (see the “Automated Upgrades” section on page 7-6).

```
switch# show version
Cisco Storage Area Networking Operating System (SAN-OS) Software
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http://www.gnu.org/licenses/gpl.html.
```

```
Software
  BIOS:      version 0.0.11
  kickstart: version 3.0(1) [build 3.0(0.294)] [gdb]
  system:    version 3.0(1) [build 3.0(0.294)] [gdb]
  ...
```

- Step 4** Issue a **show module** command to determine which Supervisor-1 module is the standby.

```
switch# show module
Mod  Ports  Module-Type                Model                Status
---  -
1    16     1/2 Gbps FC Module        DS-X9016             ok
2    32     Storage Services Module   DS-X9032-SSM        ok
3    8      IP Storage Services Module DS-X9308-SMIP        ok
4    12     1/2/4 Gbps FC Module     DS-X9112             ok
5    0      Supervisor/Fabric-1      DS-X9530-SF1-K9     ha-standby
6    0      Supervisor/Fabric-1      DS-X9530-SF1-K9     active *
```

- Step 5** Take the standby Supervisor-1 module out of service.

```
switch# out-of-service module 5
```

- Step 6** Verify that the standby Supervisor-1 module is powered down.

```
switch# show module
Mod  Ports  Module-Type                Model                Status
---  -
1    16     1/2 Gbps FC Module        DS-X9016             ok
2    32     Storage Services Module   DS-X9032-SSM        ok
3    8      IP Storage Services Module DS-X9308-SMIP        ok
4    12     1/2/4 Gbps FC Module     DS-X9112             ok
5    0      Supervisor/Fabric-1      DS-X9530-SF1-K9     powered-dn
6    0      Supervisor/Fabric-1      DS-X9530-SF1-K9     active *
```

- Step 7** Remove the standby Supervisor-1 module from the chassis. Ensure that the management interface on the active Supervisor-1 module is shut down. (Ensures that the Supervisor-2 boots TFTP from the TFTP server under the loader prompt when the Supervisor-2 module uses the same IP address.)

```
switch# config t
switch(config)# interface
switch(config)# exit
switch# config t
switch(config)# interface mgmt 0
switch(config-if)# shut
switch(config-if)# end
switch#
```

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- Step 8** Install the Supervisor-2 module in the chassis. .
- Step 9** Establish a console session on the standby Supervisor-2 module console port (see the “[Accessing the Switch](#)” section on page 2-12).
- Step 10** If the `loader>` prompt appears on the standby Supervisor-2 module console session, perform the following steps. If the prompt does not appear, continue to [Step 11](#).

- a. Verify that the Cisco SAN-OS system image and kickstart image are on the standby Supervisor-2 module bootflash:.

```
loader> dir
bootflash:

14458880 kickstart-img
12288    lost+found/
48522513 system-img
```

- b. If the images are present on bootflash:, boot the standby Supervisor-2 module using the `boot` command and continue to [Step 11](#). Otherwise, continue to [Step c](#).

```
loader> boot bootflash:kickstart-img bootflash:system-img
```

- c. Enter the local IPv4 address, IPv4 subnet mask, and IPv4 address for the default gateway for the switch using the `network` command.

```
loader> network --ip=10.16.1.2 --nm=255.255.255.0 --gw=10.16.1.1
```

- d. Boot the kickstart image file from the bootflash: (if present) or from a server.

```
loader> boot tftp://10.16.10.100/kickstart-img
INFO: Using IPv4 domain for downloading.
INFO: Initializing network interface...
INFO: Board will come up MGMT interface
INFO: MAC address is: 00:05:30:01:a8:0a
INFO: Ethernet port 1 link up and running at 100 Mbps full duplex.
TFTP from server 10.16.10.100; our IP address is 10.16.1.2; sending
through gateway 10.16.1.1
Filename 'kickstart-img'.
Load address: 0x400000
```

```
Loading: T #####T #####
#####T #####
#####T #####
#####T #####
#####T #####
#####T #####
#####T #####
#####T #####
#####
```

```
done
Bytes transferred = 16061952 (f51600 hex)
```

```
### Network statistics: ###
-----
```

```
Packets received: 31679
Packets send: 31389
Received bytes: 33167191
Send bytes: 1444202
Rx mulicast frames: 1
```

```
Automatic boot of image at addr 0x00000000 ...
Starting kernel...
```

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```

INIT: version 2.78 booting
Checking all filesystems..... done.
WARNING: image sync is going to be disabled after a mgmt0 BIOS netboot
Loading system software
No system image is specified
INIT: Sending processes the TERM signal
Stopping kernel log daemon: klogd.
Sending all processes the TERM signal... done.
Sending all processes the KILL signal... done.
Entering single-user mode...
INIT: Going single user
INIT: Sending processes the TERM signal
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http://www.gnu.org/licenses/gpl.html.
switch(boot)#

```

The `switch(boot)#` prompt indicates that you have a usable kickstart image.

- e. Enable the management interface (mgmt0).

```

switch(boot)# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
switch(boot)(config)# interface mgmt 0
switch(boot)(config-if)# no shutdown
switch(boot)(config-if)# end
switch(boot)#

```

- f. Download a Cisco SAN-OS system image to the Supervisor-2 module from a TFTP server.

```

switch(boot)# 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 SAN-OS system image. The system image for Supervisor-2 modules is different from the system image for Supervisor-1 modules.

- g. Download a kickstart image to the Supervisor-2 module from a TFTP server, if necessary.

```

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

```

- h. Load the system image on the standby Supervisor-2 module.

```

switch(boot)# load bootflash:system-img

```

- i. Load the system image on the standby Supervisor-2 module.

```

switch(boot)# load bootflash:system-img

```

- Step 11** Verify that the standby Supervisor-2 module is in the warm standby state by using a **show system redundancy status** command on the active Supervisor-1 module session.

```

switch# show system redundancy status
Redundancy mode
-----
administrative:  HA
operational:    Warm

```

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```
This supervisor (sup-2)
-----
Redundancy state:   Active
Supervisor state:   Active
Internal state:     Active with warm standby
```

```
Other supervisor (sup-1)
-----
Redundancy state:   Standby
Supervisor state:   Warm standby
Internal state:     Warm standby
```

Step 12 Enable the management interface.

```
switch# config t
switch(config)# interface mgmt 0
switch(config-if)# no shutdown
switch(config-if)# end
switch#
```

Step 13 Copy the running configuration to the startup configuration on the active Supervisor-1 module to ensure that any running configuration changes are saved to the startup configuration and that the ASCII configuration is synchronized and current on the warm standby Supervisor-2 module.

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

Step 14 If your switch has SSMs installed and intelligent services are configured, perform [Step a](#) through [Step c](#). Otherwise, continue to [Step 16](#).

a. Power down all SSMs on the switch.

```
switch# config t
switch(config)# poweroff module 2
switch(config)# exit
switch#
```



Caution Do not copy the running configuration to the startup configuration after powering down the SSMs. If you do, you will lose the configuration on the SSM interfaces.

b. Verify that the SSMs are powered down.

```
switch# show module
Mod  Ports  Module-Type                      Model                      Status
---  ---  -
1    16     1/2 Gbps FC Module              DS-X9016                   ok
2    32     Storage Services Module         powered-dn
3    8      IP Storage Services Module      DS-X9308-SMIP              ok
4    12     1/2/4 Gbps FC Module           DS-X9112                   ok
5    0      Supervisor/Fabric-2             DS-X9530-SF2-K9            ha-standby
6    0      Supervisor/Fabric-1             DS-X9530-SF1-K9            active *
...

```

c. Copy the contents of the SSM NVRAM to the standby Supervisor-2 module.

```
switch# copy ssm-nvram standby-sup
```

Step 15 Load the system image from bootflash on the Supervisor-2 module.

```
switch(boot)# load bootflash:system-image
Uncompressing system image: bootflash:/iisan-3-3-0-74
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCC
```

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```

INIT: Switching to runlevel: 3
INIT: Sending processes the TERM signal
INIT: (boot)#

MDS Switch
login: 2008 Jan 23 18:46:20 %PLATFORM-2-PS_FAIL: Power supply 1 failed or shutdown
(Serial number ART062800D5)
2008 Jan 23 18:46:20 %PLATFORM-2-PS_OK: Power supply 2 ok (Serial number ART062000D2)
2008 Jan 23 18:46:20 %PLATFORM-2-PS_FANOK: Fan in Power supply 2 ok
2008 Jan 23 18:46:20 %PLATFORM-2-FAN_OK: Fan module ok
2008 Jan 23 18:46:20 %PLATFORM-2-CHASSIS_CLKMODOK: Chassis clock module A ok
2008 Jan 23 18:46:20 %PLATFORM-2-CHASSIS_CLKMODOK: Chassis clock module B ok
2008 Jan 23 18:46:20 %PLATFORM-2-CHASSIS_CLKSRC: Current chassis clock source is
clock-A
2008 Jan 23 18:46:26 %PLATFORM-2-PFM_STDBY_POWERUP_FAIL: standby supervisor failed to
powerup

switch# 2008 Jan 23 18:47:21 %IMAGE_DNLD-SLOT1-2-IMG_DNLD_STARTED: Module image
download process. Please wait until completion...
2008 Jan 23 18:47:30 %IMAGE_DNLD-SLOT2-2-IMG_DNLD_STARTED: Module image download
process. Please wait until completion...
2008 Jan 23 18:47:34 %IMAGE_DNLD-SLOT1-2-IMG_DNLD_COMPLETE: Module image download
process. Download successful.
2008 Jan 23 18:47:43 %IMAGE_DNLD-SLOT3-2-IMG_DNLD_STARTED: Module image download
process. Please wait until completion...
2008 Jan 23 18:47:43 %IMAGE_DNLD-SLOT2-2-IMG_DNLD_COMPLETE: Module image download
process. Download successful.
2008 Jan 23 18:47:49 %IMAGE_DNLD-SLOT4-2-IMG_DNLD_STARTED: Module image download
process. Please wait until completion...
2008 Jan 23 18:47:57 %IMAGE_DNLD-SLOT3-2-IMG_DNLD_COMPLETE: Module image download
process. Download successful.

switch# 2008 Jan 23 18:48:10 %IMAGE_DNLD-SLOT4-2-IMG_DNLD_COMPLETE: Module image
download process. Download successful.
System is still initializing
Configuration mode is blocked until system is ready
switch# 2008 Jan 23 18:49:26 Vegas168 %DAEMON-2-SYSTEM_MSG:
<<%ASCII-CFG-2-ACFG_CONFIGURATION_APPLY_ERROR>> Error encountered while Ascii
configuration was being applied. Please use "show startup-config log" to view details
(this error is due to sup1 image missing)

switch# 2008 Jan 23 18:54:24 Vegas168 %SYSMGR-2-STANDBY_BOOT_FAILED: Standby
supervisor failed to boot up.

```

- Step 16** Initiate a switchover on the active Supervisor-1 module to power it down and cause the standby Supervisor-2 module to become the active supervisor module.

```
switch# system switchover
```

- Step 17** Verify that the Supervisor-1 module is powered down.

```

switch# show module
Mod  Ports  Module-Type                Model                Status
---  ---
1    16     1/2 Gbps FC Module        DS-X9016             ok
2    32     Storage Services Module   DS-X9032-SSM        ok
3    8      IP Storage Services Module DS-X9308-SMIP        ok
4    12     1/2/4 Gbps FC Module     DS-X9112             ok
5    0      Supervisor/Fabric-2       DS-X9530-SF2-K9     active *
6    0      Supervisor/Fabric-1       powered-dn
...

```

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Step 18 Remove the Supervisor-1 module from the chassis.

Step 19 Set the baud rate on the active Supervisor-2 module console session to the default value of 9600.

```
switch# config t
switch(config)# line console
switch(config-console)# speed 9600
switch(config-console)# end
switch# show line console
line Console:
  Speed:          9600 bauds
  Databits:       8 bits per byte
  Stopbits:       1 bit(s)
  Parity:         none
  Modem In:       Disable
  Modem Init-String -
                  default : ATQ0V1H0S0=1\015
```

Step 20 Install the other Supervisor-2 module in the chassis..

Step 21 Configure the boot for the Supervisor-2 module.

```
switch# config t
switch(config)# boot kickstart bootflash:kickstart-img
switch(config)# boot kickstart bootflash:system-img
switch(config)# end
switch#
```

Step 22 Save the configuration.

```
switch# copy running-config startup-config
[#####] 100%
switch#
```

Step 23 Verify that the standby Supervisor-2 module is in the HA standby state.

```
switch# show system redundancy status
Redundancy mode
-----
      administrative:  HA
      operational:    HA

This supervisor (sup-1)
-----
      Redundancy state: Active
      Supervisor state: Active
      Internal state:   Active with HA standby

Other supervisor (sup-2)
-----
      Redundancy state: Standby
      Supervisor state: HA standby
      Internal state:   HA standby
```

Step 24 If the Cisco MDS SAN-OS system image on the supervisor modules is the desired release, enter the **install all** command.

```
switch# install all
```

If you want a different release of the Cisco SAN-OS system image running on the switch, enter the **install all** command specifying the system image to perform a hitless upgrade (see the [“Automated Upgrades” section on page 7-6](#)).

```
switch# install all system tftp://10.16.10.100/system-img
```

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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.

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 SAN-OS images and kickstart images.

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 (see the [“About Combining Generation 1 and Generation 2 Switching Modules”](#) section on page 14-16).

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- 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 SAN-OS software image is not automatically copied to the standby flash device.



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, see the [“Using Switch File Systems” section on page 2-26](#).
 - 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.
-

Default Settings

Table 7-6 lists the default image settings for all Cisco MDS 9000 Family switches.

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Table 7-6 **Default Image Settings**

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