CHAPTER 7

# Configuring High Availability

This chapter describes how to configure high availability, and describes the switchover processes.

This chapter includes the following sections:


- About High Availability section, page 7-1
- Switchover Processes section, page 7-1
- Copying Boot Variable Images to the Standby Supervisor Module section, page 7-4
- Displaying HA Status Information section, page 7-5


## About High Availability

Process restartability provides the high availability functionality in Cisco MDS 9000 Family switches. This process ensures that process-level failures do not cause system-level failures. It also restarts the failed processes automatically. This process is able to restore its state prior to the failure and continues executing from the failure point going forward.

An HA switchover has the following characteristics:

- It is stateful (nondisruptive) because control traffic is not impacted.
- It does not disrupt data traffic because the switching modules are not impacted.
- Switching modules are not reset.

**Note** Switchover is not allowed if **auto-copy** is in progress.

## Switchover Processes

Switchovers occur by one of the following two processes:

- The active supervisor module fails and the standby supervisor module automatically takes over.
- You manually initiate a switchover from an active supervisor module to a standby supervisor module.

Once a switchover process has started another switchover process cannot be started on the same switch until a stable standby supervisor module is available.

**Caution** If the standby supervisor module is not in a stable state (ha-standby), a switchover is not performed.

This section includes the following topics:


- Synchronizing Supervisor Modules section, page 7-2
- Manual Switchover Guidelines section, page 7-2
- Manually Initiating a Switchover section, page 7-2


# Synchronizing Supervisor Modules

The running image is automatically synchronized in the standby supervisor module by the active supervisor module. The boot variables are synchronized during this process.

The standby supervisor module automatically synchronizes its image with the running image on the active supervisor module.

**Note** The image a supervisor module is booted up from cannot be deleted from bootflash. This is to ensure that the new standby supervisor module ia able to synchronize during the process.

# Manual Switchover Guidelines

Be aware of the following guidelines when performing a manual switchover:

- When you manually initiate a switchover, system messages indicate the presence of two supervisor modules.
- A switchover can only be performed when two supervisor modules are functioning in the switch.
- The modules in the chassis are functioning as designed.

# Manually Initiating a Switchover

To manually initiate a switchover from an active supervisor module to a standby supervisor module, use the active supervisor module using Device Manager**system switchover** command. After you enter this command, another switchover process cannot be started on the same switch until a stable standby supervisor module is available.

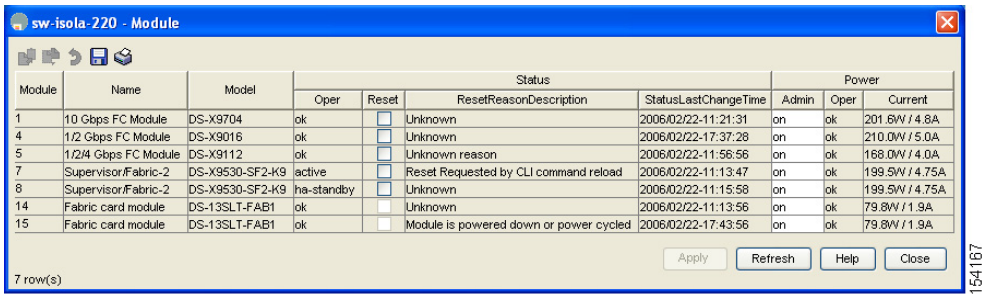
To ensure that an HA switchover is possible, enter the **show system redundancy status** command or the **show module** command. If the command output displays the HA standby state for the standby supervisor module, then the switchover is possible. See "Verifying Switchover Possibilities" for more information.

To perform a switchover using Device Manager, follow these steps:

**Step 1** Ensure that an HA switchover is possible by selecting **Physical > Modules** to verify the presence of multiple modules.

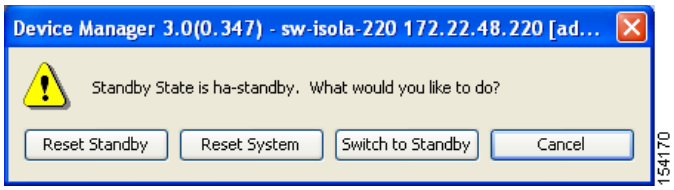
You see the screen shown in Figure 7-1.

*Figure 7-1 Modules Screen Shows Current Supervisor*




**Step 2** In the main Device Manager screen, select **Admin > Reset Switch**.

*Figure 7-2 Reset Switch Dialog Box*




**Step 3** Click **Switch to Standby**.

## Verifying Switchover Possibilities

This section describes how to verify the status of the switch and the modules before a manual switchover.

- Use the s**how system redundancy status** command to ensure that the system is ready to accept a switchover.
- Use the **show module** command to verify the status (and presence) of a module at any time. A sample 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
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  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  JAB06350B1R
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 HA-standby status for supervisor modules. If the status is either OK or active, you can continue with your configuration.

- Use the **show boot auto-copy** command to verify the configuration of the auto-copy feature and if an auto-copy to the standby supervisor module is in progress. Sample outputs of the **show boot auto-copy** command follow:

```
switch# show boot auto-copy
Auto-copy feature is enabled
switch# show boot auto-copy list
No file currently being auto-copied
```

# Copying Boot Variable Images to the Standby Supervisor Module

You can copy the boot variable images that are in the active supervisor module (but not in the standby supervisor module) to the standby supervisor module. Only those KICKSTART and SYSTEM boot variables that are set for the standby supervisor module can be copied. For module (line card) images, all boot variables are copied to the corresponding standby locations (bootflash: or slot0:) if not already present.

## Enabling Automatic Copying of Boot Variables

To enable or disable automatic copying of boot variables, follow these steps:

| | Command | Purpose |
|---|---|---|
| **Step 1** | `switch# config t`<br>`switch(config)#` | Enters configuration mode. |
| **Step 2** | `switch(config)# boot auto-copy`<br>`Auto-copy administratively enabled` | Enables (default) automatic copying of boot variables from the active supervisor module to the standby supervisor module. |
| | `switch(config)# no boot auto-copy`<br>`Auto-copy administratively disabled` | Disables the automatic copy feature. |

## Verifying the Copied Boot Variables

Use the **show boot auto-copy** command to verify the current state of the copied boot variables. This example output shows that automatic copying is enabled:

```
switch# show boot auto-copy
Auto-copy feature enabled
```

This example output shows that automatic copying is disabled:

```
switch# show boot auto-copy
Auto-copy feature disabled
```

Use the **show boot auto-copy list** command to verify what files are being copied. This example output displays the image being copied to the standby supervisor module's bootflash. Once this is successful, the next file will be image2.bin.

**Note** This command only displays files on the active supervisor module.

```
switch# show boot auto-copy list
File: /bootflash:/image1.bin
Bootvar: kickstart

File:/bootflash:/image2.bin
Bootvar: system
```

This example output displays a typical message when the **auto-copy** option is disabled or if no files are copied:

```
switch# show boot auto-copy list
No file currently being auto-copied
```

# Displaying HA Status Information

Use the **show system redundancy status** command to view the HA status of the system. Tables 7-1 to 7-3 explain the possible output values for the redundancy, supervisor, and internal states.

```
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
```

The following conditions identify when automatic synchronization is possible:

- If the internal state of one supervisor module is Active with HA standby and the other supervisor module is HA standby, the switch is operationally HA and can do automatic synchronization.
- If the internal state of one of the supervisor modules is none, the switch cannot do automatic synchronization.

Table 7-1 lists the possible values for the redundancy states.

***Table 7-1 Redundancy States***

| State | Description |
|---|---|
| Not present | The supervisor module is not present or is not plugged into the chassis. |
| Initializing | The diagnostics have passed and the configuration is being downloaded. |
| Active | The active supervisor module and the switch is ready to be configured. |
| Standby | A switchover is possible. |

*Table 7-1 Redundancy States (continued)*

| State | Description |
|---|---|
| Failed | The switch detects a supervisor module failure on initialization and automatically attempts to power-cycle the module three (3) times. After the third attempt it continues to display a failed state.<br><br>**Note** You should try to initialize the supervisor module until it comes up as HA-standby. This state is a temporary state. |
| Offline | The supervisor module is intentionally shut down for debugging purposes. |
| At BIOS | The switch has established connection with the supervisor and the supervisor module is performing diagnostics. |
| Unknown | The switch is in an invalid state. If it persists, call TAC. |

Table 7-2 lists the possible values for the supervisor module states.

*Table 7-2 Supervisor States*

| State | Description |
|---|---|
| Active | The active supervisor module in the switch is ready to be configured. |
| HA standby | A switchover is possible. |
| Offline | The switch is intentionally shut down for debugging purposes. |
| Unknown | The switch is in an invalid state and requires a support call to TAC. |

Table 7-3 lists the possible values for the internal redundancy states.

*Table 7-3 Internal States*

| State | Description |
|---|---|
| HA standby | The HA switchover mechanism in the standby supervisor module is enabled (see the "Synchronizing Supervisor Modules" section on page 7-2). |
| Active with no standby | A switchover is not possible. |
| Active with HA standby | The active supervisor module in the switch is ready to be configured. The standby supervisor module is in the HA-standby state. |
| Shutting down | The switch is being shut down. |
| HA switchover in progress | The switch is in the process of changing over to the HA switchover mechanism. |
| Offline | The switch is intentionally shut down for debugging purposes. |
| HA synchronization in progress | The standby supervisor module is in the process of synchronizing its state with the active supervisor modules. |
| Standby (failed) | The standby supervisor module is not functioning. |

*Table 7-3 Internal States (continued)*

| State | Description |
|---|---|
| Active with failed standby | The active supervisor module and the second supervisor module is present but is not functioning. |
| Other | The switch is in a transient state. If it persists, call TAC. |