



Configuring High Availability

This chapter provides details on the high availability feature that is available on switches with two supervisor modules.

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About High Availability

The Cisco MDS 9500 Series of multilayer directors support application restartability and nondisruptive supervisor switchability. The switches are protected from system failure by redundant hardware components and a high availability software framework. The high availability (HA) software framework provides for the following:

- Ensures nondisruptive software upgrade capability.
- Provides redundancy for supervisor module failure by using dual supervisor modules.
- Performs nondisruptive restarts of a failed process on the same supervisor module. A service running on the supervisor modules and on the switching module tracks the HA policy defined in the configuration and takes action based on this policy. This feature is also available in Cisco MDS 9216 switches and in the Cisco MDS 9100 Series.
- Protects against link failure using the PortChannel (port aggregation) feature. This feature is also available in Cisco MDS 9216 switches and in the Cisco MDS 9100 Series.
- Provides management redundancy using Virtual Router Redundancy Protocol (VRRP). This feature is also available in Cisco MDS 9216 switches and in the Cisco MDS 9100 Series.
- Switchability--When the active supervisor fails, the standby supervisor, if present, takes over without disrupting storage or host traffic.

Directors in the Cisco MDS 9500 Series have two supervisor modules in the two center slots (sup-1 and sup-2). When the switch powers up and both supervisor modules are present, the supervisor module that comes up first enters the active mode and the supervisor module that comes up second enters the standby

mode. If both supervisor modules come up at the same time, sup-1 becomes active. The standby module constantly monitors the active module. If the active module fails, the standby module takes over without any impact to user traffic.

Switchover Mechanisms

When the active supervisor module fails, the standby module automatically takes over. You can also 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 supervisor modules are not in a stable state (online or powered down), a switchover will not be performed.

HA Switchover

When a standby supervisor module is in the HA-standby state, an HA switchover is possible. An HA switchover has the following characteristics:

- Is stateful (nondisruptive) since control traffic is not impacted
- Does not impact data traffic since the switching modules are not impacted
- Switching modules are not reset

Process Restartability

Process restartability provides the high availability functionality in Cisco MDS 9000 Family switches.

It ensures that the process-level failures do not cause system-level failures. It also restarts the failed processes automatically.

This vital process functions on infrastructure that is internal to the switch.

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.

HA Redundancy States

The following conditions identify when automatic synchronization is possible:

- If the internal state of one supervisor module is Active with HA standby and of 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	This module is the active supervisor module and the switch is ready to be configured.
Standby	This state indicate that a switchover is possible.
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.
Offline	The switch is intentionally shut down for debugging purposes.
At BIOS	The module 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 state.

Table 7-2 Supervisor States

State	Description
Active	This module is the active supervisor module and the switch is ready to be configured.
HA standby	This state indicate that 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 state of the supervisor modules.

Table 7-3 **Internal States**

State	Description
HA standby	This module is the standby supervisor module and the HA switchover mechanism is enabled.
Active with no standby	This state indicate that a switchover is possible.
Active with HA standby	This module is the active supervisor module and the switch is ready to be configured. The standby 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 supervisor modules.
Standby (failed)	The standby supervisor module is not functioning.
Active with failed standby	This module is 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.