CHAPTER 25

Advanced Features and Concepts

This chapter describes the advanced features provided in switches in the Cisco MDS 9000 Family. It includes the following sections:

Fibre Channel Time Out Values

You can modify Fibre Channel protocol related timer values for the switch by configuring the following time out values (TOVs):

Distributed services TOV (D_S_TOV)—The valid range is from 5,000 to 10,000 milliseconds. The default is 5,000 milliseconds.

Error detect TOV (E_D_TOV)—The valid range is from 1,000 to 10,000 milliseconds. The default is 2,000 milliseconds. This value is matched with the other end during port initialization.

Resource allocation TOV (R_A_TOV)—The valid range is from 5,000 to 10,000 milliseconds. The default is 10,000 milliseconds. This value is matched with the other end during port initialization.

Note

Timer Configuration Across All VSANs

Caution

Note

	Command	Purpose
Step 1	`switch# config t` `switch(config)`	
Step 2	`switch(config)# fctimer R_A_TOV 6000`	

Timer Configuration Per-VSAN

special links like FC or IP tunnels. You can configure different E_D_TOV, R_A_TOV, and D_S_TOV values for individual VSANs. Active VSANs are suspended and activated when their timer values are changed.

You cannot perform a nondisruptive downgrade to any earlier version that does not support per-VSAN FC timers.

Note

Cisco MDS 9000 Family Troubleshooting Guide

	Command	Purpose
Step 1		Enters configuration mode.
Step 2	**fctimer D_S_TOV 6000 vsan 2** Warning: The vsan will be temporarily suspended when updating the timer value This configuration would impact whole fabric. Do you want to continue? (y/n) **y** Since this configuration is not propagated to other switches, please configure the same value in all the switches	

fctimer Distribution

You automatically acquire a fabric-wide lock when you issue the first configuration command after you enabled distribution in a switch. The fctimer application uses the effective and pending database model to store or commit the commands based on your configuration.

Refer to Chapter 5, "Using the CFS Infrastructure" for more information on the CFS application.

To enable fctimer fabric distribution, follow these steps:

switch#	
switch(config)# **fctimer distribute**	
no fctimer distribute	

Committing fctimer Changes

When you commit the fctimer configuration changes, the effective database is overwritten by the configuration changes in the pending database and all the switches in the fabric receive the same configuration. When you commit the fctimer configuration changes without implementing the session feature, the fctimer configurations are distributed to all the switches in the physical fabric.

	Command	Purpose
Step 1		
Step 2		

Discarding fctimer Changes

	Command	Purpose
Step 1		
Step 2		

Fabric Lock Override

Tip The changes are only available in the volatile directory and are subject to being discarded if the switch is restarted.

To use administrative privileges and release a locked fctimer session, use the **clear fctimer session**

```
clear fctimer session
```

Database Merge Guidelines

-
  -
  -
  -

The number of pending fctimer configuration operations cannot be more than 15.

Displaying Configured FC Timer Values

show fctimer command to display the configured FC timer values (see Examples 25-1 and 25-2).

Example 25-1 Displays Configured Global TOVs

```
        show fctimer
F_S_TOV   D_S_TOV   E_D_TOV   R_A_TOV
----------------------------------------
5000 ms   5000 ms   2000 ms   10000 ms
```

Displays Configured TOVs for a Specified VSAN

```
        show fctimer vsan 10


10        5000 ms   5000 ms   3000 ms   10000 ms
```

Configuring World Wide Names

on the switch's supervisor module, assigns WWNs to each switch.

Cisco MDS 9000 Family switches support three network address authority (NAA) address formats (see Table 25-1).

Standardized NAA WWN Formats

NAA Address	NAA Type	WWN Format	
IEEE 48-bit address	Type 1 = 0001b	000 0000 0000b	48-bit MAC address
IEEE extended	Type 2 = 0010b	Locally assigned	48-bit MAC address
IEEE registered	Type 5 = 0101b	IEEE company ID: 24 bits	VSID: 36 bits

Link Initialization WWN Usage

Exchange Link Protocol (ELP) and Exchange Fabric Protocol (EFP) use WWNs during link initialization. The usage details differ based on the Cisco SAN-OS software release:

Both ELPs and EFPs use the VSAN WWN by default during link initialization. However, the ELP usage changes based on the peer switch's usage:

- If the peer switch ELP uses the switch WWN, then the local switch also uses the switch WWN.
- If the peer switch ELP uses the VSAN WWN, then the local switch also uses the VSAN WWN.

Note As of Cisco SAN-OS Release 2.0(2b), the ELP is enhanced to be compliant with FC-SW-3.

Configuring a Secondary MAC Address

	Enters configuration mode.
wwn secondary-mac 00:99:55:77:55:55 range 64 This command CANNOT be undone. Please enter the BASE MAC ADDRESS again: Please enter the mac address RANGE again: From now on WWN allocation would be based on new MACs. Are you sure? (yes/no) You entered: no. Secondary MAC NOT programmed switch(config)#	

Displaying WWN Information

Example 25-3 Displays the Status of All WWNs

```
         Type 1 WWNs: Configured:     64 Available:     48 (75%) Resvd.: 16
    Types 2 & 5 WWNs: Configured: 524288 Available: 450560 (85%) Resvd.: 73728
NKAU & NKCR WWN Blks: Configured:   1760 Available:   1760 (100%)
        Alarm Status:      Type1:   NONE Types 2&5:   NONE
```

Example 25-4 Displays Specified Block ID Information

```
show wwn status block-id 51
```

Example 25-5 Displays the WWN for a Specific Switch

FC ID Allocation for HBAs

Default Company ID list

Caution

- Get the company ID from Port WWN.
- Add the company ID to the list that requires area.
- Bring up the port.

The list of company IDs have the following characteristics:

A persistent FC ID configuration always takes precedence over the list of company IDs. Hence even if the company ID is configured to receive an area, the persistent FC ID configuration results in the allocation of a single FC ID.

New company IDs added to subsequent releases are automatically added to existing company IDs.

The list of company IDs is saved as part of the running and saved configuration.

The list of company IDs is used only when the fcinterop FC ID allocation scheme is in auto mode. By default, the interop FC ID allocation is set to auto, unless changed.

We recommend that you set the fcinterop FC ID allocation scheme to auto and use the company ID list and persistent FC ID configuration to manipulate the FC ID device allocation.

Use the **fcinterop FCID allocation auto** **show running-config**

write erase

switch# switch(config)#	
switch(config)# **company-id 0x003223**	
no fcid-allocation area **company-id 0x00E069**	
company-id 0x003223	

show fcid-allocation area

Example 25-6 Displays the List of Default and Configured Company IDs

```
FCID area allocation company id info:
```

<---------- Default entry

```
00:E0:69
00:30:AE + <---------- User-added entry

00:E0:8B * <---------- Explicitly deleted entry (from the original default list)
```

show fcid-allocation company-id-from-wwn

Example 25-7 Displays the Company ID for the Specified WWN

Switch Interoperability

Changes in Switch Behavior When Interoperability Is Enabled

Switch Feature	Changes if Interoperability Is Enabled

Changes in Switch Behavior When Interoperability Is Enabled (continued)

Zoning attributes	Zones may be limited to the pWWN and other proprietary zoning methods (physical port number) may be eliminated. Brocade uses the **cfgsave**
	switch to be placed in offline mode and/or rebooted when changing domain IDs.
Domain reconfiguration nondisruptive	This event is limited to the affected VSAN. Only Cisco MDS 9000 Family switches have this capability—only the domain manager process for the affected VSAN is restarted and not the entire switch.
Name server	Verify that all vendors have the correct values in their respective name server database.
IVR	IVR-enabled VSANs can be configured in (default) mode or in any of the modes.

Step 3

Note

```
                fctimer e_d_tov ?
  <1000-100000>  E_D_TOV in milliseconds(1000-100000)
switch(config)#
  <5000-100000>  R_A_TOV in milliseconds(5000-100000)
```

Step 4

- ```
  switch(config)#
  ```

- ```
  switch(config#
  ```

Verifying Interoperating Status

Step 1

```
switch#
Cisco Storage Area Networking Operating System (SAN-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2003, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
Cisco Systems, Inc. and/or other third parties and are used and
distributed under license. Some parts of this software are covered
under the GNU Public License. A copy of the license is available
at http://www.gnu.org/licenses/gpl.html.

Software
  BIOS:      version 1.0.8
  loader:    version 1.1(2)
  kickstart: version 2.0(1) [build 2.0(0.6)] [gdb]
  system:    version 2.0(1) [build 2.0(0.6)] [gdb]

  BIOS compile time:       08/07/03
  kickstart image file is: bootflash:///m9500-sf1ek9-kickstart-mzg.2.0.0.6.bin
  kickstart compile time:  10/25/2010 12:00:00
  system image file is:    bootflash:///m9500-sf1ek9-mzg.2.0.0.6.bin
  system compile time:     10/25/2020 12:00:00


Hardware
  RAM 1024584 kB

  bootflash: 1000944 blocks (block size 512b)
  slot0:           0 blocks (block size 512b)

  172.22.92.181 uptime is 0 days 2 hours 18 minute(s) 1 second(s)

  Last reset at 970069 usecs after Tue Sep 16 22:31:25 1980
    Reason: Reset Requested by CLI command reload
    System version: 2.0(0.6)
    Service:
```

show interface brief

```
switch#
Interface  Vsan   Admin  Admin   Status          Oper  Oper   Port-channel
                  Mode   Trunk                   Mode  Speed
                         Mode                           (Gbps)
--------------------------------------------------------------------
fc2/1      1      auto   on      up              E     2      --
fc2/2      1      auto   on      up              E     2      --
fc2/3      1      auto   on      fcotAbsent      --    --     --
fc2/4      1      auto   on      down            --    --     --
fc2/5      1      auto   on      down            --    --     --
fc2/6      1      auto   on      down            --    --     --
fc2/7      1      auto   on      up              E     1      --
fc2/8      1      auto   on      fcotAbsent      --    --     --
fc2/9      1      auto   on      down            --    --     --
fc2/10     1      auto   on      down            --    --     --
```

show run

```
switch#
Building Configuration...

 interface fc2/1
no shutdown

 interface fc2/2
no shutdown

 interface fc2/3
 interface fc2/4
 interface fc2/5
 interface fc2/6
 interface fc2/7
no shutdown

 interface fc2/8
 interface fc2/9
 interface fc2/10

<snip>

interface fc2/32

 interface mgmt0
ip address 6.1.1.96 255.255.255.0
switchport encap default
no shutdown

vsan database
vsan 1 interop

boot system bootflash:/m9500-system-253e.bin sup-1
boot kickstart bootflash:/m9500-kickstart-253e.bin sup-1
boot system bootflash:/m9500-system-253e.bin sup-2
boot kickstart bootflash:/m9500-kickstart-253e.bin sup-2
callhome

fcdomain domain 100 preferred vsan 1

ip route 6.1.1.0 255.255.255.0 6.1.1.1
ip routing
line console
```

```
  databits 5
  speed 110
logging linecard
ssh key rsa 512 force
ssh server enable
switchname MDS9509
username admin password 5 $1$Li8/fBYX$SNc72.xt4nTXpSnR9OUFB/ role network-admin


switch#
```

```
        name:VSAN0001 stalactites
        interoperability mode:yes <------------------
        loadbalancing:src-id/dst-id/oxid
        operational state:up
```

Step 5

```
Interface              Role          RCF-reject
----------------    -------------    ------------
fc2/1               Downstream       Disabled
fc2/2               Downstream       Disabled
fc2/7               Upstream         Disabled
----------------    -------------    ------------
```

Step 6

Step 7 Use the command to verify the next hop and destination for the switch.

Step 8

```
0x651500    N     10:00:00:e0:69:f0:43:9f (JNI)

Total number of entries = 12
```

	Default

Parameters	Default