



Getting Started

This chapter describes how to install and configure the Cisco MDS DMM software. The required tasks are described in the following sections:

- [Installing Cisco MDS DMM Software, page 2-11](#)
- [Using DMM Software Licenses, page 2-11](#)
- [Deployment Guidelines, page 2-13](#)
- [DMM Management Installation and Configuration Tools, page 2-13](#)
- [Configuring IP Connectivity, page 2-14](#)
- [Enabling the DMM Feature, page 2-17](#)
- [Configuring Migration Rate, page 2-22](#)

Installing Cisco MDS DMM Software

The Cisco MDS DMM feature runs on the MSM-18/4 module or the MDS 9222i switch.



Note

Cisco MDS NX-OS Release 5.0(1) no longer supports the Storage Services Module (SSM) (DS-X9032-SSM).

Cisco Fabric Manager 5.0(1) does support the SSM and can be used to configure an SSM running SAN-OS 3.x or NX-OS 4.x software.

The DMM software package is included in the SSI image as a part of the SAN-OS or NX-OS.

For information on how to install the MSM-18/4 module, MDS 9222i or the MDS 9250i switch image, refer to *Cisco MDS 9000 Family Storage Services Interface Image Installation and Upgrade Guide*.

Using DMM Software Licenses

[Table 2-1](#) lists the Cisco DMM licenses that are available.

Table 2-1 Cisco DMM Licenses

Part Number	Description	Applicable Product
M9250IDMMK9	Cisco Data Mobility Manager (DMM) permanent license for MDS 9250i switch	MDS 9250i switch only
M9250IDMMT6M	Cisco Data Mobility Manager (DMM) time-based license for MDS 9250i switch (for 180 days)	MDS 9250i switch only
M95DMM184K9	Cisco Data Mobility Manager (DMM) permanent license for MSM-18/4 module	MDS 9500 Series with MSM-18/4 module
M95DMM184TSK9	Cisco Data Mobility Manager (DMM) time-based license for MSM-18/4 module (for 180 days)	MDS 9500 Series with MSM-18/4 module
M92DMM184K9	Cisco Data Mobility Manager (DMM) permanent license for MSM-18/4 module	MDS 9200 Series with MSM-18/4 module
M92DMM184TSK9	Cisco Data Mobility Manager (DMM) time-based license for MSM-18/4 module (for 180 days)	MDS 9200 Series with MSM-18/4 module
M9222iDMMK9	Cisco Data Mobility Manager (DMM) permanent license for fixed slot	MDS 9222i Switch only
M9222IDMMTSK9	Cisco Data Mobility Manager (DMM) time-based license (for 180 days) for fixed slot	MDS 9222i Switch only
M95DMMS1K9	Cisco Data Mobility (DMM) permanent license for one MSM-18/4 module or MDS 9222i switch	MDS 9500 Series with MSM-18/4 module or MDS 9222i switch
M95DMMTS1K9	Cisco Data Mobility (DMM) time-based license for one MSM-18/4 module or MDS 9222i switch (for 180 days)	MDS 9500 Series with MSM-18/4 module or MDS 9222i switch
M92DMMS1K9	Cisco Data Mobility (DMM) permanent license for one MSM-18/4 module or MDS 9222i switch	MDS 9200 Series with MSM-18/4 module or MDS 9222i switch
M92DMMTS1K9	Cisco Data Mobility (DMM) time-based license for one MSM-18/4 module or MDS 9222i switch (for 180 days)	MDS 9200 Series with MSM-18/4 module or MDS 9222i switch

**Note**

You can use the Cisco MDS 9000 Family DMM software for a period of 120 days.

You can purchase a DMM license for an MSM-18/4 module or MDS 9222i switch in a fabric that does not have a Fabric Manager license. In this configuration, you can open multiple fabrics in Fabric Manager and use the DMM functionality. Full Fabric Manager functionality is not available. For example, performance manager, desktop client remote login, and web client fabric reporting are not available without a Fabric Manager license.

**Note**

If the DMM license for an MSM-18/4 module or MDS 9222i switch expires, all scheduled and in-progress jobs will continue to execute. You cannot create new jobs with an expired license.

For more information about installing or upgrading software licenses, refer to *Cisco MDS 9000 Family NX-OS Licensing Guide*.

Deployment Guidelines

When planning and configuring data migration using Cisco MDS DMM, follow these deployment guidelines:

- The MSM-18/4 module or the MDS 9222i switch should be installed in the same MDS switch as the existing storage device and the new storage device should be connected to the same switch. Data migration causes increased Inter-Switch Link (ISL) traffic if the existing storage or new storage devices are connected to different switches than the MSM-18/4 module or the MDS 9222i switch.
- Cisco MDS DMM supports 16 simultaneous jobs on each MSM-18/4 module or MDS 9222i switch.
- The same initiator and target port pair should not be added into more than one migration job simultaneously.
- When using multipath ports, the server must not send simultaneous I/O write requests to the same LUN from both multipath ports. The first I/O request must be acknowledged as completed before initiating the second I/O request.
- DMM is not compatible with LUN zoning.
- DMM is not compatible with inter-VSAN routing (IVR). The server and storage ports must be included in the same VSAN.
- DMM does not support migrations between VSANs (IVR). The DMM member ports, Initiators, Existing Storage (ES), and New Storage (NS) targets within the same VSAN should also not be configured as part of an IVR zone set.
- DMM is not compatible with SAN device virtualization (SDV). The server and storage ports cannot be virtual devices, or physical devices associated with a virtual device.
- For assistance on DMM and FC/IP write acceleration, contact Cisco support.
- DMM does not support migration to a smaller destination LUN.

DMM Management Installation and Configuration Tools

Cisco MDS DMM supports a CLI tool and a GUI tool for configuring and managing data migrations. The tools are described in this section:

- [DMM CLI, page 2-14](#)

DMM CLI

The Cisco MDS DMM feature uses the CLI on the Cisco MDS 9000 Family switches, including the MDS 9222i switch and MSM-18/4 module.

No DMM-specific tasks are required to install or configure the CLI.

Configuring SSH on the Switch

The Cisco MDS DMM communicates with the MSM-18/4 module or MDS 9222i switch using a secure shell protocol (SSH) connection. Before using the Cisco MDS DMM, you need to enable SSH on the switch that hosts the MSM-18/4 module or MDS 9222i switch.

For information about configuring SSH, see the SSH chapter of the *Cisco Fabric Manager Security Configuration Guide* and the *Cisco MDS 9000 Family NX-OS Security Configuration Guide*.

Configuring IP Connectivity

This section covers the configuration of IP connectivity for the following modules

- [Configuring IP Connectivity for MSM-18/4 Modules, page 2-14](#)
- [Configuring IP Connectivity for MDS 9222i or the MDS 9250i Switches, page 2-16](#)

Configuring IP Connectivity for MSM-18/4 Modules

The MSM-18/4 module and the supervisor module in an MDS switch communicate over VSAN 1 using IP. You need to configure an IP subnetwork for VSAN 1 on the MDS switch.

The MSM-18/4 modules communicate with their peer MSM-18/4 modules using the management IP network. (See [Figure 2-1](#).)

Each DMM-enabled MSM-18/4 module on the management IP network must have a unique subnetwork address configured for VSAN 1.

Configuring IP over Fibre Channel (IPFC) for an MSM-18/4 module consists of the following tasks:

- Create the VSAN 1 interface and configure an IP address for this interface.
The IP subnet can use a private address space because these addresses will not be advertised. As noted, the subnet number needs to be unique for each MSM-18/4 module enabled MDS switch that is connected to the same management IP subnetwork.
- Create a CPP interface (with an IP address) on each MSM-18/4 module on the switch.
CPP IP addresses needs to be in the same subnet as the VSAN 1 interface.
- Configure zoning.
The CPP interfaces and the VSAN 1 interface need to be zoned together.
- Enable IPv4 routing.
- Configure the default gateway for each CPP interface.

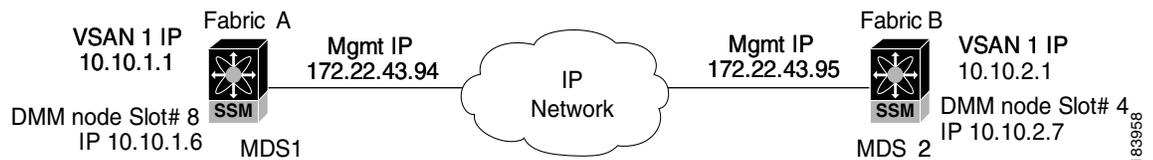
Configure the default-gateway for the CPP interface to point to the VSAN 1 IP address, so that all IP traffic from the CPP interface is routed to the management interface.



Note Beginning with MDS NX-OS Release 4.2(1) the default-gateway for the CPP interface can be configured on Fabric Manager. For more information, refer to the *Cisco Fabric Manager IP Services Configuration Guide*.

- Configure static routes as required to access the peer MSM-18/4 modules.
Configure static routes in the switch to each MSM-18/4 enabled peer module to enable routing of packets between peer MSM-18/4 modules.

Figure 2-1 IP Configuration



The following example is based on the configuration and subnetwork numbers. (See Figure 2-1.)

The example shows the configuration for MDS 9222i switch1:

- Create VSAN 1 and configure it with an IP address:


```
switch# configure terminal
switch(config)# interface vsan 1
switch(config-if)# ip address 10.10.1.1 255.255.255.0
switch(config-if)# no shutdown
switch(config-if)# exit
```
- Create the CPP IPFC interface, and configure an IP address:


```
switch(config)# interface cpp 8/1/1
switch(config-if)# ip address 10.10.1.6 255.255.255.0
switch(config-if)# no shutdown
switch(config-if)# exit
```
- Configure a new zone to include the pWWN of the CPP interface on the MSM-18/4 module and the VSAN 1 interface on the supervisor:


```
switch(config)# zone name DMM_IP_MGMT vsan 1
switch(config-zone)# member pwn 22:00:00:20:37:39:15:09
switch(config-zone)# member pwn 21:00:00:e0:8b:05:76:28
switch(config-zone)# exit
```

The zone created for the IPFC interfaces must be added to the existing zone set in VSAN 1 and the zone set must be re-activated to include the new zone. If a zone set does not exist in VSAN 1, create a zone set. Add the zone to the zone set and activate the zone set.

For additional information about creating and activating a zone set, refer to the *Cisco Fabric Manager Security Configuration Guide* and the *Cisco MDS 9000 Family NX-OS Security Configuration Guide*.

- Enable IPv4 routing:


```
switch(config)# ip routing
```
- Configure the default gateway for the MSM-18/4 modules:


```
switch(config)# ip default-gateway 10.10.1.1 interface cpp 8/1/1
```

- Configure static route to access the peer MSM-18/4 modules:

```
switch(config)# ip route 10.10.2.0 255.255.255.0 172.22.43.95
```

You can also create a host specific route to point to the IPFC interface on the peer:

```
ip route 10.10.2.1 255.255.255.255 172.22.43.95
```

The following example shows the configuration for MDS 9222i switch2 (Figure 2-1):

```
switch# configure terminal
switch(config)# interface vsan 1
switch(config-if)# ip address 10.10.2.1 255.255.255.0
switch(config-if)# no shutdown
switch(config-if)# exit

switch(config)# interface cpp 4/1/1
switch(config-if)# ip address 10.10.2.7 255.255.255.0
switch(config-if)# no shutdown
switch(config-if)# exit

switch(config)# zone name DMM_IP_MGMT vsan 1
switch(config-zone)# member pwwn 22:00:00:20:25:19:25:11
switch(config-zone)# member pwwn 21:00:00:c0:7d:76:04:15
switch(config-zone)# exit

switch(config)# ip routing

switch(config)# ip default-gateway 10.10.2.1 interface cpp 4/1/1

switch(config)# ip route 10.10.1.1 255.255.255.0 172.22.43.94
```

For additional information about configuring IPFC, refer to the *Cisco Fabric Manager IP Services Configuration Guide* and the *Cisco MDS 9000 Family NX-OS IP Services Configuration Guide*.

Configuring IP Connectivity for MDS 9222i or the MDS 9250i Switches

Configuring IPFC for an MDS 9222i or the MDS 9250i Switches (without an MSM-18/4 module in slot 2) includes the following tasks:

- Create the VSAN 1 interface and configure an IP address for this interface.

```
switch# configure terminal
switch(config)# interface vsan 1
switch(config-if)# no shutdown
switch(config-if)# ip address 10.1.1.1 255.255.255.0
switch(config-if)# exit
```

A CPP IPFC interface does not need to be created for this module.

- Use the **show interface** command to verify if the VSAN 1 interface is online.

```
switch# show interface vsan 1
vsan1 is up, line protocol is up
  WWPN is 10:00:00:0d:ec:39:08:01, FCID is 0x33000d
  Internet address is 10.1.1.1/24
```

- A VSAN is online only if there is at least one other device logged into the VSAN.

If VSAN 1 does not have any other devices except the VSAN 1 interface, VSAN 1 will be offline and following outputs are displayed for the **show** and **ping** commands.

```
switch# show interface vsan 1
vsan1 is up, line protocol is down (port down)
```

```

WVFN is 10:00:00:0d:ec:4a:ba:01, FCID not assigned
Internet address is 10.1.3.1/24
MTU 1500 bytes, BW 1000000 Kbit
0 packets input, 0 bytes, 0 errors, 0 multicast
0 packets output, 0 bytes, 0 errors, 0 dropped

```

```

switch# show fcns database vsan 1
There are no entries in the database

```

```

switch# show flogi database vsan 1
No flogi sessions found.

```

```

switch# ping 10.1.3.1
interface is down

```

- To bring VSAN 1 to the online status, configure another device to log into VSAN 1.

```

switch# configure terminal
switch(config)# vsan database
switch(config-vsan-db)# interface fc1/4
switch(config-if)# terminal monitor
switch(config-if)# no shutdown

```

Use the **show interface** and **ping** commands to view the status and the information of VSAN 1.

```

switch# show interface vsan 1
vsan1 is up, line protocol is up
WVFN is 10:00:00:0d:ec:4a:ba:01, FCID is 0x1e0003
Internet address is 10.1.3.1/24
MTU 1500 bytes, BW 1000000 Kbit
0 packets input, 0 bytes, 0 errors, 0 multicast
6 packets output, 384 bytes, 0 errors, 0 dropped

switch# ping 10.1.3.1
PING 10.1.3.1 (10.1.3.1) 56(84) bytes of data.
64 bytes from 10.1.3.1: icmp_seq=1 ttl=64 time=0.075 ms
64 bytes from 10.1.3.1: icmp_seq=2 ttl=64 time=0.073 ms

```

Enabling the DMM Feature

You can use the CLI or the Fabric Manager GUI to enable the DMM feature. The methods are described in the following sections:

- Enabling DMM with the CLI, page 2-17

Enabling DMM with the CLI

To enable DMM on an MSM-18/4 module or MDS 9222i switch and to provision ports to use the DMM feature, perform these tasks:



Note

Although Cisco MDS NX-OS Release 5.0(1a) no longer supports the SSM, the **ssm enable** command remains in Release 5.0(1a). Use the **ssm enable** command to enable the DMM feature on an MSM-18/4 module or on an MDS 9222i switch.

	Command	Purpose
Step 1	<code>switch# config t</code>	Enters the configuration mode.
Step 2	<code>switch(config)# ssm enable feature dmm module slot</code>	Enables DMM on the MSM-18/4 module or MDS 9222i switch in the specified slot.
	<code>switch(config)# no ssm enable feature dmm module slot</code>	Disables DMM on the MSM-18/4 module or MDS 9222i switch in the specified slot.

Using the DMM Pre-Configuration Wizard



Note

Although NX-OS Release 5.0(1a) does not support the SSM, Fabric Manager 5.0(1a) can be used to configure an SSM running on the SAN-OS 3.x or NX-OS 4.x software.

The DMM Pre-Configuration Wizard performs the following steps so that the DMM-capable module is ready to run the DMM jobs:

1. Configures SSH by doing the following:
 - Enables SSH.
 - Creates key.
2. Configures IP connectivity:
 - Creates the VSAN 1 interface and configures IP.
 - Creates the CPP IPFC interface and configures IP.
3. Enables IPv4 routing.
4. Configures the IP default gateway for the MSM-18/4 module, MDS 9222i or the MDS 9250i switch.
5. Configures static route-to-peer MSM-18/4 module, MDS 9222i, or the MDS 9250i switch (dual fabric only).
6. Configures a zone to include the pWWN of the MSM-18/4 modules or MDS 9222i switches and the supervisor module.
7. Enables the DMM feature.

In the DMM Pre-Configuration Wizard, when you click **Next** at each step, the configuration listed for that step will be performed. For most steps, the **Back** button is disabled in the wizard. However, if an error occurs at any step, you are prevented from moving to the next step until you modify the data and click **Next** again successfully.

If you click **Cancel**, the wizard exits at the step without undoing any of the settings performed by the previous steps. The **Back** option will not be available for the steps in this wizard.

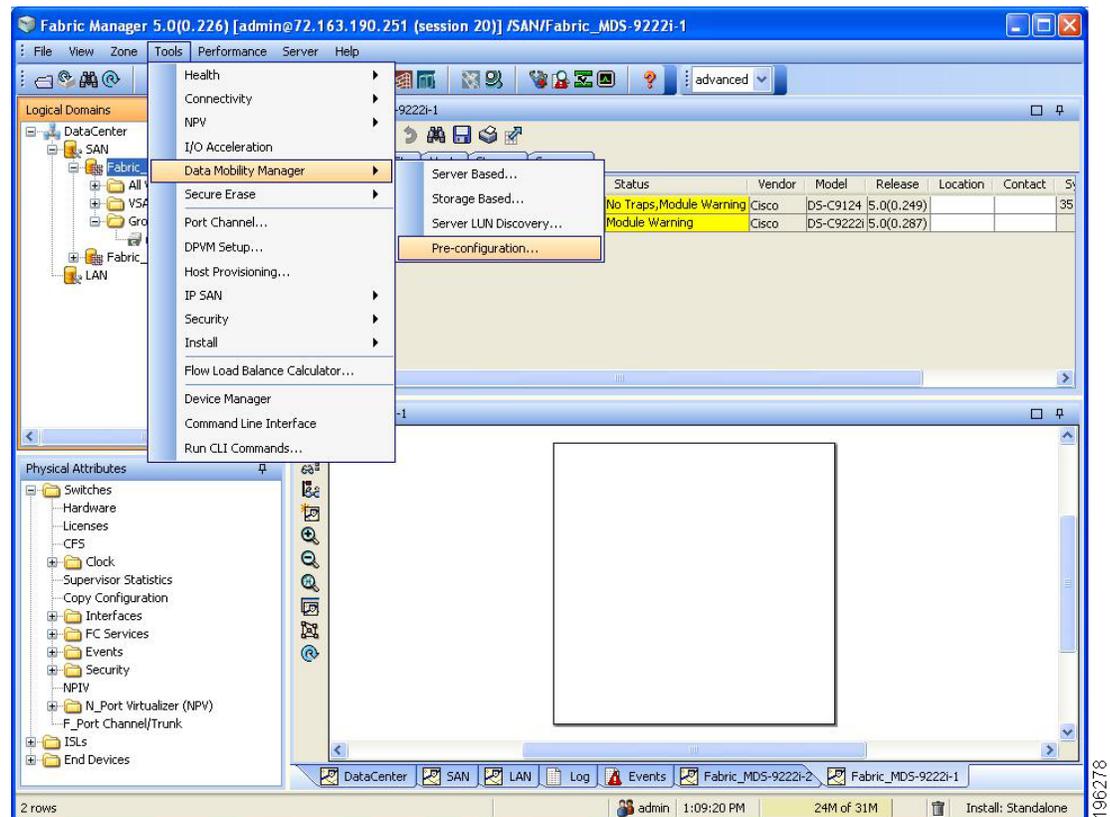
To use the DMM Pre-Configuration Wizard, launch the Fabric Manager GUI after selecting the required fabric .



Note

Before you use the DMM Pre-Configuration Wizard, install the DMM package with the SSI image in the switch. SSH is enabled by the DMM pre-configuration setup.

Figure 2-2 DMM Pre-Configuration



Configuring MDS Modules for DMM

To configure MDS modules for DMM, in the DMM Pre-Configuration Wizard follow these steps:

Step 1 Select the DMM capable modules that you want to configure and click **Next**.

Step 2 The Enable Secure Shell (SSH) screen displays a list of DMM switches.

The table indicates if SSH is enabled and if the key already exists.

a. Click **Next**.

The SSH key is created if the key does not exist already. SSH is enabled. The SSH key is created for protocol RSA with a numbits value of 1024.



Note

If SSH is already enabled on all the switches, then the “No action necessary” message is displayed. Click **Next** to continue.

Step 3 Select a switch from the drop-down list to configure the IP address and mask for the VSAN 1 interface.

a. Click **Add**.

The switch moves from the drop-down list to the table. One entry can be added for each switch.

b. Click **Next**.

The IP address is created and the IPv4 routing is enabled for all the switches that are selected.



Note

The valid mask values are 8, 16, 24, or 32.

If the VSAN 1 IP address is already configured for the switch, then the switch does not appear in the drop-down list.

If all the switches already have their VSAN 1 IP address configured, then a message is displayed. Once you click **Next**, the IPv4 routing is configured.

If you do not add a VSAN 1 IP address for all the switches in the list and click **Next**, an error message is displayed.

Figure 2-3 Error Message for VSAN IP Connectivity



Step 4 Select a switch module from the drop-down list and specify the CPP IP address/mask.

sets the IP address for CPP and configures the default gateway for the CPP interface to point to the VSAN 1 IP address. All IP traffic from the CPP interface is routed to the management interface.

a. Click **Add** to move the switch module from the drop-down list to the table.

The CPP IP address must be in the same subnet as the VSAN 1 IP address or an error message is displayed. Only one entry can be added for each switch module.

b. Click **View necessary gateways**.

c. The Necessary Default Gateways screen is displayed that shows the VSAN 1 IP address that will be used to configure the default gateways for each of the switch modules. It also shows if a default gateway already exists.

d. Click **Next**

The IP address is created and the gateway is configured.



Note

The valid mask values are 8, 16, 24, or 32.

If the CPP IP address is already configured for the switch module, then the module does not appear in the drop-down list.

The MDS 9222i switch or the MDS 9250i switch is not displayed in the drop-down list because it is not necessary to set a separate CPP IP address or default gateway for the MDS 9222i fixed slot.

If all of the switch modules already have their CPP IP addresses configured, then a message is displayed. Click **Next**. The necessary default gateways are configured.

Step 5 In Configure Route to Peer screen (select a switch module and peer switch module from the drop-down lists.

This screen configures static routes in the switch to each DMM enabled peer node to enable routing of packets between the peer MSM-18/4 modules, MDS 9222i or the MDS 9250i switches.

a. Click **Add**.

The selected switch module and peer switch modules are displayed in the Switch, Module table area.

b. Click **Next**.

**Note**

The appropriate routes are created. The routes are created on the local management interface to the peer subnet through this peer management interface. This step is optional and does not need to be performed if you do not need multiple fabric job support. However, if you require multiple fabric job support, check the Multiple Fabric Job Support check box. The other fields are enabled only when this box is selected.

If creating routes fails due to a conflict, an error message is displayed.

Step 6 In the Zoning screen Click **Create/Activate Zones**.

The wizard goes through the fabrics to create the zones. Before creating the zones, the wizard checks if the active and local zone databases match. If there is a mismatch, an input dialog box is displayed. You will be prompted to copy the active zone database to the local zone database. If you click **Yes**, the zones are created on the principal switch for the fabric. If you click **No**, the zone creation is skipped for the zone mismatched fabric. After the zone creation is completed, a pop-up dialog box is displayed that specifies if the zone creation process was successful or if it failed.

If there is an error during zone creation, the **Create/Activate Zones** button is enabled. Click **Create/Activate Zones** again to create the zones that failed previously. Only the zones that failed previously will be created to avoid any duplicate entries in the zones database.

Once all the zones are created successfully on all the fabrics, the **Create/Activate Zones** button is disabled and the **Status** button is enabled. (See (Optional) If you want to do the zoning yourself, follow these steps:

a. Click **Next** without clicking **Create/Activate Zones**.

A warning message is displayed stating that the Zones are not created, and asks if you want to continue to the next step without creating zones.

b. Click **Yes** to continue.

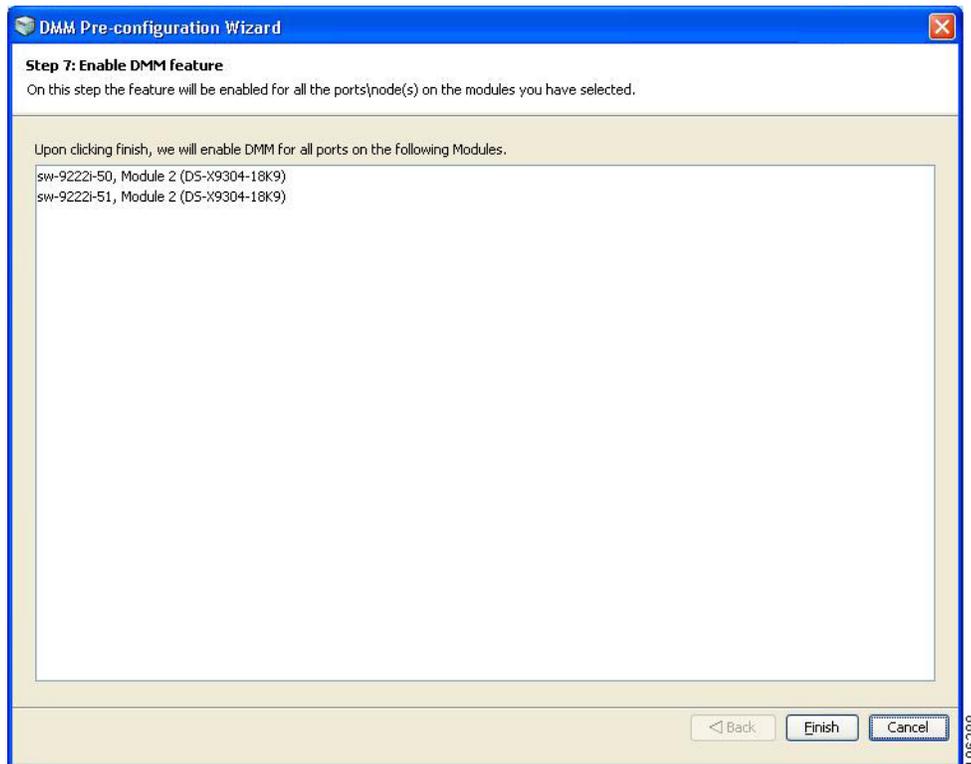
The **Status** button allows you to verify that the zones were added to the active zone database.

**Note**

Zoning is not required for the MDS 9222i switch or the MDS 9250i switch fixed slot because it is also a supervisor and does not need to be zoned with the supervisor's VSAN 1 WWN to allow communication.

The Zoning screen shows all the zones in the active zone database.

Step 7 Click **Finish** to complete the DMM Pre-Configuration Wizard setup.

**Note**

The DMM Pre-Configuration Wizard enables the DMM functionality for all the ports and nodes on the modules selected.

A message appears that shows the status of the setup as success or as a failure. If successful, the **Finish** button is disabled and the **Cancel** button changes to **Close**.

Click **Close** to close the DMM Pre-Configuration Wizard

Configuring Migration Rate

When a migration job is created, you can configure the migration rate as fast, medium, or slow. Use the CLI or the Fabric Manager GUI to configure the values for these rates, as described in the following sections:

- Configuring Migration Rate Using the CLI, page 2-23

Configuring Migration Rate Using the CLI

To configure the values associated with the fast, medium, and slow migration rates, follow this step:

	Command	Purpose
Step 1	<code>switch# config t</code>	Enters the configuration mode.
Step 2	<code>switch(config)# dmm module module-id rate_of_migration fast rate medium rate slow rate</code>	<p>Sets the migration rate for the specified MSM-18/4 module or MDS 9222i switch. The migration rate has a range of 1 to 200 and the units are megabytes per second (MB/s).</p> <p>The default values for migration rate are as follows:</p> <ul style="list-style-type: none"> • Slow: 10 MB/s • Medium: 25 MB/s • Fast: 60 MB/s

The following example sets the fast migration rate to 100 MB/s for the MSM-18/4 module or the MDS 9222i switch in slot 4:

```
switch(config)# dmm module 4 rate_of_migration fast 100 medium 25 slow 10
```



Note

While configuring DMM with two hosts accessing the same storage port on a per-job basis, the rate limit that gets applied will be the lower configured rate because the configured rate is the total bandwidth per existing storage port and not per job. Hosts with active sessions will have this bandwidth shared between them.

