# Managing FLOGI, Name Server, FDMI, and RSCN Databases

This chapter describes the fabric login database, the name server features, the Fabric-Device Management Interface, and Registered State Change Notification (RSCN) information provided in the Cisco MDS 9000 Family. It includes the following sections:

- Displaying FLOGI Details, page 15-1
- Configuring the Name Server Proxy Feature, page 15-3
- Displaying FDMI, page 15-5
- Displaying RSCN Information, page 15-7

## Displaying FLOGI Details

In a Fibre Channel fabric, each host or disk requires an FC ID. Use the **show flogi** command to verify if a storage device is displayed in the fabric login (FLOGI) table as in the following examples. If the required device is displayed in the FLOGI table, the fabric login is successful. Examine the FLOGI database on a switch that is directly connected to the host HBA and connected ports. See Examples 15-1 to 15-4.

**Example 15-1** **Displays Details on the FLOGI Database**

```
switch# show flogi database
---------------------------------------------------------------------
INTERFACE  VSAN   FCID       PORT NAME             NODE NAME
---------------------------------------------------------------------
sup-fc0    2      0xb30100   10:00:00:05:30:00:49:63  20:00:00:05:30:00:49:5e
fc9/13     1      0xb200e2   21:00:00:04:cf:27:25:2c  20:00:00:04:cf:27:25:2c
fc9/13     1      0xb200e1   21:00:00:04:cf:4c:18:61  20:00:00:04:cf:4c:18:61
fc9/13     1      0xb200d1   21:00:00:04:cf:4c:18:64  20:00:00:04:cf:4c:18:64
fc9/13     1      0xb200ce   21:00:00:04:cf:4c:16:fb  20:00:00:04:cf:4c:16:fb
fc9/13     1      0xb200cd   21:00:00:04:cf:4c:18:f7  20:00:00:04:cf:4c:18:f7

Total number of flogi = 6.
```

**Example 15-2** **Displays the FLOGI Database by Interface**

```
switch# show flogi database interface fc1/11
INTERFACE  VSAN   FCID       PORT NAME                NODE NAME
---------- ------ ---------- ----------------------- ---------------------
fc1/11     1      0xa002ef   21:00:00:20:37:18:17:d2  20:00:00:20:37:18:17:d2
```

```
fc1/11    1      0xa002e8   21:00:00:20:37:38:a7:c1   20:00:00:20:37:38:a7:c1
fc1/11    1      0xa002e4   21:00:00:20:37:6b:d7:18   20:00:00:20:37:6b:d7:18
fc1/11    1      0xa002e2   21:00:00:20:37:18:d2:45   20:00:00:20:37:18:d2:45
fc1/11    1      0xa002e1   21:00:00:20:37:39:90:6a   20:00:00:20:37:39:90:6a
fc1/11    1      0xa002e0   21:00:00:20:37:36:0b:4d   20:00:00:20:37:36:0b:4d
fc1/11    1      0xa002dc   21:00:00:20:37:5a:5b:27   20:00:00:20:37:5a:5b:27
fc1/11    1      0xa002da   21:00:00:20:37:18:6f:90   20:00:00:20:37:18:6f:90
fc1/11    1      0xa002d9   21:00:00:20:37:5b:cf:b9   20:00:00:20:37:5b:cf:b9
fc1/11    1      0xa002d6   21:00:00:20:37:46:78:97   20:00:00:20:37:46:78:97

Total number of flogi = 10.
```

*Example 15-3   Displays the FLOGI Database by VSAN*

```
switch# show flogi database vsan 1
-------------------------------------------------------------------------------
INTERFACE  VSAN   FCID       PORT NAME                 NODE NAME
-------------------------------------------------------------------------------
fc1/3     1      0xef02ef   22:00:00:20:37:18:17:d2   20:00:00:20:37:18:17:d2
fc1/3     1      0xef02e8   22:00:00:20:37:38:a7:c1   20:00:00:20:37:38:a7:c1
fc1/3     1      0xef02e4   22:00:00:20:37:6b:d7:18   20:00:00:20:37:6b:d7:18
fc1/3     1      0xef02e2   22:00:00:20:37:18:d2:45   20:00:00:20:37:18:d2:45
fc1/3     1      0xef02e1   22:00:00:20:37:39:90:6a   20:00:00:20:37:39:90:6a
fc1/3     1      0xef02e0   22:00:00:20:37:36:0b:4d   20:00:00:20:37:36:0b:4d
fc1/3     1      0xef02dc   22:00:00:20:37:5a:5b:27   20:00:00:20:37:5a:5b:27
fc1/3     1      0xef02da   22:00:00:20:37:18:6f:90   20:00:00:20:37:18:6f:90
fc1/3     1      0xef02d9   22:00:00:20:37:5b:cf:b9   20:00:00:20:37:5b:cf:b9
fc1/3     1      0xef02d6   22:00:00:20:37:46:78:97   20:00:00:20:37:46:78:97

Total number of flogi = 10.
```

*Example 15-4   Displays the FLOGI Database by FC ID*

```
switch# show flogi database fcid 0xef02e2
-------------------------------------------------------------------------------
INTERFACE  VSAN   FCID       PORT NAME                 NODE NAME
-------------------------------------------------------------------------------
fc1/3     1      0xef02e2   22:00:00:20:37:18:d2:45   20:00:00:20:37:18:d2:45

Total number of flogi = 1.
```

See the "Allocating Flat FC IDs" section on page 29-19 and the "Enabling Loop Monitoring" section on page 29-20.

# Configuring the Name Server Proxy Feature

The name server functionality maintains a database containing the attributes for all hosts and storage devices in each VSAN. Name servers allow a database entry to be modified by a device that originally registered the information.

The proxy feature is useful when you wish to modify (update or delete) the contents of a database entry that was previously registered by a different device.

All name server registration requests come from the same port whose parameter is registered or changed. If it doesn't, then the request is rejected.

This authorization enables WWNs to register specific parameters for another node.

## Registering Name Server Proxies

To register the name server proxy, follow these steps:

|       | Command | Purpose |
|-------|---------|---------|
| Step 1 | `switch# config t`<br>`switch(config)#` | Enters configuration mode. |
| Step 2 | `switch(config)# fcns proxy-port 21:00:00:e0:8b:00:26:d0 vsan 2` | Configures a proxy port for the specified VSAN. |

## Displaying Name Server Database Entries

The name server stores name entries for all hosts in the FCNS database. The name server permits an Nx port to register attributes during a PLOGI (to the name server) to obtain attributes of other hosts. These attributes are deregistered when the Nx port logs out either explicitly or implicitly.

In a multiswitch fabric configuration, the name server instances running on each switch shares information in a distributed database. One instance of the name server process runs on each switch.

Use the **show fcns** command to display the name server database and statistical information for a specified VSAN or for all VSANs (see Examples 15-5 to 15-8).

***Example 15-5   Displays the Name Server Database***

```
switch# show fcns database
-------------------------------------------------------------------------
FCID       TYPE  PWWN                   (VENDOR)        FC4-TYPE:FEATURE
-------------------------------------------------------------------------
0x010000   N     50:06:0b:00:00:10:a7:80                scsi-fcp fc-gs
0x010001   N     10:00:00:05:30:00:24:63 (Andiamo)      ipfc
0x010002   N     50:06:04:82:c3:a0:98:52 (Company 1)    scsi-fcp 250
0x010100   N     21:00:00:e0:8b:02:99:36 (Company A)    scsi-fcp
0x020000   N     21:00:00:e0:8b:08:4b:20 (Company A)
0x020100   N     10:00:00:05:30:00:24:23 (Andiamo)      ipfc
0x020200   N     21:01:00:e0:8b:22:99:36 (Company A)    scsi-fcp
```

***Example 15-6   Displays the Name Server Database for the Specified VSAN***

```
switch# show fcns database vsan 1
VSAN 1:
--------------------------------------------------------------------------
FCID        TYPE  PWWN                    (VENDOR)        FC4-TYPE:FEATURE
--------------------------------------------------------------------------
0x030001    N     10:00:00:05:30:00:25:a3 (Cisco)        ipfc
0x030101    NL    10:00:00:00:77:99:60:2c (Interphase)
0x030200    N     10:00:00:49:c9:28:c7:01
0xec0001    NL    21:00:00:20:37:a6:be:14 (Seagate)      scsi-fcp

Total number of entries = 4
```

***Example 15-7   Displays the Name Server Database Details***

```
switch# show fcns database detail
-----------------------
VSAN:1    FCID:0x030001
-----------------------
port-wwn (vendor)    :10:00:00:05:30:00:25:a3 (Cisco)
node-wwn             :20:00:00:05:30:00:25:9e
class                :2,3
node-ip-addr         :0.0.0.0
ipa                  :ff ff ff ff ff ff ff ff
fc4-types:fc4_features:ipfc
symbolic-port-name   :
symbolic-node-name   :
port-type            :N
port-ip-addr         :0.0.0.0
fabric-port-wwn      :00:00:00:00:00:00:00:00
hard-addr            :0x000000
-----------------------
VSAN:1    FCID:0xec0200
-----------------------
port-wwn (vendor)    :10:00:00:5a:c9:28:c7:01
node-wwn             :10:00:00:5a:c9:28:c7:01
class                :3
node-ip-addr         :0.0.0.0
ipa                  :ff ff ff ff ff ff ff ff
fc4-types:fc4_features:
symbolic-port-name   :
symbolic-node-name   :
port-type            :N
port-ip-addr         :0.0.0.0
fabric-port-wwn      :22:0a:00:05:30:00:26:1e
hard-addr            :0x000000

Total number of entries = 2
```

***Example 15-8   Displays the Name Server Statistics***

```
switch# show fcns statistics
registration requests received = 27
deregistration requests received = 0
queries received = 57
queries sent = 10
reject responses sent = 14
RSCNs received = 0
RSCNs sent = 0
```

# Displaying FDMI

Cisco MDS SAN-OS Release 1.3(x) provides support for the Fabric-Device Management Interface (FDMI) functionally, as described in the FC-GS-4 standard. FDMI enables management of devices such as Fibre Channel Host Bus Adapters (HBAs) through inband communications. This addition complements the existing Fibre Channel name server and management server functions.

Using the FDMI functionality, the SAN-OS software can extract the following management information about attached HBAs and host operating systems without installing proprietary host agents:

- Manufacturer, model, and serial number
- Node name and node symbolic name
- Hardware, driver, and firmware versions
- Host operating system (OS) name and version number

All FDMI entries are stored in persistent storage and are retrieved when the FDMI process is started.

Use the **show fdmi** command to display the FDMI database information (see Examples 15-9 to 15-11).

***Example 15-9   Displays All HBA Management Servers***

```
switch# show fdmi database
Registered HBA List for VSAN 1
  10:00:00:00:c9:32:8d:77
  21:01:00:e0:8b:2a:f6:54
switch# show fdmi database detail
Registered HBA List for VSAN 1
-------------------------------
HBA-ID: 10:00:00:00:c9:32:8d:77
-------------------------------
Node Name       :20:00:00:00:c9:32:8d:77
Manufacturer    :Emulex Corporation
Serial Num      :0000c9328d77
Model           :LP9002
Model Description:Emulex LightPulse LP9002 2 Gigabit PCI Fibre Channel Adapter
Hardware Ver    :2002606D
Driver Ver      :SLI-2 SW_DATE:Feb 27 2003, v5-2.20a12
ROM Ver         :3.11A0
Firmware Ver    :3.90A7
OS Name/Ver     :Window 2000
CT Payload Len   :1300000
  Port-id: 10:00:00:00:c9:32:8d:77
-------------------------------
HBA-ID: 21:01:00:e0:8b:2a:f6:54
-------------------------------
Node Name       :20:01:00:e0:8b:2a:f6:54
Manufacturer    :QLogic Corporation
Serial Num      :\74262
Model           :QLA2342
Model Description:QLogic QLA2342 PCI Fibre Channel Adapter
Hardware Ver    :FC5010409-10
Driver Ver      :8.2.3.10 Beta 2 Test 1 DBG (W2K VI)
ROM Ver         :1.24
Firmware Ver    :03.02.13.
OS Name/Ver     :500
CT Payload Len   :2040
  Port-id: 21:01:00:e0:8b:2a:f6:54
```

***Example 15-10 Displays HBA Details for a Specified VSAN***

```
switch# show fdmi database detail vsan 1
Registered HBA List for VSAN 1
-------------------------------
HBA-ID: 10:00:00:00:c9:32:8d:77
-------------------------------
Node Name        :20:00:00:00:c9:32:8d:77
Manufacturer     :Emulex Corporation
Serial Num       :0000c9328d77
Model            :LP9002
Model Description:Emulex LightPulse LP9002 2 Gigabit PCI Fibre Channel Adapter
Hardware Ver     :2002606D
Driver Ver       :SLI-2 SW_DATE:Feb 27 2003, v5-2.20a12
ROM Ver          :3.11A0
Firmware Ver     :3.90A7
OS Name/Ver      :Window 2000
CT Payload Len   :1300000
  Port-id: 10:00:00:00:c9:32:8d:77
-------------------------------
HBA-ID: 21:01:00:e0:8b:2a:f6:54
-------------------------------
Node Name        :20:01:00:e0:8b:2a:f6:54
Manufacturer     :QLogic Corporation
Serial Num       :\74262
Model            :QLA2342
Model Description:QLogic QLA2342 PCI Fibre Channel Adapter
Hardware Ver     :FC5010409-10
Driver Ver       :8.2.3.10 Beta 2 Test 1 DBG (W2K VI)
ROM Ver          :1.24
Firmware Ver     :03.02.13.
OS Name/Ver      :500
CT Payload Len   :2040
  Port-id: 21:01:00:e0:8b:2a:f6:54
```

***Example 15-11 Displays Details for the Specified HBA Entry***

```
switch# show fdmi database detail hba-id 21:01:00:e0:8b:2a:f6:54 vsan 1

Node Name        :20:01:00:e0:8b:2a:f6:54
Manufacturer     :QLogic Corporation
Serial Num       :\74262
Model            :QLA2342
Model Description:QLogic QLA2342 PCI Fibre Channel Adapter
Hardware Ver     :FC5010409-10
Driver Ver       :8.2.3.10 Beta 2 Test 1 DBG (W2K VI)
ROM Ver          :1.24
Firmware Ver     :03.02.13.
OS Name/Ver      :500
CT Payload Len   :2040
  Port-id: 21:01:00:e0:8b:2a:f6:54
```

# Displaying RSCN Information

The Registered State Change Notification (RSCN) is a Fibre Channel service that informs hosts about changes in the fabric. Hosts can receive this information by registering with the fabric controller (through SCR). These notifications provide a timely indication of one or more of the following events:

- Disks joining or leaving the fabric.
- A name server registration change.
- A new zone enforcement.
- IP address change.
- Any other similar event that affects the operation of the host.

Apart from sending these events to registered hosts, a switch RSCN (SW-RSCN) is sent to all reachable switches in the fabric.

> **Note** The switch sends an RSCN to notify registered nodes that a change has occurred. It is up to the nodes to query the name server again to obtain the new information. The details of the changed information are not delivered by the switch in the RSCN sent to the nodes.

Use the **show rscn** command to display RSCN information (see Examples 15-12 and 15-13).

***Example 15-12 Displays Register Device Information***

```
switch# show rscn scr-table vsan 1
SCR table for VSAN: 1
---------------------------------------------
FC-ID          REGISTERED FOR
---------------------------------------------
0x1b0300       fabric detected rscns

Total number of entries = 1
```

> **Note** The SCR table cannot be configured. It is only populated if one or more hosts send SCR frames to register for RSCN information. If the **show rscn scr-table** command does not return any entries, no host is interested in receiving RSCN information.

***Example 15-13 Displays RSCN Counter Information***

```
switch# show rscn statistics vsan 1

Statistics for VSAN: 1
------------------------

Number of SCR received       = 8
Number of SCR ACC sent       = 8
Number of SCR RJT sent       = 0
Number of RSCN received      = 0
Number of RSCN sent          = 24
Number of RSCN ACC received  = 24
Number of RSCN ACC sent      = 0
Number of RSCN RJT received  = 0
Number of RSCN RJT sent      = 0
Number of SW-RSCN received   = 6
Number of SW-RSCN sent       = 15
```

```
Number of SW-RSCN ACC received = 15
Number of SW-RSCN ACC sent     = 6
Number of SW-RSCN RJT received = 0
Number of SW-RSCN RJT sent     = 0
```

# Sending RSCNs

If the RSCN **multi-pid** option is enabled, then RSCNs generated to the registered Nx ports may contain more than one affected port IDs. In this case, zoning rules are applied before putting the multiple affected port IDs together in a single RSCN. By enabling this option, you can reduce the number of RSCNs.

For example: Suppose you have two disks (D1, D2) and a host (H) connected to switch 1. Host H is registered to receive RSCNs. D1, D2 and H belong to the same zone. If disks D1 and D2 are online at the same time, then one of the following applies:

- If the **multi-pid** option is disabled on switch 1, then two RSCNs is generated to host H—one for the disk D1 and another for disk D2.

- If the **multi-pid** format is enabled on switch 1, then a single RSCN is generated to host H, and the RSCN payload lists the affected port IDs (in this case, both D1 and D2).

To configure the **multi-pid** option, follow these steps:

|  | **Command** | **Purpose** |
|---|---|---|
| **Step 1** | switch# **config t**<br>switch(config)# | Enters configuration mode. |
| **Step 2** | switch(config)# **rscn multi-pid vsan 105** | Sends RSCNs in a multi-pid format for the specified VSAN. |

**Note**    Some Nx ports may not understand multi-pid RSCN payloads. If so, you must disable the **multi-pid** RSCN option.

# Clearing RSCN Statistics

Use the **clear rscn statistics** command to clear the RSCN statistics for the specified VSAN.

```
switch# clear rscn statistics vsan 1
```

After clearing the RSCN statistics, you can view the cleared counters by issuing the **show rscn** command.

```
switch# show rscn statistics vsan 1

Statistics for VSAN: 1
------------------------

Number of SCR received        = 0
Number of SCR ACC sent        = 0
Number of SCR RJT sent        = 0
Number of RSCN received       = 0
Number of RSCN sent           = 0
Number of RSCN ACC received   = 0
Number of RSCN ACC sent       = 0
Number of RSCN RJT received   = 0
Number of RSCN RJT sent       = 0
```

```
Number of SW-RSCN received    = 0
Number of SW-RSCN sent        = 0
Number of SW-RSCN ACC received = 0
Number of SW-RSCN ACC sent    = 0
Number of SW-RSCN RJT received = 0
Number of SW-RSCN RJT sent    = 0
```

This command is used for debugging purposes. You can clear the counters and later view the counters for a different set of events. For example, you can keep track of how many RSCNs or SW-RSCNs are generated on a particular event (like ONLINE or OFFLINE events). You can use these statistics to monitor responses for each event in the VSAN.