

Managing Modules

This chapter describes how to manage switching and services modules (also known as line cards) and provides information on monitoring module states.

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About Modules

This table describes the supervisor module options for switches in the Cisco MDS 9000 Family.

Table 1: Supervisor Module Options

Product	Number of Supervisor Modules	Supervisor Module Slot Number	Switching and Services Module Features
Cisco MDS 9513	Two modules	7 and 8	13-slot chassis allows any switching or services module in the other eleven slots.

Product	Number of Supervisor Modules	Supervisor Module Slot Number	Switching and Services Module Features
Cisco MDS 9509	Two modules	5 and 6	9-slot chassis allows any switching or services module in the other seven slots.
Cisco MDS 9506	Two modules	5 and 6	6-slot chassis allows any switching or services module in the other four slots.
Cisco MDS 9216	One module	1	2-slot chassis allows one optional switching or services module in the other slot.
Cisco MDS 9216A	One module	1	2-slot chassis allows one optional switching or services module in the other slot.
Cisco MDS 9216i	One module	1	2-slot chassis allows one optional switching or services module in the other slot.

Supervisor Modules

Supervisor modules are automatically powered up and started with the switch. The Cisco MDS Family switches have the following supervisor module configurations:

- Cisco MDS 9513 Directors—Two supervisor modules, one in slot 7 (sup-1) and one in slot 8 (sup-2). When the switch powers up and both supervisor modules come up together, the active module is the one that comes up first. The standby module constantly monitors the active module. If the active module fails, the standby module takes over without any impact to user traffic.
- Cisco MDS 9506 and Cisco MDS 9509 Directors—Two supervisor modules, one in slot 5 (sup-1) and one in slot 6 (sup-2). When the switch powers up and both supervisor modules come up together, the active module is the one that comes up first. The standby module constantly monitors the active module. If the active module fails, the standby module takes over without any impact to user traffic.
- Cisco MDS 9216i switches—One supervisor module that includes an integrated switching module with 14 Fibre Channel ports and two Gigabit Ethernet ports.

- Cisco MDS 9200 Series switches—One supervisor module that includes an integrated 16-port switching module.

Module Terms	Fixed or Relative	Usage
module-7 and module-8	Fixed usage for the Cisco MDS 9513 Director	module-7 always refers to the supervisor module in slot 7 and module-8 always refers to the supervisor module in slot 8.
module-5 and module-6	Fixed usage for the Cisco MDS 9509 and Cisco MDS 9506 Directors	module-5 always refers to the supervisor module in slot 5 and module-6 always refers to the supervisor module in slot 6.
module-1	Fixed usage for the Cisco MDS 9200 Series switches	module-1 always refers to the supervisor module in slot 1.
sup-1 and sup-2	Fixed usage	On the Cisco MDS 9506 and MDS 9509 switches, sup-1 always refers to the supervisor module in slot 5 and sup-2 always refers to the supervisor module in slot 6. On the Cisco MDS 9513 Directors, sup-1 always refers to the supervisor module in slot 7 and sup-2 always refers to the supervisor module in slot 8.
sup-active and sup-standby	Relative usage	sup-active refers to the active supervisor module-relative to the slot that contains the active supervisor module. sup-standby refers to the standby supervisor module-relative to the slot that contains the standby supervisor module.
sup-local and sup-remote	Relative usage	If you are logged into the active supervisor, sup-local refers to the active supervisor module and sup-remote refers to the standby supervisor module. If you are logged into the standby supervisor, sup-local refers to the standby supervisor module (the one you are logged into.) There is no sup-remote available from the standby supervisor module (you cannot access a file system on the active sup).

Switching Modules

Cisco MDS 9000 Family switches support any switching module in any non-supervisor slot. These modules obtain their image from the supervisor module.

Services Modules

Cisco MDS 9000 Family switches support any services module in any non-supervisor slot.

Refer to the *Cisco MDS 9000 Series SAN Volume Controller Configuration Guide* for more information on Cisco MDS 9000 Caching Services Modules (CSMs).

Maintaining Supervisor Modules

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

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 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.

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 NX-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 have not set the boot variables appropriately.

Verifying the Status of a Module

Before you begin configuring the switch, you need to ensure that the modules in the chassis are functioning as designed. To verify the status of a module at any time, issue the **show module** command. The interfaces in each module are ready to be configured when the ok status is displayed in the **show module** command output. A sample screenshot output of the **show module** command follows:

```
switch# show module
Mod  Ports  Module-Type                      Model              Status
---  -----  -------------------------------- ------------------ ------------
2    8      IP Storage Services Module       DS-X9308-SMIP      ok
4    0      Caching Services Module                             ok
5    0      Supervisor/Fabric-1              DS-X9530-SF1-K9    active *
6    0      Supervisor/Fabric-1              DS-X9530-SF1-K9    ha-standby
8    0      Caching Services Module          DS-X9560-SMAP      ok
9    32     1/2 Gbps FC Module               DS-X9032           ok

Mod  Sw           Hw      World-Wide-Name(s) (WWN)
---  -----------  ------  --------------------------------------------------
2    1.3(0.106a)  0.206   20:41:00:05:30:00:00:00 to 20:48:00:05:30:00:00:00
5    1.3(0.106a)  0.602   --
6    1.3(0.106a)) 0.602   -- <---------------- New running version in module 6
8    1.3(0.106a)  0.702   --
9    1.3(0.106a)  0.3     22:01:00:05:30:00:00:00 to 22:20:00:05:30:00:00:00

Mod  MAC-Address(es)                         Serial-Num
---  --------------------------------------  ----------
2    00-05-30-00-9d-d2 to 00-05-30-00-9d-de  JAB064605a2
5    00-05-30-00-64-be to 00-05-30-00-64-c2
6    00-d0-97-38-b3-f9 to 00-d0-97-38-b3-fd  JAB06350B1R
8    00-05-30-01-37-7a to 00-05-30-01-37-fe  JAB072705ja
9    00-05-30-00-2d-e2 to 00-05-30-00-2d-e6  JAB06280ae9

* this terminal session
```

The Status column in the output should display an ok status for switching modules and an active or standby (or HA-standby) status for supervisor modules. If the status is either ok or active, you can continue with your configuration.

Note A standby supervisor module reflects the HA-standby status if the HA switchover mechanism is enabled. If the warm switchover mechanism is enabled, the standby supervisor module reflects the standby status.

Checking the State of a Module

Modules in a chassis can be in various states which can be displayed using the **show module** command. The state updates as the module steps through the boot sequence. When it reaches 'ok' state it is ready for operation. If any faults are detected during bootup or operation then the state will be updated to show the type of error.

This table describes the module states listed in the **show module** command output.

Table 2: Module States

Module Status Output	Description
`powered up`	The module is receiving electrical power. Once the module is powered up, the software begins booting.
`testing`	The module has established connection with the supervisor module and is performing bootup diagnostics.
`initializing`	The diagnostics have completed successfully and the configuration is being downloaded.
`failure`	The module has failed to initialize successfully after three attempts. This may be due to a software or hardware issue.
`ok`	The module is online and ready for use.
`power-dn`	The module is powered off in the configuration.
`power-denied`	There is insufficient power for the module to power up.
`active`	This module is the active supervisor module and the switch is ready to be configured.
`ha-standby`	The standby supervisor is synchronised with the active supervisor and ready to take over in the event of failure of the active supervisor.
`standby`	The warm switchover mechanism is enabled on the standby supervisor module.

Connecting to a Module

At any time, you can connect to any module using the **attach module** command. Once you are at the module prompt, you can obtain further details about the module using module-specific commands.

You can also use the **attach module** command as follows:

- To display the standby supervisor module information. You cannot configure the standby supervisor module using this command.
- To display the switching module portion of the Cisco MDS 9200 Series supervisor module which resides in slot 1.

SUMMARY STEPS

1. **attach module** *slot*
2. **exit**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**attach module** *slot*
	Example:
	`switch# attach module 4`
	`Attaching to module 4 ...`
	`To exit type 'exit', to abort type '$.'`
	`module-4#`
		Provides direct access to the module in the specified slot.

Step 2	**exit**
	Example:
	`module-4# exit`
	`rlogin: connection closed.`
	`switch#`
		Exits module access configuration mode.

Reloading Modules

You can reload the entire switch, reset specific modules in the switch, or reload the image on specific modules in the switch.

Reloading a Switch

To reload the switch, issue the **reload** command without any options. When you issue this command, you reboot the switch (see the *Cisco MDS 9000 NX-OS Release 4.1(x) and SAN-OS 3(x) Software Upgrade and Downgrade Guide*.

Power Cycling Modules

You can power cycle any module in a chassis. Power cycling reinitializes the module.

SUMMARY STEPS

1. Identify the module that needs to be reset.
2. Issue the **reload module** command to reset the identified module. This command power cycles the selected module.

DETAILED STEPS

Procedure

Step 1 Identify the module that needs to be reset.

Step 2 Issue the **reload module** command to reset the identified module. This command power cycles the selected module.

reload module *number*

number indicates the slot in which the identified module resides.

```
switch# reload module 2
```

Caution
Reloading a module disrupts traffic through the module.

Reloading Switching Modules

Switching modules automatically download their images from the supervisor module and do not need a forced download. This procedure is provided for reference if a new image is required.

SUMMARY STEPS

1. Identify the switching module that requires the new image.
2. Issue the **reload module** command to update the image on the switching module.

DETAILED STEPS

Procedure

Step 1 Identify the switching module that requires the new image.

Step 2 Issue the **reload module** command to update the image on the switching module.

reload module *number* **force-dnld**

number indicates the slot in which the identified module resides. In this example, the identified module resides in slot 9:

```
switch# reload module 9 force-dnld
Jan  1 00:00:46 switch %LC-2-MSG:SLOT9 LOG_LC-2-IMG_DNLD_COMPLETE: COMPLETED
downloading of linecard image. Download successful...
```

Saving the Module Configuration

Issue the **copy running-config startup-config** command to save the new configuration into nonvolatile storage. Once this command is issued, the running and the startup copies of the configuration are identical.

This table displays various scenarios when module configurations are preserved or lost.

Table 3: Switching Module Configuration Status

Scenario	Consequence
You remove a switching module and issue the **copy running-config startup-config** command.	The configured module information is lost.
You remove a switching module and reinsert the same switching module before issuing the **copy running-config startup-config** command.	The configured module information is saved.
You remove a switching module, insert the same type switching module in the same slot, and issue a **reload module** *number* command.	The configured module information is saved.
You enter a **reload module** *number* command to reload a switching module.	The configured module information is preserved.

Scenario	Consequence
You remove a switching module and insert a different type of switching module in the slot. For example, you replace a 16-port switching module with a 32-port switching module. Sample scenario: **1.** The switch currently has a 16-port switching module and the startup and running configuration files are the same. **2.** You replace the 16-port switching module in the switch with a 32-port switching module. **3.** Next, you remove the 32-port switching module and replace it with the same 16-port switching module referred to in Step 1. **4.** You enter the **reload** command to reload the switch.	The configured module information is lost from the running configuration. The default configuration is applied. The configured module information remains in startup configuration until a **copy running-config startup-config** command is issued again. Sample response: **1.** The switch uses the 16-port switching module and the present configuration is saved in nonvolatile storage. **2.** The factory default configuration is applied. **3.** The factory default configuration is applied. **4.** The configuration saved in nonvolatile storage referred to in Step 1 is applied.

Purging Module Configurations

Enter the **purge module** *slot* **running-config** command to delete the configuration in a specific module. Once you enter this command, the Cisco NX-OS software clears the running configuration for the specified slot. This command does not work on supervisor modules or on any slot that currently has a module. This command only works on an empty slot (where the specified module once resided).

The **purge module** command clears the configuration for any module that previously existed in a slot and has since been removed. While the module was in that slot, some parts of the configuration may have been stored in the running configuration and cannot be reused (for example, IP addresses), unless you clear it from the running configuration.

For example, suppose you create an IP storage configuration with an IPS module in slot 3 in Switch A. This module uses IP address 10.1.5.500. You decide to remove this IPS module and move it to Switch B, and you no longer need the IP address10.1.5.500. If you try to configure this unused IP address, you will receive an error message that prevents you from proceeding with the configuration. In this case, you must enter the **purge module 3 running-config** command to clear the old configuration on Switch A before proceeding with using this IP address.

Powering Off Switching Modules

You can power off a switching module from the command-line interface (CLI). By default, all switching modules are in the power up state when the chassis loads or you insert the module into the chassis.

SUMMARY STEPS

1. **configure terminal**

2. [**no**] **poweroff module** *slot*

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	[**no**] **poweroff module** *slot* **Example:** `switch(config)# poweroff module 2`	Powers off the specified module. Use the **no** form of the command to power on a module.

Powering off Power Supply Units

You can power off a power supply unit from the command line interface (CLI). Powering down PSUs that are not connected to external power or not switched on prevents them from triggering system power warnings.

SUMMARY STEPS

1. **configure terminal**
2. **poweroff power-supply**<*psu*>
3. [**no**] **poweroff module** *slot*

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**poweroff power-supply**<*psu*> **Example:** `switch(config)# poweroff power-supply 3`	Power off an individual power supply unit.
Step 3	[**no**] **poweroff module** *slot* **Example:** `switch(config)# no poweroff module 3`	Power on an individual power supply unit.

Identifying Module LEDs

This table describes the LEDs for the Cisco MDS 9200 Series integrated supervisor modules.

Table 4: LEDs for the Cisco MDS 9200 Series Supervisor Modules

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Orange	The module is booting or running diagnostics (normal initialization sequence). or The inlet air temperature of the system has exceeded the maximum system operating temperature limit (a minor environmental warning). To ensure maximum product life, you should immediately correct the environmental temperature and restore the system to normal operation.
	Red	The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. or The inlet air temperature of the system has exceeded the safe operating temperature limits of the card (a major environmental warning). The card has been shut down to prevent permanent damage. The system will be shut down after two minutes if this condition is not cleared.
Speed	On	2-Gbps mode and beacon mode disabled.
	Off	1-Gbps mode and beacon mode disabled.
	Flashing	Beacon mode enabled.

LED	Status	Description
Link	Solid green	Link is up.
	Solid yellow	Link is disabled by software.
	Flashing yellow	A fault condition exists.
	Off	No link.

This table describes the LEDs for the Cisco MDS 9200 Series interface module.

Table 5: LEDs on the Cisco MDS 9200 Series Interface Module

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Orange	The module is booting or running diagnostics (normal initialization sequence). or The inlet air temperature of the system has exceeded the maximum system operating temperature limit (a minor environmental warning). To ensure maximum product life, you should immediately correct the environmental temperature and restore the system to normal operation.
	Red	The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. or The inlet air temperature of the system has exceeded the safe operating temperature limits of the card (a major environmental warning). The card has been shut down to prevent permanent damage.

LED	Status	Description
System	Green	All chassis environmental monitors are reporting OK.
	Orange	The power supply failed or the power supply fan failed. or Incompatible power supplies are installed. or The redundant clock failed.
	Red	The temperature of the supervisor module exceeded the major threshold.
MGMT 10/100 Ethernet Link LED	Green	Link is up.
	Off	No link.
MGMT 10/100 Ethernet Activity LED	Green	Traffic is flowing through port.
	Off	No link or no traffic.

This table describes the LEDs for the 16-port and 32-port switching modules, and the 4-port, 12-port, 24-port, and 48-port Generation 2 switching modules.

Table 6: LEDs for the Cisco MDS 9000 Family Fibre Channel Switching Modules

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Red	The module is booting or running diagnostics (normal initialization sequence). or The inlet air temperature of the system has exceeded the maximum system operating temperature limit (a minor environmental warning). To ensure maximum product life, you should immediately correct the environmental temperature and restore the system to normal operation.
	Orange	The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. or The inlet air temperature of the system has exceeded the safe operating temperature limits of the card (a major environmental warning). The card has been shut down to prevent permanent damage.
Speed	On	2-Gbps mode.
	Off	1-Gbps mode.

LED	Status	Description
Link	Solid green	Link is up.
	Steady flashing green	Link is up (beacon used to identify port).
	Intermittent flashing green	Link is up (traffic on port).
	Solid yellow	Link is disabled by software.
	Flashing yellow	A fault condition exists.
	Off	No link.

The LEDs on the supervisor module indicate the status of the supervisor module, power supplies, and the fan module.

This table provides more information about these LEDs.

Table 7: LEDs for the Cisco MDS 9500 Series Supervisor Modules

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Orange	The module is booting or running diagnostics (normal initialization sequence). or An over temperature condition has occurred (a minor threshold has been exceeded during environmental monitoring).
	Red	The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. or An over temperature condition occurred (a major threshold was exceeded during environmental monitoring).

LED	Status	Description
System **Note** The System and Pwr Mgmt LEDs on a redundant supervisor module are synchronized to the active supervisor module.	Green	All chassis environmental monitors are reporting OK.
	Orange	The power supply has failed or the power supply fan has failed. or Incompatible power supplies are installed. or The redundant clock has failed.
	Red	The temperature of the supervisor module major threshold has been exceeded.
Active	Green	The supervisor module is operational and active.
	Orange	The supervisor module is in standby mode.
Pwr Mgmt[1]	Green	Sufficient power is available for all modules.
	Orange	Sufficient power is not available for all modules.
MGMT 10/100 Ethernet Link LED	Green	Link is up.
	Off	No link.
MGMT 10/100 Ethernet Activity LED	Green	Traffic is flowing through port.
	Off	No link or no traffic.
Compact Flash	Green	The external CompactFlash card is being accessed.
	Off	No activity.

EPLD Images

Switches and directors in the Cisco MDS 9000 Family contain several electrical programmable logical devices (EPLDs) that provide hardware functionalities in all modules. EPLD image upgrades are periodically provided to include enhanced hardware functionality or to resolve known issues.

Tip Refer to the Cisco MDS NX-OS Release Notes to verify if the EPLD has changed for the Cisco NX-OS image version being used.

Upgrading EPLD Images

You can upgrade the EPLD images on the modules.

Note The same procedure used to upgrade the EPLD images on a module can be used to downgrade the EPLD images.

SUMMARY STEPS

1. Log into the switch through the console port, an SSH session, or a Telnet session.
2. Enter the **show version** command to verify the Cisco MDS NX-OS software release running on the MDS switch.
3. If necessary, upgrade the Cisco MDS NX-OS software running on your switch (see the *Cisco MDS 9000 NX-OS Release 4.1(x) and SAN-OS 3(x) Software Upgrade and Downgrade Guide*).
4. Issue the **dir bootflash:** or **dir slot0:** command to verify that the EPLD software image file corresponding to your Cisco MDS NX-OS release is present on the active supervisor module. For example, if your switch is running Cisco MDS SAN-OS Release 2.1(2), you must have m9000-epld-2.1.2.img in bootflash: or slot0: on the active supervisor module.
5. If you need to obtain the appropriate EPLD software image file, follow these steps:
6. Use the **install module** *number* **epld** *url* command on the active supervisor module to upgrade EPLD images for a module.

DETAILED STEPS

Procedure

Step 1 Log into the switch through the console port, an SSH session, or a Telnet session.

Step 2 Enter the **show version** command to verify the Cisco MDS NX-OS software release running on the MDS switch.

```
switch# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2006, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
other third parties and are used and distributed under license.
Some parts of this software may be covered under the GNU Public
License or the GNU Lesser General Public License. A copy of
each such license is available at
http://www.gnu.org/licenses/gpl.html and
http://www.gnu.org/licenses/lgpl.html

Software
```

```
  BIOS:      version 1.0.8
  loader:    version unavailable [last: 1.0(0.267c)]
  kickstart: version 2.1(2) [build 2.1(2.47)] [gdb]
  system:    version 2.1(2) [build 2.1(2.47)] [gdb]

...
```

Step 3 If necessary, upgrade the Cisco MDS NX-OS software running on your switch (see the *Cisco MDS 9000 NX-OS Release 4.1(x) and SAN-OS 3(x) Software Upgrade and Downgrade Guide*).

Step 4 Issue the **dir bootflash:** or **dir slot0:** command to verify that the EPLD software image file corresponding to your Cisco MDS NX-OS release is present on the active supervisor module. For example, if your switch is running Cisco MDS SAN-OS Release 2.1(2), you must have m9000-epld-2.1.2.img in bootflash: or slot0: on the active supervisor module.

```
switch# dir bootflash:
  12288 Jan 01 00:01:07 1980 lost+found/
2337571 May 31 13:43:02 2005 m9000-epld-2.1.2.img
...
```

You can find the EPLD images at the following URL:

http://www.cisco.com/pcgi-bin/tablebuild.pl/mds-epld

Step 5 If you need to obtain the appropriate EPLD software image file, follow these steps:

a. Download the EPLD software image file from Cisco.com to your FTP server.

b. Verify that you have enough free space available on the active and standby supervisor memory devices that you plan to use, either bootflash: or slot0:. The download site on Cisco.com shows the size of the EPLD image file in bytes.

The following example shows how to display the available memory for the bootflash: devices on the active and standby supervisors:

```
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
15944704 Apr 06 16:46:04 2005 m9500-sf1ek9-kickstart-mz.2.1.1a.bin
48063243 Mar 21 15:34:46 2005 m9500-sf1ek9-mz.2.1.1.bin
48036239 Apr 06 16:45:41 2005 m9500-sf1ek9-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-sf1ek9-kickstart-mz.2.1.1.bin
15944704 Apr 06 16:46:04 2005 m9500-sf1ek9-kickstart-mz.2.1.1a.bin
48063243 Mar 21 15:34:46 2005 m9500-sf1ek9-mz.2.1.1.bin
48036239 Apr 06 16:45:41 2005 m9500-sf1ek9-mz.2.1.1a.bin

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

switch(standby)# exit
switch#
```

The following example shows how to display the available memory for the slot0: devices on the active and standby supervisors:

```
switch# dir slot0:
   12288 Jan 01 00:01:06 1980 lost+found/
14765056 Mar 21 15:35:06 2005 m9500-sf1ek9-kickstart-mz.2.1.1.bin
15944704 Apr 06 16:46:04 2005 m9500-sf1ek9-kickstart-mz.2.1.1a.bin
48063243 Mar 21 15:34:46 2005 m9500-sf1ek9-mz.2.1.1.bin
48036239 Apr 06 16:45:41 2005 m9500-sf1ek9-mz.2.1.1a.bin

Usage for slot:
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 slot0:
   12288 Jan 01 00:01:06 1980 lost+found/
14765056 Mar 21 15:35:06 2005 m9500-sf1ek9-kickstart-mz.2.1.1.bin
15944704 Apr 06 16:46:04 2005 m9500-sf1ek9-kickstart-mz.2.1.1a.bin
48063243 Mar 21 15:34:46 2005 m9500-sf1ek9-mz.2.1.1.bin
48036239 Apr 06 16:45:41 2005 m9500-sf1ek9-mz.2.1.1a.bin

Usage for slot0:
141066240 bytes used
 43493376 bytes free
184559616 bytes total

switch(standby)# exit
switch#
```

c. If there is not enough space, delete unneeded files.

```
switch# delete bootflash:m9500-sf1ek9-kickstart-mz.2.1.1.bin
```

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)# delete bootflash:m9500-sf1ek9-kickstart-mz.2.1.1.bin
switch(standby)# exit
switch#
```

d. Copy the EPLD image file from the FTP server to the bootflash: or slot0: device in the active supervisor module. The following example shows how to copy to bootflash:

```
switch# copy ftp://10.1.7.2/m9000-epld-2.1.2.img bootflash:m9000-epld-2.1.2.img
```

Note
he system will automatically synchronize the ELPD image to the standby supervisor if automatic copying is enabled.

```
switch# configure terminal
switch(config)# boot auto-copy
```

Step 6 Use the **install module** *number* **epld** *url* command on the active supervisor module to upgrade EPLD images for a module.

```
switch# install module 2 epld bootflash:m9000-epld-2.1.2.img

EPLD                                Curr Ver    New Ver
----------------------------------------------------
XBUS IO                             0x07        0x07
UD Flow Control                     0x05        0x05
PCI ASIC I/F                        0x05        0x05
PCI Bridge                          0x05        0x07
WARNING: Upgrade process could take upto 15 minutes.

Module 2 will be powered down now!!
Do you want to continue (y/n) ? y
\ <-----------------------------------------------------------progress twirl
Module 2 EPLD upgrade is successful
```

If you forcefully upgrade a module that is not online, all EPLDs are forcefully upgraded. If the module is not present in the switch, an error is returned. If the module is present, the command process continues. To upgrade a module that is not online but is present in the chassis, use the same command. The switch software prompts you to continue after reporting the module state. When you confirm your intention to continue, the upgrade continues.

```
switch# install module 2 epld bootflash:m9000-epld-2.1.2.img
\ <-----------------------------------------------------------progress twirl
Module 2 EPLD upgrade is successful
```

Note
When you upgrade the EPLD module on Cisco MDS 9100 Series switches, you receive the following message:

```
Data traffic on the switch will stop now!!
```

```
Do you want to continue (y/n) ?
```

Displaying EPLD Image Versions

Use the **show version module** *number* **epld** command to view all current EPLD versions on a specified module.

```
switch# show version module 2 epld
EPLD Device                   Version
---------------------------------------
Power Manager                 0x07
XBUS IO                       0x07
UD Flow Control               0x05
PCI ASIC I/F                  0x05
PCI Bridge                    0x07
```

Use the **show version module epld** *url* command to view the available EPLD versions.

```
switch# show version epld bootflash:m9000-epld-2.1.1a.img
MDS series EPLD image, built on Wed May  4 09:52:37 2005

Module Type                         EPLD Device         Version
-------------------------------------------------------------------
MDS 9500 Supervisor 1               XBUS 1 IO              0x09
                                    XBUS 2 IO              0x0c
                                    UD Flow Control        0x05
                                    PCI ASIC I/F           0x04

1/2 Gbps FC Module (16 Port)        XBUS IO                0x07
                                    UD Flow Control        0x05
                                    PCI ASIC I/F           0x05

1/2 Gbps FC Module (32 Port)        XBUS IO                0x07
                                    UD Flow Control        0x05
                                    PCI ASIC I/F           0x05

Advanced Services Module            XBUS IO                0x07
                                    UD Flow Control        0x05
                                    PCI ASIC I/F           0x05
                                    PCI Bridge             0x07

IP Storage Services Module (8 Port) Power Manager          0x07
                                    XBUS IO                0x03
                                    UD Flow Control        0x05
                                    PCI ASIC I/F           0x05
                                    Service Module I/F     0x0a
                                    IPS DB I/F             0x1a

IP Storage Services Module (4 Port) Power Manager          0x07
                                    XBUS IO                0x03
                                    UD Flow Control        0x05
                                    PCI ASIC I/F           0x05
                                    Service Module I/F     0x1a

Caching Services Module             Power Manager          0x08
                                    XBUS IO                0x03
```

```
                                    UD Flow Control        0x05
                                    PCI ASIC I/F           0x05
                                    Service Module I/F     0x72
                                    Memory Decoder 0       0x02
                                    Memory Decoder 1       0x02

MDS 9100 Series Fabric Switch       XBUS IO                0x03
                                    PCI ASIC I/F           0x40000003

2x1GE IPS, 14x1/2Gbps FC Module     Power Manager          0x07
                                    XBUS IO                0x05
                                    UD Flow Control        0x05
                                    PCI ASIC I/F           0x07
                                    IPS DB I/F             0x1a
```

SSI Boot Images

From Cisco MDS NX-OS Release 8.1(1) and later releases, SSI images are no longer supported. Any SSI images installed in boot commands must be removed using the **no boot ssi** command and then reloading the modules before upgrading to Cisco MDS NX-OS Release 8.1(1) and later releases.

Managing SSMs and Supervisor Modules

This section describes the guidelines for replacing SSMs and supervisor modules and for upgrading and downgrading Cisco MDS NX-OS and SAN-OS releases.

Configuring SSM and MSM Global Upgrade Delay

When there are multiple SSMs or MSMs in the same chassis, you can set the amount of time to delay between upgrading the SSMs or MSMs in a rolling SSI upgrade.

SUMMARY STEPS

1. **configure terminal**
2. [**no**] **ssm upgrade delay** *seconds*
3. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

	Command or Action	Purpose
Step 2	[**no**] **ssm upgrade delay** *seconds* **Example:** `switch(config)# ssm upgrade delay 30`	Delays the SSI upgrade between SSMs or MSMs by the specified number of seconds. The range is from 1 to 600 seconds. The default is 0 seconds. Use the **no** form of the command to clear the delay timer.
Step 3	(Optional) **copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Guidelines for Replacing SSMs and Supervisor Modules

If you replace an SSM or supervisor module, consider the following guidelines:

- If you replace an SSM with another SSM and the SSM boot image is on bootflash:, you can leave the boot image installed on the active supervisor module.
- If you replace an SSM with another SSM and the SSI boot image is on the modflash:, the SSM might not initialize.
- If you replace an SSM with any other type of module, you can leave the SSM boot image installed on the active supervisor module or remove it. The active supervisor module detects the module type and boots the module appropriately.
- If you replace a supervisor module in a switch with active and standby supervisor modules, no action is required because the boot image is automatically synchronized to the new supervisor module.
- If you replace a supervisor module in a switch with no standby supervisor module, you need to reimplement the configuration on the new supervisor module.

Recovering an SSM After Replacing Corrupted CompactFlash Memory

As of Cisco MDS NX-OS Release 4.1(1a) and SAN-OS Release 2.1(2), you can use the CompactFlash memory (modflash:) on the SSM to store the SSI image. If the modflash: on the SSM is replaced, the SSM might not initialize.

SUMMARY STEPS

1. Log into the switch through the console port, an SSH session, or a Telnet session.
2. Display the values assigned to the SSI image boot variable for each module and note the values for later reference.
3. Clear the values assigned to the SSI image boot variable.
4. Reload the SSM to initialize in Fibre Channel switching mode.
5. After the SSM initializes, upgrade the SSI boot image.
6. Reassign the SSI boot variables cleared in Step 3.

DETAILED STEPS

Procedure

Step 1 Log into the switch through the console port, an SSH session, or a Telnet session.

Step 2 Display the values assigned to the SSI image boot variable for each module and note the values for later reference.

```
switch# show boot module
Module 2
ssi variable = modflash://2-1/m9000-ek9-ssi-mz.2.1.2.bin
Module 4
ssi variable = modflash://4-1/m9000-ek9-ssi-mz.2.1.2.bin
```

Step 3 Clear the values assigned to the SSI image boot variable.

```
switch# configure terminal
switch(config)# no boot ssi
```

Step 4 Reload the SSM to initialize in Fibre Channel switching mode.

```
switch# reload module 4
reloading module 4 ...
```

Step 5 After the SSM initializes, upgrade the SSI boot image.

Step 6 Reassign the SSI boot variables cleared in Step 3.

```
switch# configure terminal
switch(config)# boot ssi modflash://2-1/m9000-ek9-ssi-mz.2.1.2.bin module 2
```

Guidelines for Upgrading and Downgrading Cisco MDS NX-OS Releases

Consider the following guidelines when upgrading and downgrading the Cisco MDS NX-OS software on a switch containing an SSM:

- Once you set the SSI image boot variable, you do not need to reset it for upgrades or downgrades to any Cisco MDS NX-OS release that supports boot images. You can use the **install all** command or Fabric Manager GUI to upgrade SSMs once it has been installed.
- If you downgrade to a Cisco MDS NX-OS release that does not support the SSM, you must power down the module. The boot variables for the module are lost.
- The SSM cannot be configured for both the SSI and any other third-party software on the module such as VSFN.

The following example shows successful **install all** command output including an SSI image upgrade.

Note The SSI boot variable setting is included in the **install all** output. Also, if the SSI boot image is located on bootflash: the **install all** command copies the SSI boot image to the modflash: on the SSMs.

```
Switch# install all system bootflash:isan-2-1-1a kickstart bootflash:boot-2-1-1a
ssi bootflash:ssi-2.1.1a

Copying image from bootflash:ssi-2.1.1a to modflash://2-1/ssi-2.1.1a.
[####################] 100% -- SUCCESS

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".

------------------------------
```

Default Settings

This table lists the default settings for the supervisor module.

Table 8: Default Supervisor Module Settings

Parameter	Default
Administrative connection	Serial connection.
Global switch information	• No value for system name. • No value for system contact. • No value for location.
System clock	No value for system clock time.
In-band (VSAN 1) interface	IP address, subnet mask, and broadcast address assigned to the VSAN are set to 0.0.0.0.

This table lists the default settings for the SSM.

Table 9: Default Supervisor Module Settings

Parameter	Default
Initial state when installed	• Power-down state on switches with Cisco MDS SAN-OS Release 2.1(1a) and earlier installed. • Fibre Channel switching mode on switches with Cisco MDS SAN-OS Release 2.1(2) and NX-OS Release 4.1(1b), or later installed and SSMs with EPLD version 2.0(2) and later installed.