CHAPTER 6

Managing Modules

This chapter describes how to manage switching modules (also known as line cards) and provides information on monitoring module states. This chapter includes the following sections:

About Modules

Table 6-1 describes the supervisor module options for switches in the Cisco MDS 9000 Family.

Table 6-1 Supervisor Module Options

Product	No. of Supervisor Modules	Supervisor Module Slot	Switching Module Features
Cisco MDS 9216	One module (includes 16 Fibre Channel ports)	1	2-slot chassis allows one optional switching module in the other slot.
Cisco MDS 9509	Two modules	5 and 6	9-slot chassis allows any switching module in the other seven slots.
Cisco MDS 9506	Two modules	5 and 6	6-slot chassis allows any switching module in the other four slots.

Supervisor Modules

Supervisor modules are automatically powered up and started with the switch.

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

Cisco MDS 9500 Series switches have 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 module that enters the active mode is dependent on which of the two modules 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.

Switching Modules

Cisco MDS 9000 Family switches support any switching module in any non-supervisor slot. The switching module obtains its image from the supervisor module.

The interfaces in each module are ready to be configured when the `ok` status is displayed in the **show module** command output (see the "Configuring Fibre Channel Interfaces" section on page 9-2).

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 in EXEC mode. A sample output of the **show module** command follows:

```
switch# show module
Mod  Ports  Module-Type                       Model                Status
---  -----  --------------------------------  -------------------  ------------
2    16     1/2 Gbps FC Module                DS-X9016             ok
5    0      Supervisor/Fabric-1               DS-X9530-SF1-K9      active *
6    0      Supervisor/Fabric-1               DS-X9530-SF1-K9      HA-standby
8    32     1/2 Gbps FC Module                DS-X9032             ok

Mod  Sw           Hw      World-Wide-Name(s) (WWN)
---  -----------  ------  --------------------------------------------------
2    1.0(0.253)   1.0     20:41:00:05:30:00:38:de to 20:50:00:05:30:00:38:de
5    1.0(0.253)   1.0     --
6    1.0(0.253)   1.0     --
8    1.0(0.253)   1.0     20:41:00:05:30:00:38:de to 20:50:00:05:30:00:38:de

Mod  MAC-Address(es)                         Serial-Num
---  --------------------------------------  ----------
2    00-05-30-00-0f-e4 to 00-05-30-00-0f-e8  jab0636063v
5    00-05-30-00-19-66 to 00-05-30-00-19-6a  jab06370593
6    00-05-30-02-20-02 to 00-05-30-02-20-06  jab06371593
8    00-05-30-00-1a-12 to 00-05-30-00-1a-16  jab06370574

* 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 (see the "HA Switchover" section on page 4-3). If the warm switchover mechanism is enabled, the standby supervisor module reflects the standby status.

The states through which a switching module progresses is discussed in the "Viewing the State of a Module" section on page 6-3.

Viewing the State of a Module

If your chassis has more than one switching module (also known as line card), you will see the progress check if you issue the **show module** command several times and view the status column each time.

The switching module goes through a testing and an initializing stage before displaying an `ok` status. Table 6-2 describes the possible states in which a module can exist.

Table 6-2 Module States

show module Output	Description
`powered up`	The hardware has electrical power. When the hardware is powered up, the software begins booting.
`testing`	The module has established connection with the supervisor and the switching module is performing bootup diagnostics.
`initializing`	The diagnostics have completed successfully and the configuration is being downloaded.
`failure`	The switch detects a switching module failure upon initialization and automatically attempts to power-cycle the module three times. After the third attempt it continues to display a failed state.
`ok`	The switch is ready to be configured.
`power-denied`	The switch detects insufficient power for a switching module to power up. In this case, issue a **show environment power** command to determine power consumption issues (see Chapter 26, "Monitoring System Processes and Logs").
`active`	This module is the active supervisor module and the switch is ready to be configured.
`HA-standby`	This module is the standby supervisor module and that the HA switchover mechanism is enabled (see the "HA Switchover" section on page 4-3).
`standby`	This module is the standby supervisor module and the warm switchover mechanism is enabled (see the "HA Switchover" section on page 4-3).

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 in EXEC mode.

To attach to a module, follow these steps:

	Command	Purpose
Step 1	`switch# attach module 6` `switch(standby)#`	Provides direct access to the specified module (in this example, the standby supervisor module is in slot 6).

Step 2	`switch(standby)# dir bootflash:`
	
	`root 14502912 Jan 13 12:23:52 1980 kickstart_image1`
	`admin 14424576 Jan 14 06:47:29 1980 kickstart_image2`
	`admin 14469632 Jan 14 01:29:16 1980 kickstart_image3`
	`root 14490112 Jan 08 07:25:50 1980 kickstart_image4`
	`root 12288 Jan 16 15:49:24 1980 lost+found/`
	`admin 14466048 Jan 14 02:40:16 1980 kickstart_image5`
	`admin 24206675 Jan 14 02:57:03 1980 m9500-sf1ek.bin`
	`root 19084510 Jan 13 12:23:28 1980 system_image1`
	`admin 19066505 Jan 14 06:45:16 1980 system_image2`
	`admin 18960567 Jan 14 01:25:21 1980 system_image5`
	
	`Usage for bootflash: filesystem`
	`158516224 bytes total used`
	`102400 bytes free`
	`167255040 bytes available`
		Provides the available space information for the standby supervisor module.
		Note Type **exit** to exit the module-specific prompt.
		Tip If you are not accessing the switch from a console terminal, this is the only way to access the standby supervisor module.

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

- To view the standby supervisor module information, but you can not configure the standby supervisor module using this command.
- On the switching module portion of the Cisco MDS 9216 supervisor module which resides in slot 1.

Reloading Modules

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

Reloading the Switch

To reload the switch, issue the **reload** command without any options. When you issue this command, you reboot the switch (see Chapter 5, "Software Images").

Note If you need to issue the **reload** command, be sure to save the running configuration using the **copy running-config startup-config** command.

Power Cycling Modules

To power cycle any module, follow these steps:

Step 1 Identify the module that needs to be reset.

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

```
switch# reload module number
```

Where *number* indicates the slot in which the identified module resides. For example, if the identified module resides in slot 2:

```
switch# reload module 2
```

Reloading Switching Modules

Switching modules automatically download their images from the supervisor module, and do not need a force download. This procedure is provided for reference should a need arise.

To replace the image on a switching module, follow these steps:

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

Step 2 Issue the **reload module** *number* **force-dnld** command to update the image on the switching module.

```
switch# reload module number force-dnld
```

Where *number* indicates the slot in which the identified module resides. For example, if 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...
```

Preserving Module Configuration

To save the configuration, enter the **copy running-config startup-config** command from the EXEC mode prompt to save the new configuration into nonvolatile storage. Once this command is issued, the running and the startup copies of the configuration are identical.

Table 6-3 displays various scenarios when module configurations are persevered or lost.

Table 6-3 Switching Module Configuration Status

Scenario	Consequence
A particular switching module is removed and the **copy running-config startup-config** command is issued again.	The configured module information is lost.
A particular switching module is removed and the same switching module is replaced before the **copy running-config startup-config** command is issued again.	The configured module information is preserved.
A particular switching module is removed and replaced with the same type switching module, and a **reload module** *number* command is issued.	The configured module information is preserved.
A particular switching module is removed and replaced with a different type of switching module. For example, a 16-port switching module is replaced 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 **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 Configuration

To delete the configuration in a specific module, issue the **purge module** *slot* **running-config** command from EXEC mode. Once this command is issued, the running configuration is cleared for the specified slot. This command will not work on supervisor modules or on any slot which 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 it is cleared from the running configuration.

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

Powering Off Switching Modules

By default, all switching modules are configured to be in the power up state.

To power off a module, follow these steps:

	Command	Purpose
Step 1	`switch# config t`	Enters configuration mode.
Step 2	`switch(config)# poweroff module 1` `switch(config)#`	Powers off the specified module (switching module 1) in the switch.
	`switch(config)# no poweroff module 1` `switch(config)#`	Powers up the specified module (switching module 1) in the switch.

Identifying Module LEDs

Table 6-4 to Table 6-7 describe the LED location, type, and status for supervisor and switching modules used in Cisco MDS 9000 Family switches.

Table 6-4 Module LEDs on a Cisco MDS 9200 Series Switch

Module	LED Type	Status	Description
Fixed switching module	Status	Green	• All chassis environmental monitors (power supply, fan, temperature sensor, clock, and chassis SEE PROM) are reporting OK. • Sufficient power is available for all modules
		Orange	• Any one of the chassis environmental monitors (power supply, fan, temperature sensor, clock, and chassis SEE PROM) failed. • Sufficient power is not available for all modules. • Incompatible power supplies are installed. • The redundant clock failed.
		Red	• The diagnostic test failed. • The module is not operational because a fault occurred during the initialization sequence. • A temperature condition occurred. (A major threshold was exceeded during environmental monitoring.)
Optional switching module	System	Green	All diagnostics pass. The module is operational (normal initialization sequence).
		Orange	• The module is booting or running diagnostics (normal initialization sequence). • An over temperature condition occurred. (A minor threshold was exceeded during environmental monitoring.)
		Red	• The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. • An over temperature condition occurred. (A major threshold was exceeded during environmental monitoring.)

Table 6-5 Supervisor Module LEDs on a Cisco MDS 9500 Series Switch

LED	Status	Description
Status	Green	All diagnostics pass. The module is online.
	Orange	• The module is booting or running diagnostics (normal initialization sequence). • The module is not online. • 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. • An over temperature condition has occurred. (A major threshold has been exceeded during environmental monitoring.)
System[1]	Green	All chassis environmental monitors (power supply, fan, temperature sensor, clock, and chassis SEE PROM) are reporting OK.
	Orange	• Any one of the environmental monitors (power supply, fan, temperature sensor, clock, and chassis SEE PROM) has failed. • Incompatible power supplies are installed. • 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.

1. The System and Pwr Mgmt LEDs on a redundant supervisor module are synchronized to the active supervisor module.

Table 6-6 Ethernet Interface LEDs on a Cisco MDS 9200 Series Switch

Module	LED Type	Status	Description
Ethernet (mgmt 0)	Activity	Flashing green	Traffic is passing through the interface.
	Link	Solid green	The link is functioning.
		Off	The link is down.

Table 6-7 Switching Module LEDs

LED Type	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). • An over temperature condition occurred. (A minor threshold was exceeded during environmental monitoring.)
	Red	• The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. • An over temperature condition occurred. (A major threshold was exceeded during environmental monitoring.)
Speed	On	2 Gbps mode.
	Off	1 Gbps mode.
Link	Solid green	Link is up.
	Flashing green	Link is up (beacon used to identify port). See the "Identifying the Beacon LEDs" section on page 9-12.
	Solid yellow	Disabled by software.
	Flashing yellow	Fault is detected.
	Off	Link is down.

Default Supervisor Module Settings

Table 6-8 lists the default settings for the supervisor module.

Table 6-8 Default Supervisor Module Settings

Parameters	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 is set to 0.0.0.0.