CHAPTER 15

Scheduling Maintenance Jobs

The Cisco MDS command scheduler feature helps you schedule configuration and maintenance jobs in any switch in the Cisco MDS 9000 Family. You can use this feature to schedule jobs on a one-time basis or periodically.

This chapter includes the following sections:

About the Command Scheduler

The MDS command scheduler provides a facility to schedule a job (set of CLI commands) or multiple jobs at a specified time in the future. The job(s) can be executed once at a specified time in the future or at periodic intervals.

> **Note** To use the command scheduler, you do not need to obtain any license. This feature is available in all switches in the Cisco MDS family that use the Cisco SAN-OS Release 2.0(1b) (or later) software.

You can use this feature to schedule zone set changes, QOS policy changes, backup data, save the configuration and other similar jobs.

Scheduler Terminology

The following terms are used in this chapter.

- Job—A job is a set of SAN-OS CLI commands (EXEC and config mode) that are executed as defined in the schedule.
- Schedule—A schedule determines the time when the assigned jobs must be executed. Multiple jobs can be assigned to a schedule. A schedule executes in one of two modes: one-time or periodic.

- Periodic mode—A job is executed at the user-specified periodic intervals, until it is deleted by the administrator. The following types of periodic intervals are supported:
    - Daily—The job is executed once a day
    - Weekly—The job is executed once a week
    - Monthly—The job is executed once a month
    - Delta—The job is executed beginning at the specified start time and thereafter at user-specified intervals (days:hours:minutes).
- One-time mode—The job is executed once at a user-specified time.

Scheduling Guidelines

Before scheduling jobs on a Cisco MDS switch, be aware of the following guidelines:

- A user who is authenticated and authorized by a remote service (for example, RADIUS) cannot schedule jobs.
- Be aware that the scheduled job can fail if it encounters one of the following situations when executing the job:
    - If the license has expired for a feature at the time when a job containing commands pertaining to that feature is scheduled.
    - If a feature is disabled at the time when a job containing commands pertaining to that feature is scheduled.
    - If you have removed a module from a slot and the job has commands pertaining to the interfaces for that module or slot.
- Verify that you have configured the time. The scheduler does not have any default time configured. If you create a schedule and assign job(s) and do not configure the time, that schedule is not launched.
- While defining a job, verify that no interactive or disruptive commands (for example, **copy bootflash:** *file* **ftp:** *URI*, **write erase**, and other similar commands) are specified as part of a job since the job is executed noninteractively at the scheduled time.

Scheduler Configuration

To configure the command scheduler, follow these steps:

Step 1   Enable (initialize) the scheduler.

Step 2   Define the job.

Step 3   Define the schedule and assign jobs to the schedule.

Step 4   Specify the time for the schedule(s).

Step 5   Verify the scheduled configuration.

Command Scheduler Initialization

To use the scheduling feature, you must explicitly enable this feature on the required switches in the fabric. By default, this feature is disabled in all switches in the Cisco MDS 9000 family.

The configuration and verification commands for the command scheduler feature are only available when this feature is enabled on a switch. When you disable this feature, all related configurations are automatically discarded.

To enable the command scheduling feature, follow these steps:

	Command	Purpose
Step 1	switch# **config t**	Enters configuration mode.
Step 2	switch(config)# **scheduler enable**	Enables the scheduler.
	switch(config)# **no scheduler enable**	Discards the scheduler configuration and disables the scheduler (default).

Job Definition

To define a job, you must specify the job name. This action places you in the job definition (config-job) submode. In this submode, you can define the sequence of CLI commands that the job has to perform. Be sure to exit the config-job submode to complete the job definition.

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Caution   You cannot modify or remove a command after entering the sequence of commands. To make changes, you must explicitly delete the defined job name and restart this process.

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Note   You must exit the config-job submode for the job definition to be complete.

To define a job for the command scheduler, follow these steps:

	Command	Purpose
Step 1	`switch# conf t` `switch(config)#`	Enters the configuration mode.
Step 2	`switch(config)# scheduler job name addMemVsan99` `switch(config-job)#`	Defines a job name and enters the job definition submode

Step 3	`switch(config-job)# config terminal`
	`switch(config-job-config)# vsan database`
	`switch(config-job-config-vsan-db)# vsan 99 interface`
	`fc1/1 - 4`
	`switch(config-job-config-vsan-db)# end`
	`switch#`
		Specifies a sequence of actions for the specified job. The defined commands are checked for validity and stored for future use.
		
		Note Be sure you exit the `config-job` submode.

	`switch(config)# scheduler job name offpeakQOS`
	`switch(config-job)# conf t`
	`switch(config-job-config)# qos class-map`
	`offpeakbackupcmap match-all`
	`switch(config-job-config-cmap)# match source-wwn`
	`23:15:00:05:30:00:2a:1f`
	`switch(config-job-config-cmap)# match destination-wwn`
	`20:01:00:05:30:00:28:df`
	`switch(config-job-config-cmap)# exit`
	`switch(config-job-config)# qos policy-map`
	`offpeakbackuppolicy`
	`switch(config-job-config-pmap)# class`
	`offpeakbackupcmap`
	`switch(config-job-config-pmap-c)# priority high`
	`switch(config-job-config-pmap-c)# exit`
	`switch(config-job-config-pmap)# exit`
	`switch(config-job-config)# qos service policy`
	`offpeakbackuppolicy vsan 1`
	`switch(config-job-config)# end`
	`switch#`
		Provides another example of scheduling a different set of jobs.

Job Deletion

To delete a job for the command scheduler, follow these steps:

	Command	Purpose
Step 1	`switch# conf t` `switch(config)#`	Enters the configuration mode.
Step 2	`switch(config)# no scheduler job name addMemVsan99`	Deletes a defined job and all commands defined within that job.

Schedule Definition

After defining jobs, you can create schedules and assign jobs to the schedule. Subsequently, you can configure the time of execution. The execution can be one-time or periodic depending on your requirements. If the time for the schedule is not configured, then it will never be executed.

Periodic Schedule Definition

When you specify a periodic job execution, that job is executed periodically at the specified (daily, weekly, monthly, or delta) intervals.

To specify a periodic job for the command scheduler, follow these steps:

	Command	**Purpose**
Step 1	`switch# conf t` `switch(config)#`	Enters the configuration mode.
Step 2	`switch(config)# scheduler schedule name weekendbackupqos` `switch(config-schedule)#`	Defines a job schedule (weekendbackup) and enters the submode for that schedule.
	`switch(config)# no scheduler schedule name weekendbackup`	Deletes the defined schedule.
Step 3	`switch(config-schedule)# job name offpeakZoning` `switch(config-schedule)# job name offpeakQOS`	Assign two jobs offpeakZoning and offpeakQOS for this schedule.
	`switch(config-schedule)# no job name addMem99`	Deletes the job assigned for this schedule.

Note   The following examples are only provided for reference.

	Command	**Purpose**
Step 4	`switch(config-schedule)# time daily 23:00`	Executes the specified jobs at 11 p.m. every day.
	`switch(config-schedule)# time weekly Sun:23:00`	Specifies a weekly execution every Sunday at11 p.m.
	`switch(config-schedule)# time monthly 28:23:00`	Specifies a monthly execution at 11 p.m on the 28th of each month. If you specify the date as either 29, 30, or 31, the command is automatically executed on the last day of each month.
	`switch(config-schedule)# time start now repeat 48:00`	Specifies a job to be executed every 48 hours beginning 2 minutes from *now* —if today is September 24th 2004 and the time is now 2:00 p.m., the command begins executing at 2 minutes past 2:00 p.m. on September 24th 2004 and continues to execute every 48 hours after that.
	`switch(config-schedule)# time start 14:00 repeat 14:00:00`	If today is September 24th, 2004 (Friday), this command specifies the job to be executed every alternate Friday at 2 p.m. (every 14 days).

The most significant fields in the **time** parameter are optional. If you omit the most significant fields, the values are assumed to be the same as the current time. For example, if the current time is September 24th, 2004, 22:00 hours, then the commands are executed as follows:

- The **time start 23:00 repeat 4:00:00** command implies a start time of September 24th, 2004 23:00 hours.
- The **time daily 55** command implies every day at 22:55 hours.
- The **time weekly 23:00** command implies every Friday at 23:00 hours.
- The **time monthly 23:00** command implies the 24th of every month at 23:00 hours.

Note If the time interval configured for any schedule is smaller than the time taken to execute its assigned job(s), then the subsequent schedule execution occurs only after the configured interval amount of time has elapsed following the completion time of the last iteration of the schedule. For example, a schedule is executed at 1-minute intervals and a job assigned to it takes 2 minutes to complete. If the first schedule is at 22:00 hours, the job finishes at 22:02 following which, the 1-minute interval is observed and the next execution occurs at 22:03 which finishes at 22:05.

One-Time Schedule Definition

When you specify a one-time job execution, that job is only executed once

To specify a one-time job for the command scheduler, follow these steps:

	Command	Purpose
Step 1	switch# **conf t** switch(config)#	Enters the configuration mode.
Step 2	switch(config)# **scheduler schedule name configureVsan99** switch(config-schedule)#	Defines a job schedule (configureVsan99) and enters the submode for that schedule.
Step 3	switch(config-schedule)# **job name addMemVsan99**	Assigns a predefined job name (addMemVsan99) for this schedule.
Step 4	switch(config-schedule)# **time start 2004:12:14:23:00**	Specifies a one-time execution on December 14th, 2004 at 11 p.m.
	switch(config-schedule)# **no time**	Deletes the time assigned for this schedule.

Schedule Deletion

To delete a schedule, follow these steps:

	Command	Purpose
Step 1	switch# **conf t** switch(config)#	Enters the configuration mode.
Step 2	switch(config)# **no scheduler schedule name weekendbackup**	Deletes the defined schedule.

Job Disassociation

To disassociate an assigned job, follow these steps:

	Command	Purpose
Step 1	switch# **conf t** switch(config)#	Enters the configuration mode.
Step 2	switch(config)# **scheduler schedule name weekendbackupqos** switch(config-schedule)#	Defines a job schedule (weekendbackup) and enters the submode for that schedule.
Step 3	switch(config-schedule)# **no job name addMem99**	Deletes the job assigned for this schedule.

Schedule Time Deletion

To delete the schedule time, follow these steps:

	Command	Purpose
Step 1	switch# **conf t** switch(config)#	Enters the configuration mode.
Step 2	switch(config)# **scheduler schedule name weekendbackupqos** switch(config-schedule)#	Defines a job schedule (weekendbackup) and enters the submode for that schedule.
Step 3	switch(config-schedule)# **no time**	This will delete the schedule time configuration.The schedule will not be run until the time is configured again.

Execution Log

The command scheduler maintains a log file. While you cannot modify the contents of this file, you can change the file size. This log file is a circular log which contains the output of the job executed. If the output of the job is greater than the log file, then the output stored in this file remains truncated.

You can configure the log file size to be a maximum of 1024KB. The default size of the execution log file is 16KB.

To configure the execution log file size, follow these steps:\

	Command	Purpose
Step 1	switch# **conf t** switch(config)#	Enters the configuration mode.
Step 2	switch(config)# **scheduler logfile size 1024**	Configures the log file to be a maximum of 1024 KB
	switch(config)# **no scheduler logfile size**	Defaults to the log size of 16KB.

Clearing the Log File Contents

To clear the contents of the scheduler log file, issue the **clear scheduler logfile** command in EXEC mode.

switch# **clear scheduler logfile**

Scheduler Configuration Verification

The **show** commands display the current command scheduler settings for the Cisco MDS switch (see Examples 15-1 to 15-4).

Example 15-1   Displays the Commands to be Executed for a Specified Job

```
switch# show scheduler job addMemVsan99
Job Name: addMemVsan99
---------------------
  config terminal
   vsan database
    vsan 99 interface fc1/1
    vsan 99 interface fc1/2
    vsan 99 interface fc1/3
    vsan 99 interface fc1/4
```

Example 15-2   Displays the Execution Status of the Schedule

```
switch# show scheduler schedule configureVsan99
Schedule Name      : configureVsan99
------------------------------------
User Name          : admin
Schedule Type      : Run once on Tue Aug 10 09:48:00 2004
Last Execution Time: Tue Aug 10 09:48:00 2004
-----------------------------------------------
        Job Name                 Status
-----------------------------------------------
addMemVsan99                      Success (0)
```

Example 15-3   Displays the Execution Log of All Jobs Executed in the System

```
switch# show scheduler logfile
Job Name       : addMemVsan99           Job Status: Success (0)
Schedule Name  : configureVsan99        User Name : admin
Completion time: Tue Aug 10 09:48:00 2004
------------------------- Job Output --------------------------
`config terminal`
`vsan database`
`vsan 99 interface fc1/1`
`vsan 99 interface fc1/2`
`vsan 99 interface fc1/3`
`vsan 99 interface fc1/4`
```

Example 15-4   Displays the Scheduler Configuration on the Switch

```
switch# show scheduler config
config terminal
  scheduler enable
  scheduler logfile size 512
end

config terminal
   scheduler job name addMemVsan99
     config terminal
       vsan database
       vsan 99 interface fc1/1
       vsan 99 interface fc1/2
       vsan 99 interface fc1/3
       vsan 99 interface fc1/4
end

config terminal
  scheduler schedule name configureVsan99
    time start 2004:8:10:9:52
    job name addMemVsan99
end
```

Default Settings

Table 15-1 lists the default settings for command scheduling parameters.

Table 15-1   Default Command Scheduler Parameters

Parameters	Default
Command scheduler	Disabled.
Log file size	16 KB

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